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Telepractice in Speech–Language Therapy: The Use of Online Technologies for Parent Training and Coaching

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Abstract

Researchers and practitioners have found that telepractice is an effective means of increasing access to high-quality services that meet children's unique needs and is a viable mechanism to deliver speech–language services for multiple purposes. We offer a framework to facilitate the implementation of practices that are used in direct speech–language therapy into parent training and coaching. We overlay the use of telepractice onto parent training and coaching to provide a framework that guides the conversion of practices used in direct service to parent training and coaching programs that can be used via telepractice. We include recommendations for addressing common challenges to providing parent training and coaching via telepractice with an example of the framework's application in Early Intervention. Using this framework, speech–language pathologists can combine telepractice with direct services by teaching and coaching parents in the use of strategies to improve their children's communication skills.

Keywords

social communication, family/parent issues, intervention strategies, service delivery, technology

Telepractice refers to services provided from a distance using videoconferencing or other technologies (American Speech–Language–Hearing Association [ASHA], n.d.). Because the technology to support videoconferencing has developed rapidly in recent decades and access to the Internet has become increasingly available (U.S. Department of Commerce, 2013), telepractice has emerged as another means of delivering services, enabling speech–language pathologists (SLPs) to provide effective services to individuals with communication disorders and delays (ASHA, n.d.; Cason, Behl, & Ringwalt, 2012; Keck & Doarn, 2014; McCarthy, 2013). Telepractice has been promoted as a means of overcoming some of the challenges to in-home or clinic-based services. Some examples of these benefits include reducing the expense and time associated with travel and with rescheduling canceled or missed appointments (Anderson, Balandin, Stancliffe, & Layfield, 2014; Cason et al., 2012; Gibson, Pennington, Stenhoff, & Hopper, 2010). In addition, telepractice has been identified as a medium for increasing access to services for clients living in rural areas or in neighborhoods perceived as unsafe by service providers (Carter, Muir, & McLean, 2011). Clients who do not have access to a service provider from their own culture or one who speaks their own language may benefit from telepractice, and clients who cannot travel to receive services as a result of a disability or financial hardship might also benefit from using telepractice (Carter et al., 2011; Pham, 2014). Given the advances in technology and the advantages of telepractice, SLPs are increasingly embracing new technologies to facilitate service delivery to their clients (see http://www.asha.org/SIG/18/).

The purpose of this article is to describe a framework of parent training and coaching that can be used to incorporate strategies SLPs use during direct service to children into supports parents use during home-based activities with their children. By incorporating parent training and coaching into service delivery, SLPs can more easily use telepractice as a means for providing services to children with communication disorders who may not be able to participate in child–therapist direct therapy via telepractice. We provide an example of how we used this framework to incorporate telepractice into communication intervention

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in Early Intervention (EI) services. Although we focus on young children with communication disorders, this framework may be useful for incorporating parent training and coaching and telepractice as a delivery method for a variety of services for other populations. We begin with a brief review of the literature that has addressed telepractice applications in speech–language pathology and identify potential challenges to using telepractice to deliver intervention. We then discuss the use of parent training and coaching as one way to mitigate some of these challenges.

Current Uses in Speech–Language Therapy

Telepractice can be a means for delivering speech therapy with various population groups, ranging from infants to adults, who have speech and communication disorders (e.g., voice disorders, aphasia, articulation, dysarthria, speech sound disorders; Grogan-Johnson et al., 2013; Keck & Doarn, 2014; Theodoros, 2011). Telepractice has also been used to deliver services to individuals who have hearing loss (Galvan, Case, & Todd Houston, 2014; Houston & Stredler-Brown, 2012) and other conditions that affect speech and communication (e.g., schizencephaly, Hall, Boisvert, Jellison, & Andianopoulos, 2014; velo-cardio-facial syndrome, Shprintzen & Golding-Kushner, 2012). Researchers have also employed telepractice to deliver services to individuals with autism spectrum disorder (ASD; Allen & Shane, 2014; Meadan et al., 2016).

In addition to its application with a variety of populations, telepractice has been applied in multiple contexts. For example, Allen and Shane (2014) conducted assessments on the communication abilities of children with autism via telepractice, providing preliminary evidence that communication assessment can be conducted via telepractice for these children. Telepractice also has been used to deliver services in actual intervention or therapy sessions (e.g., Grogan-Johnson et al., 2013; Theodoros, 2011). Finally, telepractice has been embraced as a tool for conversing with, providing consultation to, and providing training and supports to clients, caregivers, and other professionals (Anderson et al., 2014; Galvan et al., 2014; Hall et al., 2014; Meadan et al., 2016). Grogan-Johnson et al. (2013) compared the use of telepractice in the delivery of speech–language therapy services with traditional on-site services, and found no difference with the intervention outcomes between the two service delivery models.

When SLPs adopt telepractice as a medium for providing intervention, they may interact with their client in a variety of ways during the telepractice sessions. They may (a) provide intervention directly to clients by interacting with them via videoconference (e.g., Grogan-Johnson et al., 2013), (b) incorporate online tools and apps that have been created to help clients access the telepractice intervention (Mashima & Doarn, 2008), and/or (c) provide training and support to a caregiver who then works directly with the client (e.g., Meadan et al., 2016; Vismara, McCormick, Young, Nadhan, & Monlux, 2013; Wainer & Ingersoll, 2013).

Challenges With Telepractice

Although these researchers have demonstrated increasingly diverse applications of telepractice in speech–language therapy, SLPs may encounter challenges when attempting to employ telepractice to provide direct intervention services to children. To engage in direct service using videoconferencing, the child must remain within view of the camera, direct his or her attention to the screen, and maintain that attention for the duration of the therapy session, which researchers have noted may be a struggle for children (Gibson et al., 2010; Grogan-Johnson et al., 2013). In addition, because the SLP is not in the same location, he or she cannot move throughout the environment with the child (Anderson et al., 2014) and may find it more difficult to effectively prompt the child (Grogan-Johnson et al., 2013; Keck & Doarn, 2014). The SLP may still need a skilled adult present with the child to assist with technical difficulties, loss of the child's attention, or safety issues (Hall et al., 2014; Tindall, 2013). In addition to these challenges to direct intervention via telepractice, some children may require adaptive equipment to access telepractice technologies (Grogan-Johnson et al., 2013), or they may have an aversive response to some equipment (e.g., headphones; Grogan-Johnson et al., 2013; Keck & Doarn, 2014). For younger children and/or individuals with complex communication needs, these challenges may be exacerbated. Thus, for telepractice to be an effective means of delivering intervention support to children who have communication disorders, adjustments to service delivery methods will likely be necessary. Training and coaching parents as interventionists to support their children's growth is one potential option that addresses these challenges.

Parent Training and Coaching as One Solution

Parents and family members are central to children's development and are typically children's first teachers. They have abundant opportunities to facilitate language development because they are present in their child's daily routines. Parents and family members are the individuals who are most frequently involved in social interactions with their young children (ASHA, 2008; Stoner, Meadan, & Angell, 2013). Thus, parents are readily available to encourage and promote language production in their children across multiple settings and contexts. To address some of the challenges associated with providing direct intervention to children via telepractice, an SLP may choose to assume the

Table 1. Common Technological Infrastructure Needed for Telepractice.

SLP	Client
• Computer, tablet, or smartphone (computer recommended)	• Tablet or smartphone
• Internet connection (25 Mbps or faster is recommended)	• Internet connection (25 Mbps or faster is best) *or* Data package for tablet/smartphone—Only with unlimited data packages

• Videoconferencing software installed on computer or tablet
  ○ Polycom RealPresence, Doxy.me (HIPAA compliant)
  ○ Skype, FaceTime
	• Videoconferencing software installed on tablet/smartphone
	  ○ Same software as SLP

• Secure, online file sharing service account (i.e., cloud) ○ Box, Dropbox, Google Drive	• Secure, online file sharing service account (i.e., cloud)

Note. SLP = speech–language pathologist; HIPAA = Healthcare Insurance Portability and Accountability Act.

role of trainer and coach for parents in addition to providing direct one-on-one intervention with the child. By instructing parents, the SLP empowers them to better support their children's communication development. Through training and coaching, parents learn strategies they can transfer from a therapy setting to everyday routines where naturally occurring communication opportunities with their children abound (Galvan et al., 2014; Mobayed, Collins, Strangis, Schuster, & Hemmeter, 2000; Woods, Kashinath, & Goldstein, 2004).

In addition, researchers have found that parents can be taught and coached to be effective implementers of a wide array of evidence-based communication interventions and strategies, such as discrete trial training (DTT), Joint Attention Symbolic Play Engagement and Regulation (JASPER), pivotal response teaching (PRT), naturalistic language strategies, Enhanced Milieu Teaching (EMT), and strategies such as scaffolding and use of closed-ended questions (Kaderavek & Pakulski, 2007; Kaiser, Hancock, & Nietfield, 2000; Kasari et al., 2014; McConachie & Diggle, 2007; Meadan, Meyer, Snodgrass, & Halle, 2013; Meadan, Ostrosky, Zaghlawan, & Yu, 2009; Paul, Campbell, Gilbert, & Tsiouri, 2013; Roberts & Kaiser, 2011; Yoder, McCathren, Warren, & Watson, 2001). Parent training and coaching have been shown to be effective in producing positive outcomes for parents and their children, including parents' enhanced confidence in supporting their children, children's improved expressive language, and children's increased communication initiation (e.g., Barton & Fettig, 2013; Lang, Machalicek, Rispoli, & Regester, 2009; Meadan & Daczewitz, 2015; Meadan et al., 2009; Roberts & Kaiser, 2011). Training refers to instruction in a target skill that is provided outside of the setting in which the skill will be used (e.g., teaching parents about strategies in a seminar held in a clinic conference room). Coaching is distinguished from training by including observation of the parents using the target strategies in context and providing feedback on their performance. Training and coaching programs to support parent-implemented interventions have been identified as promising and evidence-based practices for children with autism from birth to 11 years of age (Wong et al., 2013). Multiple investigators have demonstrated that parents can learn new strategies and implement them with fidelity, including milieu teaching strategies, aided augmentative and alternative communication (AAC) modeling, and systematic prompting procedures (Dunlap, Ester, Langhans, & Fox, 2006; Kashinath, Woods, & Goldstein, 2006; Meadan, Angell, Stoner, & Daczewitz, 2014; Roberts & Kaiser, 2011; Romski et al., 2010; Schultz, Schmidt, & Stichter, 2011). Thus, using parent training and coaching in both onsite and telepractice service is warranted.

We turn our discussion to one option for implementing practices used in direct speech–language therapy into a parent training and coaching model that can be delivered via telepractice.

Framework for Incorporating Telepractice

Before incorporating telepractice into service delivery, SLPs must first ensure that both they and the families with whom they intend to use telepractice have the technological infrastructure to be successful. Table 1 is an overview of common technologies needed to successfully participate in telepractice. The list of technologies in Table 1 is not intended to be comprehensive. We refer interested readers to other publications for additional information on technologies that have been used in telepractice (see Allen &

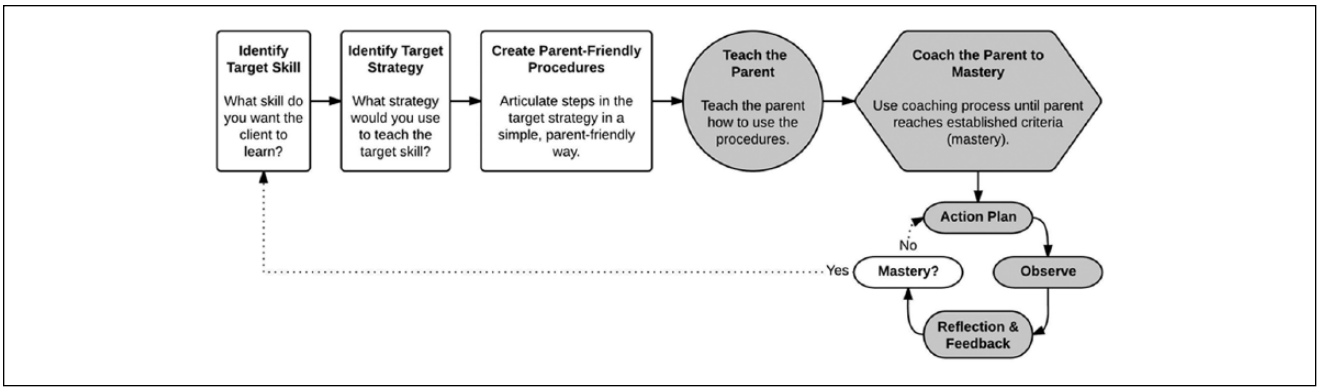

Figure 1. Framework for transitioning to telepractice.
Note. Shapes without shading represent preparation activities that therapists complete prior to engaging in telepractice. Shapes shaded gray represent components delivered to parents that can be conducted via telepractice.

Shane, 2014; Crutchley, Campbell, & Christiana, 2012; Hall et al., 2014; Keck & Doarn, 2014; McCarthy, 2013; Meadan et al., 2013).

Both the SLP and the family must have an adequate Internet connection and a device that supports online videoconferencing, such as a computer, tablet, or smartphone. The recommended minimum Internet speed for videoconferencing is 25 Mbps (U.S. Department of Commerce, 2013), and, in our experience, a cellular data package is only sufficient if the client has an unlimited data plan and lives in an area that has consistent reception to 4G (Fourth Generation) or LTE (Long-Term Evolution) mobile data technology.

Another critical consideration is protection for the SLP and the client's privacy when engaging in telepractice. The Federal Healthcare Insurance Portability and Accountability Act of 1996 (HIPAA; hhs.gov/ocr/hipaa/) mandates the protection of patient health information; the risks of uninvited parties observing telepractice sessions can be mitigated by using an HIPAA-compliant videoconferencing service, such as Polycom RealPresence (polycom.com/products-services/realpresence-platform.html) or Doxy (doxy.me). For additional information regarding HIPAA-compliant telepractice, we direct readers to ASHA's website (http://www.asha.org/practice/reimbursement/hipaa/securityrule/#video).

Once feasibility is assured, we introduce a framework, shown in Figure 1, for implementing practices used in direct speech–language therapy into a parent training and coaching model that can be delivered on-site or via telepractice. First, there are three steps listed in the framework that are necessary to prepare for parent training and coaching (see the white boxes in Figure 1): (a) identifying a target skill, (b) identifying a target strategy, and (c) creating parent-friendly procedures. Next, the procedures for providing parent training and coaching are displayed (see the shaded gray area in Figure 1): teaching the parents and then coaching the parents to mastery. We describe each of these steps and provide an example of how we have applied the procedures in this framework to EI services.

Identify the Target Skill

Just as in all service delivery, when preparing to provide parents with training and coaching in strategies to support their children's development, an SLP, in collaboration with the family, must first identify a target skill the child needs to learn. The target skill should be operationalized into observable and measurable behavior that both the SLP and the parents can easily identify. For example, an SLP may target the skill of correctly signing five specific words or the skill of responding within 5 s to another person's question. The more clearly the skill is defined, the greater the likelihood that the training and coaching the parents receive will be successful.

Identify the Target Strategy

Once the SLP and family have identified the target skill, the SLP identifies the evidence-based strategy to teach or foster that skill. Evidence-based strategies are instructional techniques with empirical evidence to support claims that they produce the desired effect on the learner (Cook & Cook, 2011). The SLP might begin by identifying the strategy or strategies he or she would use to address this skill when working with the child in person during speech–language therapy. The SLP might also refer to sources to help identify evidence-based strategies for the specific target skill, such as the ASHA/National Center for Evidence-Based Practice in Communication Disorders' repository of evidence-based systematic reviews (http://www.asha.org/Research/EBP/EBSRs/). The critical step is to clearly define the target strategy that the SLP is going to teach parents to implement with their child, and ensure that it is likely to be effective

Table 2. Published Training Materials for Communication Strategies.

Resource	Description
AIM http://www.autismsinternetmodules.org	"AIM is designed to provide high-quality information and professional development for anyone who supports, instructs, works with, or lives with someone with autism. Each module guides you through case studies, instructional videos, pre- & post-assessments, a glossary, and . . . more. AIM modules are available at no cost . . . Certificate and credit options are available for a fee."
AFIRM http://afirm.fpg.unc.edu/	"AFIRM Modules are designed to help you learn the step-by-step process of planning for, using, and monitoring an EBP with learners with ASD from birth to 22 years of age. Supplemental materials and handouts are available for download."
ImPACT Online Communication Training http://www.vcuautismcenter.org/training/impact.cfm	"Hosted online by Michigan State University, this distance learning program can help you learn to promote your child's social communication during daily routines and activities. Children with ASD have social communication challenges. The goal of this online program is to teach parents to promote their child's social communication development during play and daily routines."
Texas Statewide Leadership for Autism Training http://www.txautism.net/trainings	"In response to a need for autism training, we have created the online trainings detailed below . . . There is no fee to take these online trainings, but you must register." (Texas Statewide leadership website).

Note. AIM = Autism Internet Modules; AFIRM = Autism Focused Intervention Resources and Modules; EBP = evidence-based practice; ASD = autism spectrum disorder.

because rigorous research has indicated its potential impact (i.e., it is evidence based).

Create Parent-Friendly Procedures

The next task in preparing for parent training and coaching is to translate the target strategy into parent-friendly procedures. That is, the SLP must state the procedures for using the strategy accurately in a way that is clear, free of professional jargon, and accommodates the everyday routines and activities of the family. Rephrasing procedures for nonprofessionals is perhaps the most challenging part of shifting from direct service to parent training and coaching; however, numerous strategies have already been translated into parent-friendly procedures for nonprofessionals by researchers and practitioners, and we encourage SLPs to search for resources that have already been developed. In Table 2, we list some existing resources for teaching someone to use various evidence-based practices with children with autism as examples. Although not all of these resources are directed toward parents, many of them may be useful when preparing to teach and coach parents to implement new strategies.

If already-developed procedures and materials for the target strategy are not readily available, SLPs may need to create their own. Just remember to (a) keep it *simple*, (b) *introduce* the strategy clearly, (c) plan to *illustrate* how the strategy is used, and (d) plan to provide opportunities for parents to *practice* using the strategy with feedback (adapted from Trivette, Dunst, Hamby, & O'Herin, 2009).

The procedures for implementing the strategy must be *simple*. Parents will need to integrate these procedures into their already busy lives. Therefore, complex procedures are unlikely to be successful. Simplifying a strategy into its most critical and basic components without sacrificing efficacy is key to helping parents become successful implementers of the strategy. When learning a new skill, such as the target strategy, adults learn best when the skill is taught in context and connected to what they already know (Trivette et al., 2009). When *introducing* the target strategy, include a clear description of the target skill the parents will be shaping in their children, the role the target strategy will play in promoting that skill, and how, when, and how much the parents should use the target strategy. Then, to *illustrate* how the parents will use the strategy, we recommend (a) clearly listing the steps in the strategy and (b) either modeling the steps or showing the parents a video of another person using the strategy with a child. Then, plan to let the parents *practice* using the strategy immediately following the illustration with feedback focused on steps performed accurately and those that could be improved.

Teach the Parent

With identified procedures translated into parent-friendly procedures, SLPs are ready to begin to teach the parents how to use the strategy to support their child's development of the target skill. Adult learning is facilitated when content is presented first in its entirety and then subdivided into parts (Knowles, Holton, & Swanson, 2015). Thus, training (i.e., teaching) is an important first step as it gives parents an overview of the strategies they are going to learn to implement with their child before mastering the specific skills needed to apply them accurately, which is addressed during coaching. When training via telepractice, SLPs can present this overview to parents through many different media, such

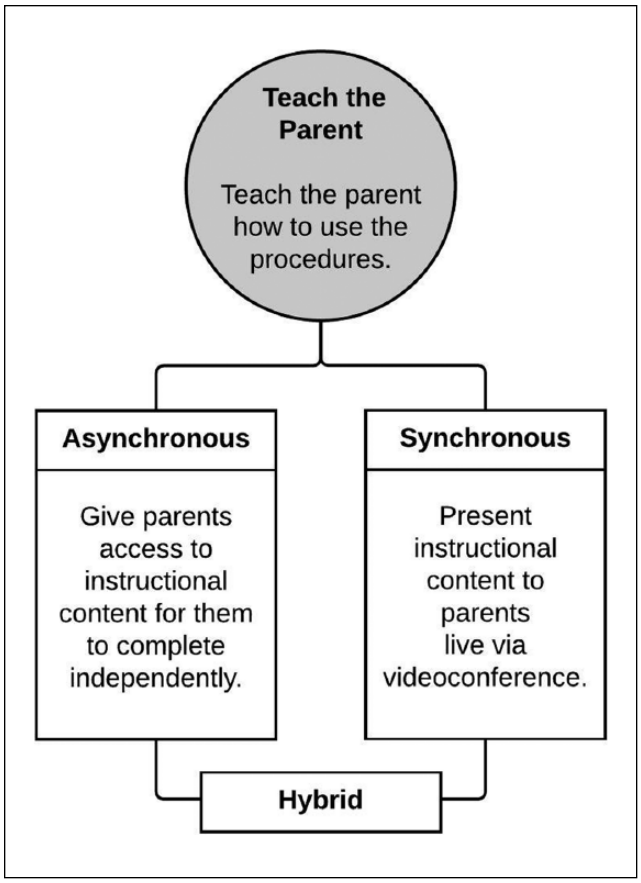

Figure 2. When teaching parents to use the target strategy, SLPs must decide if the information will be presented asynchronously, synchronously, or in a combination of the two.
Note. SLP = speech–language pathologist.

as providing instruction directly (e.g., via videoconference) or incorporating online content (e.g., YouTube video, online module). Ultimately, when using telepractice, the SLP must determine whether to present instruction asynchronously or synchronously (see Figure 2).

Asynchronous parent instruction. Asynchronous parent instruction means that the SLP gives the parents access to instructional content and allows them to complete it independently at a convenient time; the SLP and parent are not interacting at the same point in time (see Figure 2). Asynchronous instruction is advantageous when using online modules (e.g., Autism Internet Modules) or other online content (e.g., YouTube demonstrations) to teach the parents to use the target strategy (see Table 2).

Synchronous parent instruction. Synchronous parent instruction means that the SLP provides instruction to the parents live (i.e., simultaneously in time). To do this via telepractice, the SLP arranges a videoconference with the parents and presents the instructional content in a virtual face-to-face session (see Figure 2). Recall that telepractice may include videoconferencing and other technologies and synchronous training could be delivered via telephone, for example. However, for the purpose of synchronous parent instruction, we prefer to use videoconferencing. Most videoconference platforms have screen-sharing capabilities that allow SLPs to share their screen so that parents can see content on the SLP's computer. This feature can be used to *illustrate* how the strategy is used by showing the parents a video while sharing the screen.

Hybrid models of parent instruction. SLPs can also choose to combine asynchronous and synchronous features to present instructional content to parents. For example, an SLP may videoconference with the family to present the *simple* steps in the strategy and *introduce* how they can use the strategy. Then, the SLP may ask the parents to review demonstrations of the target strategy online asynchronously to *illustrate* its use and then videoconference to *practice* the strategy. Parent instruction can also be conducted in person (e.g., Meadan et al., 2014) or conducted using a combination of in-person and telepractice sessions (e.g., Baharav & Reiser, 2010).

Coach the Parent to Mastery

Once the parents have completed training for using the target strategy, the SLP can begin coaching the parents via telepractice to support mastering the use of the strategy and incorporating it into daily routines. Coaching includes observing parents' use of the strategy during their everyday interactions with their children and providing feedback on their application of the strategy. Again, coaching can be delivered asynchronously, synchronously, or using a combination of these two methods (see Figure 3); however, synchronous coaching is preferable, as immediate feedback has been demonstrated to be more effective in producing change in behavior (O'Reilly et al., 1992; Scheeler, Ruhl, & McAfee, 2004). The steps in the coaching process include development of an action plan, observation, and reflection and feedback. After a coaching session ends, the SLP makes a determination about whether the parents have mastered the target strategy or their child has mastered the target skill to determine whether to continue with the present step or proceed to the next one. We provide a description of each of the steps in the coaching process (see Figure 1).

Develop an action plan. The first step in the coaching process is to develop a plan for how the parents will implement the target strategy with their child while the SLP observes (Rush & Shelden, 2011). This plan can be created verbally during the videoconference or created in writing via a shared online document (e.g., on a Google Doc). The action plan should identify (a) the target strategy, (b) the activity in

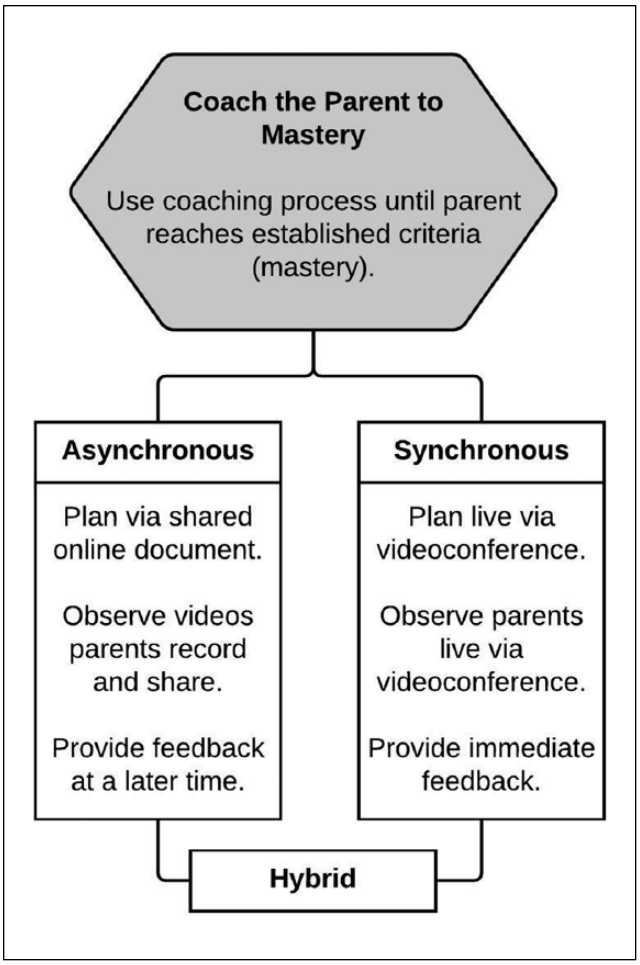

Figure 3. When coaching parents in the use of the target strategy, SLPs must decide whether the process will be conducted asynchronously, synchronously, or in a combination of the two.
Note. Synchronous coaching is recommended. SLP = speech–language pathologist.

which the parent plans to implement the strategy, (c) materials needed in that activity, (d) a brief review of the steps in the target strategy, (e) the target skill, and (f) at least one example of the parent implementing the target skill and the child's response.

Observe the parent. The second step in the coaching process is to observe the parents as they execute the action plan with their child (Rush & Shelden, 2011). When providing coaching synchronously, the parents simply place their computer, tablet, or smartphone in a location that allows the SLP to observe them and their child. The parents need to ensure that the camera is far enough away that it captures their entire interaction. Especially for children who move around during an activity, camera placement is critical to permitting observation of enough of the interaction to enable informed feedback. However, because the parent is implementing the strategy, losing sight of the child and/or parent for small amounts of time is not necessarily problematic. Propping the device on a bookcase, against the television, or in other locations that are off the floor provide the best location for video recording. Most smartphones and tablets also have a camera on the front and back of the device. This can be useful if the child is distracted by the movement on the device screen, as parents can switch to the rear-facing camera so that the back of their device, rather than the screen, is facing their child. If coaching is provided asynchronously, parents can record a video of an interaction with their child and share that video footage with the SLP using an online, secure file sharing and storage service (e.g., Box, Dropbox, Google Drive; see Table 1).

While the parents are implementing the strategy, the SLP watches carefully and takes notes about (a) how well the parents follow the steps in the strategy, (b) situations that arise and that interfere with using the strategy, and (c) other events that the SLP wants to highlight and that serve as the basis for feedback. Also, the SLP takes notes about the child's performance of the target skill. These notes will be used in the next phase of the coaching session: reflection and feedback. Alternatively, when coaching synchronously, the SLP can provide real-time feedback using bug-in-ear technologies (see Ottley, 2016).

Reflection and feedback. The third step of the coaching process is encouraging parents to reflect on their use of the strategy and providing feedback about their performance (Rush & Shelden, 2011). The SLP begins this postobservation conference by asking the parents to reflect on their interaction with their child, encouraging them to identify strategies and interactions that they felt went well (and why) and issues that arose for them. Using notes from the observation, the SLP provides both supportive and corrective feedback. For example, the SLP might recount an instance in which the parents correctly applied the strategy and praise their application. Then, the SLP might describe an instance in which the parents missed one of the steps in the strategy and remind them that this step is critical to ensure that the strategy has the desired effect on their child's learning. Reflection and feedback can be achieved via conversation (i.e., during videoconferencing) or via written, shared documents. SLPs should give parents multiple opportunities to ask questions or comment on their own concerns and successes.

Determine mastery of the strategy. The purpose of determining mastery of the strategy is to decide when to terminate coaching for the target strategy and return to the beginning of the framework. There are two options for determining mastery: (a) whether the parents have mastered the target strategy or (b) whether the child has mastered the target

Table 3. Naturalistic Developmental Behavioral Interventions Taught in i-PiCS.

Strategy	Description	Example
Environmental arrangement	Setting up the environment to increase a child's desire to communicate	The parent holds up the child's favorite ball just out of reach so the child must communicate to gain access to the ball.
Modeling	Providing an example of the target word the child is to produce	The parent holds up the child's favorite ball and, when the child reaches toward the ball, says, "Ball." The child tries to imitate by saying, "Ba." The parent says, "Ball! Good job!" and gives the child the ball.
Mand-model	Presenting the child with a choice, question, or direction	The parent holds up the child's favorite ball and, when the child reaches toward the ball, says, "What do you want?" The child says, "Ba." The parent says, "Ball! Good job telling me!" and gives the child the ball.
Time delay	Waiting or pausing before providing a prompt, using body language, expectant facial expressions, and an extended wait time to encourage the child to initiate a communication exchange	The parent holds up the child's favorite ball and, when the child reaches toward the ball, looks expectantly at the child and waits. The child says, "Ba." The parent says, "Ball! You want the ball! Good job!" and gives the child the ball.

Note. i-PiCS = Internet-Based Parent-Implemented Communication Strategies.

skill. When mastery is based on the parent's performance of the target strategy, SLPs assume that the parent will continue to apply the strategy, without coaching, until the child has mastered the target skill. The SLP's notes and data on the parent's accurate implementation of the strategy will guide the decision to terminate coaching on that strategy. If an SLP chooses to determine mastery in this way and terminates coaching, we recommend continuing to provide intermittent coaching sessions to review the target strategy, make adjustments to how the parents are applying it in their everyday routines, and remind the parents of its ongoing importance.

When mastery is based on the child's performance of the target skill, SLPs are choosing to continue to coach the parent in the use of the strategy until it has its intended effect on the child's skill. This mastery option is preferred when the target strategy is useful primarily for teaching the target skill and will not be needed once the child has mastered that skill. When the child has reached a desired level of performance, the SLP returns to the beginning of the flowchart and identifies a new target skill to address during future sessions with the family.

An Example of the Framework in Action: Internet-Based Parent-Implemented Communication Strategies (i-PiCS)

We present an example of how this framework was adopted to facilitate the implementation of practices that were used in parent training and coaching on-site in families' homes (i.e., Parent-Implemented Communication Strategies [PiCS]; Meadan et al., 2014), and then transformed into a program delivered via telepractice (i.e., i-PiCS; Meadan et al., 2013; Meadan et al., 2016). This program focused on providing EI services to young children between the ages of 2 and 5 years with developmental delays/disabilities and autism and limited verbal communication (i.e., fewer than 10 functional words). When the data from piloting the PiCS and i-PiCS programs were accumulated across the 13 participating families (each family constituted a three-tiered multiple-baseline design), the results were promising: Parents learned the communication-promotion strategies and implemented them with high fidelity (Meadan et al., 2014; Meadan et al., 2016). In addition, parents reported that their children's social-communication skills improved and they were very satisfied with the program goals, procedures, and outcomes. For a description of a study conducted using this program on-site, see Meadan et al. (2014); for a study conducted incorporating telepractice, see Meadan et al. (2016).

Identify the target skill. The PiCS and i-PiCS programs were designed to improve two target social-communication skills of young children with disabilities by training and coaching their parents to provide the intervention strategies. The social-communication skills included (a) rate and accuracy of children's communicative responses to adult communication and (b) rate and accuracy of children's initiated communication exchanges with their parents (Meadan, Angell, & Stoner, 2010). The programs were designed to improve parents' skills, which in turn, likely would improve their children's skills. For each child, the i-PiCS team defined behaviors that constituted a communication act for the child, such as producing verbal approximations of target words (e.g., *more* and *done*). These definitions were used to guide data collection about rate and accuracy of responses and initiations during observations.

Identify the target strategy. To help young children with limited verbal communication increase their communicative responses and initiations, the PiCS team identified four evidence-based target strategies: (a) environmental arrangement (EA), (b) modeling, (c) mand-model, and (d) time delay (Meadan et al., 2010; Meadan et al., 2014). A summary description of these strategies is presented in Table 3. The team combined EA with each of the other three strategies because EA was a prerequisite for creating teaching opportunities.

Create parent-friendly procedures. To make the steps for each of the four target strategies *simple* and easy for parents to apply in their everyday lives, the PiCS team created a flowchart for each strategy that presented the basic steps. Examples of these flowcharts are available upon request from the authors. The team used these flowcharts to *introduce* the strategies to parents and gave them a copy for their reference. The team also created short video clips in which a parent implemented a strategy to *illustrate* how it is applied. Finally, the team created a plan to provide opportunities for parents to *practice* applying the strategy. These opportunities were presented either in a videoconference during which they interacted with their child or by uploading a video they recorded of their interaction into a folder on the cloud that was shared with their coach (see Table 1).

Teach the parents. After creating the procedures in language understood by the parents, the researcher taught the parents to implement the target strategies via telepractice. In the i-PiCS program, we offered this training as either a 45-min synchronous videoconferencing session or as a series of five asynchronous, self-directed online modules (see Figure 2). Regardless of format, the training consisted of the following:

- Introduction—The principles of effective communication intervention were reviewed, which included establishing joint attention, following the child's lead, and creating opportunities for their child to practice communication skills. The steps in each target strategy were described, using the flowchart to guide the discussion.
- Illustration—The parents watched video clips of other parents using each strategy accurately, highlighting the steps in the flowchart within the clip. These were highlighted as the critical steps for implementation.
- Practice—The parents were encouraged to practice each strategy. If the parents participated in the asynchronous training, they uploaded a video of themselves practicing the strategy to their shared folder on the cloud. If they participated in the synchronous training, they were given the option of practicing during the videoconference or practicing on their own later and uploading the video to the cloud.

In addition, at the end of the training, the parents worked with their i-PiCS coach to establish goals for improving the child's communication skills, clearly stating what the child's target skill would look like (e.g., the child will correctly sign three target words in response to a parent's model or mand; Meadan et al., 2010). They also created an action plan together to describe how the parents intended to apply each strategy in their everyday routines.

Coach parents to mastery. After training, the parents were coached in implementing the target strategies. These coaching sessions were conducted synchronously via videoconference following the format displayed in Figure 1 and explained in detail here.

Develop an action plan. At the beginning of the telepractice session, the coach spent a few minutes listening to the parents report about how they had been independently using the target strategy. The coach asked how accurately the parents believed they had implemented the strategy with their child, and answered any of the parents' questions. The coach reviewed the steps in the target strategy, again giving the parents opportunities to ask questions (Meadan et al., 2010). Finally, the coach developed a plan with the parents for the activities the parent intended to do during the day's observation. Together, they identified what words or signs (i.e., target communication behavior) the parents would attempt to teach their child and the routine or activity in which the target behavior would be taught. The coach would observe the parent–child interaction and make notes about the session.

Observe the parent. Now the parents were ready to practice using the target strategy with their child. As they played with their child, the coach synchronously observed the parent–child interaction via RealPresence, Doxy, or another videoconferencing tool. The coach muted his or her microphone during the observation to minimize noise or disruptions during the interaction. If the parents used a camera on a device with front and rear cameras, the coach encouraged them to switch the camera so that the screen of the video recording device was facing away from the child. This method minimized distractions for the children because they could not see the screen. During the parent–child interaction, the coach carefully recorded the number of steps in the target strategy that the parent implemented correctly (i.e., fidelity; Meadan et al., 2010). The coach also recorded the child's communication behavior in response to the parent's use of the strategy. These notes were used later for determining mastery of the target strategy.

Reflection and feedback. Following the observation, the coach discussed the interaction with the parents (Stoner et al., 2013). The coach asked them to reflect on the implementation of the action plan, and the use of probing questions, such as "*How well did you feel you used the modeling strategy today?*" or "*Did you have any trouble remembering all of the steps in the mand-model strategy?*" The coach responded to the parents' questions and comments and referred to their notes on the data collection sheet to provide specific supportive and corrective feedback related to the accuracy with which the parents implemented the strategy. The coach identified what the parents did well and how they could improve their implementation of the target strategy (Meadan et al., 2010; Stoner et al., 2013).

The coach also highlighted recordings of parents' previous coaching sessions to create short video clips of them implementing the strategy and used these to provide models/feedback to perfect their execution. The parents found this practice to be helpful, as it provided an opportunity to watch themselves applying the strategy. The coach created these clips to function either as self-modeled demonstrations of accurate implementation of the strategy or as examples of strategy-implementation errors that enabled the coach to provide constructive and corrective feedback. After providing feedback, the coach and parent collaborated to establish a goal for the parents to work toward as they interacted with their child before the next telepractice coaching session and to set a date for the next coaching session.

Determine mastery of the strategy. Because the target strategies are useful for addressing many different social-communication skills over time, the i-PiCS team chose to determine mastery based on the parent's performance of the target strategies. After each coaching session ended, the coach analyzed the session notes to determine how many times the parents used the target strategy accurately (i.e., correctly completed all of the steps of the strategy listed in the flowchart). If the parents used the target strategy accurately on at least 80% of their attempts for three consecutive coaching sessions, the coach transitioned to the next strategy in the subsequent telepractice session (Meadan et al., 2010). The target strategies progressed in order of increasing demand for the child's independent performance with modeling being the least demanding and time delay being the most demanding. We taught the parents to pair EA with all three strategies during initial training because each strategy required a different level of the child's independent performance. Thus, when the parents achieved mastery of combining EA with modeling during the coaching phase, instead of returning to the beginning of the flowchart (i.e., selecting another target skill), the coach immediately began the coaching process on the next strategy. During the next telepractice session, the coach followed the same procedures but began the action planning by informing the parents that they were ready to advance to the next strategy (i.e., from modeling to mand-model, from mand-model to time delay) and reviewed the steps in that strategy. For a more detailed description of the coaching process and the associated criteria, see Stoner et al. (2013). The coach encouraged the parents to continue using the mastered strategy with new target skills to encourage their child's continued communication development.

The i-PiCS team found that parents varied in the number of coaching sessions they required to master each strategy. Most parents required more coaching sessions to master modeling than they required to master mand-model or time delay. Presumably, this is a function of modeling being the first strategy they learned (see learning-to-learn or learning set; Harlow, 1949). On average, parents who participated in i-PiCS required eight coaching sessions to reach criterion for modeling (ranging from six to 10 sessions), four sessions for mand-model (ranging from three to six sessions), and three sessions for time delay (ranging from three to four sessions). Thus, parents averaged a total of 15 coaching sessions to complete the program (ranging from 13 to 19 sessions). When the parents mastered all of the strategies, we then could return to the beginning of the framework (see Figure 1) to identify the next target skill to be addressed.

Conclusion

Technology has greatly affected our lives in many ways, including how speech–language therapy services can be delivered. With the expansion of the Internet to geographically remote areas, onto smartphones, and into cellular data packages, accessing speech–language therapy services has become possible for many individuals and families who, heretofore, were underserved or not served at all. Through the use of videoconferencing and online training tools, telepractice has evolved as a viable alternative or supplemental means to performing speech–language therapy. However, there are challenges to using telepractice as a delivery medium for intervention.

The framework we have presented for translating on-site direct speech–language intervention services into parent training and coaching that can be used on-site or via telepractice has been used on a limited basis in telepractice contexts. As such, practitioners and researchers should continue to examine the framework's effectiveness for improving communication skills in children via telepractice. If SLPs attempt to incorporate telepractice into their service delivery, we encourage them to share their experience with the field, offering comments and critiques of the framework.

In addition to the preliminary nature of the framework, the following concerns remain as critical considerations when adopting telepractice: (a) the degree of rapport that can be established with a family via telepractice and its

impact on outcomes is unknown (Murphy & Rodriguez-Manzanares, 2012), (b) the quality of services clients receive via telepractice in comparison with on-site requires further scrutiny (Cason et al., 2012; Olsen, Fiechtl, & Rule, 2012), and (c) the applicability of telepractice for professionals and/or parents who are "technophobes" or who have limited experience with technology needs to be determined (Vismara et al., 2013).

There are additional challenges related to creating an appropriate infrastructure for providing telepractice services, including issues around licensure, billing, and secure video connections. These challenges are beyond the scope of this article but are important to consider when incorporating telepractice into service delivery.

To alleviate some of the challenges inherent in providing speech–language intervention via telepractice, especially for young children, an SLP may choose to assume the role of trainer and coach for parents or caregivers, in addition to or in lieu of providing direct one-on-one intervention on-site with the child. We presented a framework for incorporating telepractice into speech–language therapy services for children by converting practices employed in on-site intervention into parent training and coaching programs. Capitalizing on three steps in the framework (i.e., identifying a target skill, identifying a target strategy, and creating parent-friendly procedures), SLPs can then teach and coach parents how to apply strategies to improve their children's communication skills. One fundamental advantage of training and coaching parents is that they become "24/7" interventionists because they are with their children in naturally occurring settings and routines throughout the day.

The framework we have described for transforming the strategies used in direct, on-site speech–language intervention into telepractice through the use of coaching and training parents is not without its drawbacks, in part because of the limited extent to which it has been applied and, thereby, the limited evidence for its efficacy. The more the framework is explored by practitioners and professionals, the more it can be examined for its effectiveness and the more the procedures can be refined and improved. Clearly, the degree to which telepractice affects professionals and clients is yet to be fully realized. By training and coaching parents through telepractice, we hope that many more children with speech–language support needs and their families can access vital services. These services can enhance children's communication repertoires and, thereby, the child and family's quality of life.

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