**The Use of Technology in Speech-Language Pathology Practices: Prior to and During the COVID-19 Pandemic**

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**Abstract**

Speech-language pathologists (SLPs) treat various differences and disorders in a variety of settings (private practice, schools, hospitals). SLPs can use different tools, such as technology, to enrich therapy. During the COVID-19 pandemic, speech-language pathologists transitioned from in-person therapy to teletherapy, so all therapy occurred virtually. This paper investigates the experiences of SLPs during the pandemic to understand the impact of teletherapy on SLPs’ and students’ social-emotional status, students’ learning environment, and the overall quality of therapy. The findings of the study indicate that during virtual instruction students and SLPs suffered socially and emotionally, students struggled to create productive learning environments, and the overall quality of therapy was negatively impacted. Moving forward, speech-language pathologists should receive appropriate training in teletherapy and be provided with the proper equipment for telepractice so that virtual therapy is as effective as possible.

**The Use of Technology in Speech-Language Pathology Practices: Prior to and During the COVID-19 Pandemic**

 In the current day and age, technology is constantly advancing. In order for society to keep up with technological advancements, people must be flexible and adaptable. In the past few decades, technology has become increasingly integrated into people’s daily lives. Technology is found in hospitals, restaurants, stores, homes, schools, and everywhere in between. New apps, websites, and devices are developed daily and serve a variety of purposes.

 The practices of speech-language pathology are evolving alongside technology. Based on research and successes, speech-language pathologists (SLPs) develop new practices to make therapy as effective as possible, and this includes incorporating technology. The use of technology in speech-language pathology is not simple. Speech-language pathologists must be intentional when using technology so that it positively impacts therapy quality. When providing therapy in-person, speech therapists use technology as a tool either to provide therapy or as an incentive for clients to engage in therapy. When practicing teletherapy, SLPs use technology as the platform to provide treatment, and they use technological tools to aid them.

 As technology becomes more relevant in speech-language pathology, especially during the COVID-19 pandemic, it is important to evaluate the role technology serves in treatment. SLPs need to consider how technology enhances and undermines the quality and effectiveness of therapy, what uses of technology are most impactful, what conditions (i.e., SLP training, learning environment, tools used) make teletherapy most effective, and how students are affected by the use of telepractice. Investigating the personal experiences of practicing SLPs is extremely insightful into these conditions of teletherapy. The purpose of this research is to explore through interviews how transitioning from in-person to completely virtual therapy during the COVID-19 pandemic impacted SLPs, students, and the quality of speech-language therapy. This insight is fundamental for future practices of speech-language pathology.

**Literature Review**

A diverse set of disorders and differences define the practices of speech-language pathologists. Speech-language pathologists provide treatment to people of all ages with a diverse spectrum of disorders and differences (ASHA, 2016). Disorders and differences treated by SLPs include fluency, language (spoken and written), voice, resonance, speech production, articulation, cognition, feeding and swallowing, and auditory habilitation/rehabilitation (ASHA, 2016). Speech-language therapists play a crucial role in people’s ability to speak, write, eat, swallow, and so much more. Without the help of SLPs, people would struggle to communicate, eat, and at times have an active role in society.

Due to the importance of and demand for SLPs, they work in a variety of contexts—schools, hospitals, health care facilities, private practice—and must know a variety of skills and methods to treat the different speech and language differences and disorders in the human population (ASHA, 2020a). In 2019, 51.3% of ASHA (American Speech-Language-Hearing Association)-certified SLPs worked in schools (ASHA, 2020a). The National Institute on Deafness and Other Communication Disorders (2016) reported that about 7.7% of American children between the ages of 3 and 17 have a speech, language, voice, or communication disability. In 2012, communication disorders were the most common, then speech disorders, followed by language disorders, then voice disorders, and lastly swallowing problems (Black, Vahratian, & Hoffman, 2015).

Technology is evolving every day. As society and technology develop, speech-language pathologists adapt their treatment methods to incorporate technology into therapy. SLPs have access to phones, iPads, tablets, computers, telecommunications devices for the Deaf (TDD), voice and speech translators, sound amplifiers, frequency adjusters, and signal systems (Grillo, 2019; Meinzen-Derr, Sheldon, Henry, Grether, Smith, Mays, Riddle, Altaye & Wiley, 2019; Özkan, Tokel & Çakmak, 2017; Zajc, Starčič, Lebeničnik, & Gačnik, 2018). Technology allows curriculums to be more accessible for students with learning differences and disabilities (Cranmer, 2019).

Many studies from the past decades evaluate the effectiveness of technology as a tool in speech-language pathology treatment. For example, researchers investigated the use of technology in writing therapy for people with aphasia (Marshall, Caute, Chadd, Cruice, Monnelly, Wilson, & Woolf, 2018). The findings of the study indicate that technology—such as virtual writing exercises, word-processing software, and word-prediction software—was an effective tool in improving writing abilities (Marshall et al., 2018). Also, there are a variety of apps for patients with dysphagia (swallowing difficulties) that teach people how to properly swallow, provide different swallowing exercises, and send reminders to swallow (Winget, 2014).

SLPs in Ohio exercising augmentative and alternative communication (AAC) strategies (strategies for communicating without verbalization) have experienced success in improving spoken language abilities when utilizing iPads with school-aged students who are deaf and hard of hearing (Meinzen-Derr et al., 2019). Meinzen-Derr et al. (2019) discuss how it was beneficial to provide therapy through iPads because they were small, portable, socially acceptable, did not always require Wi-Fi/service to function, and were generally affordable and accessible. In Turkey, special education teachers used informatics technology and instructional information on computers to aid students in the classroom who were deaf and hard of hearing (Özkan et al., 2017). Students found learning with this technological equipment to be more fun (Özkan et al., 2017). The students who were deaf and hard of hearing performed better than their peers in classes with the help of technology, and their written expression skills drastically improved (Özkan et al., 2017). Additionally, the Turkish students learned content quicker using computers, and this gave them more time to practice repeatedly and fully grasp the information being taught (Özkan et al., 2017). SLPs in Slovenia found that treatment through tablet games increased student engagement and motivation, and tablets had a positive influence on students socially (Zajc et al., 2018). Similarly, SLPs in an American study noted student enjoyment when using technology for therapy, and they found technology made learning content more manageable for students (Jozwik & Mustian, 2019).

In the 2019-2020 school year, the education system drastically changed. Because of the coronavirus (COVID-19) pandemic, the world went into lockdown in March of 2020. Schools across the United States and globe closed for in-person instruction. Most public places closed or transitioned to limited operations. As a result, school and therapy all occurred virtually—something teachers, therapists, students, and parents had never experienced before. Speech therapists transitioned to providing therapy via telepractice. The role of technology in speech-language practices drastically shifted. Technology changed from being a helpful tool to being the primary source of therapy.

Telepractice/teletherapy is the practice of providing therapy via technology to a person in another location (Grillo, 2019). Teletherapy allows for people to receive treatment from anywhere (Grillo, 2019). Telepractice is an acceptable replacement for in-person treatment as long as the quality of therapy is the same virtually as it is in-person, but the pandemic caused teletherapy to be the source of treatment even if SLPs felt in-person treatment would be more effective (ASHA; ASHA, 2020b; Euben, 2020). Before the pandemic, some speech therapists based their practices exclusively around teletherapy, but most SLPs were primarily accustomed to providing in-person therapy.

The transition to virtual school and teletherapy impacted the social-emotional development of students. Children had to learn a new skill set for how to interact virtually with others (Kamei & Harriott, 2020). Reported levels of student anxiety because of having to virtually interact with others were higher than expected (Arslan & Korkmaz, 2019). During the lockdown, students lost the opportunity to socialize with their classmates, which is crucial for students with speech and language disorders who learn how to communicate and interact through interactions with their peers at school (Therrien & Light, 2018). On top of that, students with speech-language disorders and differences develop language abilities from interacting with other students (Walker, Price, & Watson, 2018). Despite in-person and virtual experiences being different, research indicates that engaging with classmates in a virtual environment does provide students with the opportunity to develop their language abilities and develop a sense of social connection (Walker, Price, & Watson, 2018). Researchers have found that socially isolating situations can cause children to be less in control of their emotions and have PTSD symptoms, which can lead to students behaving aggressively (Kamei & Harriott, 2020). Students with these behaviors often have less academic success and growth (Kamei & Harriott, 2020).

 The pandemic was psychologically challenging for everyone. For both children and adults with and without speech-language differences and disorders, prolonged periods of social isolation are known to cause negative health outcomes (Kong, 2021). These negative health outcomes include extreme stress, fear, frustration, depression, PTSD symptoms, anger, stroke, dementia, and heart disease (Kong, 2021). The pandemic and transition to virtual instruction increased SLPs’ workload and left SLPs worried about the health of their families and students (Sylvan, Goldstein, & Crandall, 2020). SLPs also worried about the academic success of their students (Sylvan et al., 2020). On top of their jobs, many SLPs had to deal with stress relating to taking care of their own children (Sylvan et al., 2020). Despite these stressors, the SLPs remained resilient (Sylvan et al., 2020).

While the change to virtual school was a challenging time for students and SLPs, there is great value in the convenience of teletherapy (Cason & Cohn, 2014). Telepractice is described as a way to “reach students where they are,” whether that means physically, emotionally, or developmentally (Bryant, Parafiniuk & Sippl, 2017). Using technology, SLPs are able to access students in “exceptional settings,” so students in difficult-to-access settings, remote locations, extreme environments, and districts with SLP shortages can receive treatment for their differences and disorders (Cason & Cohn, 2014). Research indicates that teletherapy was very common and effective with students in rural and remote areas where there are fewer SLPs (Bryant et al., 2017; Grillo, 2019; Short, Rea, Houston, Scott & Forducey, 2016). In Oklahoma, SLP teletherapy programs were very successful in providing effective treatment when given the appropriate equipment, training, and support (Forducey, 2006). Teletherapy and in-person therapy, for a variety of communication, speech, language, fluency, voice, swallowing, and articulation differences and disorders, was found to be equally effective (Grillo, 2019; Short et al., 2016). Prior to 2020, telepractice was considered a resource when needed rather than a replacement for in-person therapy (Bryant et al., 2017). Technology before the pandemic was generally either a supplement or a way to enhance therapy rather than the primary source of therapy.

Teletherapy depends on access to dependable and functioning technology. First and foremost, students and SLPs need access to technological devices and Wi-Fi. Wi-Fi and technological issues inevitably interfere with telepractice at times, so SLPs must be prepared to respond to and resolve them (Short et al., 2016). SLPs should be prepared to help families set up the technology for treatment (Landinguin, 2020). If not dealt with, technical difficulties may prevent students from participating in therapy (Cranmer, 2019). Additionally, SLPs should work with families to minimize background noise during teletherapy (Harmon, Dromey, Nelson, & Chapman, 2021). Research indicates that background noise during telepractice negatively impacts speech fluency and language production because background noises increase the demands for cognitive functioning (Harmon et al., 2021).

Since teletherapy became the primary platform for speech-language treatment during the pandemic, it is important to consider the effectiveness of telepractice and factors that influence the effectiveness. Depending on how technology is used, it has the potential to both include and exclude students from learning (Cranmer, 2019). With the potential for technology to facilitate both learning and confusion, SLPs must be careful in the application of technology in therapy.

There are resources that SLPs can use to make teletherapy as effective as possible. There are all sorts of apps and technological tools, such as accelerometer sensors that relay information into an app on a phone (Grillo, 2019). SLPs can provide engaging teletherapy using fun websites, apps, games, YouTube videos, digital books, and music videos (Andricks & Smith, 2020). The variety in equipment, applications, programs, and websites allows all different disabilities to be addressed in different ways (Kurland, Liu & Stokes, 2018). For these resources to be useful, SLPs need to have access to them.

Research indicates the importance of training in technology for the success of teletherapy. Everyone participating in teletherapy needs to be trained to use technology. First and foremost, SLPs must learn how to provide treatment via teletherapy (Bryant et al., 2017). SLPs must understand the technology themselves so that they appropriately incorporate it into therapy (Taghizadeh & Hasani Yourdshahi, 2019). In a 2002 study, less than 21% of the participants had received training in telepractice (ASHA, 2002). Secondly, students need to be trained in teletherapy practices (Taghizadeh & Hasani Yourdshahi, 2019). Teletherapy with students has been found to be time-efficient when students are already familiar with the technology (Short et al., 2016). Students are more likely to engage with technology if they are trained to use it and have time to practice using it (Edwards & Dukhovny, 2017). In Massachusetts, researchers examined the impact of a 6-month tablet program with weekly teletherapy meetings on people with aphasia due to a stroke (Kurland et al., 2018). The researchers noted the importance of taking the time to train participants of teletherapy in how to use the technology so that the treatment was as effective as possible (Kurland et al., 2018). Additionally, the electronic programs must be designed to appropriately match students’ developmental stages (Drager, Light, Carlson, D'Silva, Larsson, Pitkin, & Stopper, 2004). Lastly, parents should be trained to use the technology—especially if the student is young and the treatment is not easily accessible for them (Chmela, 2013). Parent involvement has been found to enhance student enjoyment of reading and engagement (Morris & Bellon-Harn, 2021). SLPs, students, and parents, though, are not always properly trained in how to use teletherapy (Cranmer, 2019).

SLPs cannot neglect the legality of teletherapy. Speech therapists need consent from students and their parents to practice teletherapy (Euben, 2020). Complete confidentiality and privacy of students are imperative (Euben, 2020). A HIPAA-approved video conference platform that includes webcam sharing, screen sharing, and interactive features should be used to maintain confidentiality and provide engaging virtual activities (Andricks & Smith, 2020). Additionally, SLPs must have a license to practice in the state where they and the client are located (Grillo, 2019). Lastly, SLPs need to be conscious of all the laws regarding teletherapy to guarantee that treatment is ethical (Euben, 2020; Grillo, 2019).

 The effectiveness of teletherapy depends on students being motivated and engaging virtually. Research indicates that student motivation depends on the psychological fulfillment of *competence, autonomy, and relatedness* while completing a task (Deci & Ryan, 1985; Ryan & Deci, 2000). *Competence* relates to feeling effective and impactful, *autonomy* relates to feeling as an agent in one’s life, and *relatedness* refers to feeling connected to people in one’s environment (Deci, 1975). *Relatedness* tends to be fulfilled when students and SLPs create a supportive, community-based learning environment (Deci, 1975). Having choices while completing a task motivates students, while restrictions decrease student motivation (Zuckerman, Porac, Lathin, & Deci, 1978). Extracurricular activities are positively related to students’ academic achievement and a strong sense of community (Akos, 2006; Holloway, 2002). Student motivation has been found to decline with age (Lazowski and Hulleman, 2016; Scherrer & Preckel, 2019).

During the COVID-19 pandemic, parents perceived that their children’s motivation in online school declined (Zaccoletti, Camacho, Correia, Aguiar, Mason, Alves, & Daniel, 2020). This decline in motivation relates to the uncertainty of the times and students’ inability to fulfill their sense of *autonomy*, *competence*, and *relatedness* (Zaccoletti et al., 2020). Due to so much being unknown during the pandemic, students did not feel in control of their lives which prevented them from fulfilling their need for *autonomy*. During this period, the expectations for students were unclear, causing a lack of a sense of *competence*. Students had to become more independent and responsible for their schoolwork, which is especially difficult for younger students who have not yet developed such skills (Zaccoletti et al., 2020). Additionally, students’ sense of *relatedness* was not being fulfilled due to a decrease in their interactions with teachers and friends (Zaccoletti et al., 2020). Lastly, the sudden ending of extracurricular activities negatively affected student motivation because it again impacted students’ sense of *relatedness*.

Students’ attitudes towards virtual learning and teletherapy also varied depending on age. There are social skill developmental stages for different age groups. Typically developing children in early childhood (ages 2-6) develop prosocial skills and a sense of self. Then, in middle childhood (ages 7-10), they learn to follow rules and develop a sense of self-esteem. After that, children in early adolescence (ages 11-13) develop their social selves and become more independent. When students become more independent, they begin pushing against authority. Along with social skills, students’ age influences their attention span. Children who are typically developing around four years of age have an attention span of about 8-12 minutes, eight-year-olds can typically focus for 16-24 minutes, and twelve-year-olds can pay attention for up to 36 minutes (Brain Balance Achievement Centers). As attention span increases with age, students also become more socially aware, resistant, and unmotivated.

 Parent involvement in teletherapy is beneficial for student success (Fairweather, Lincoln, Ramsden, & Bulkeley, 2019). For parents to be involved in their children’s therapy, there needs to be a sense of trust and collaboration between the parents, children, and SLPs (Fairweather et al., 2019). Parents, SLPs, and students need to agree on appropriate goals and tasks in the teletherapy sessions (Fairweather et al., 2019). When parents are involved in teletherapy, they are able to learn more about their child’s disorder or difference and participate in therapy (Law, Dornstauder, Charlton, & Gréaux, 2020). Parents are able to continue parts of therapy in the home when they have a strong relationship with the SLP and a comprehensive understanding of their child’s needs (Fairweather et al., 2019).

At the beginning of the 2020-2021 school year, some schools returned in person, while others continued instruction virtually. During the spring of 2020, students lost the opportunity to socialize with their classmates, which, again, is known to help students with speech and language disorders learn to communicate and interact (Therrien & Light, 2018). In-person interactions with both teachers and peers are important for both students’ learning and social development, so schools returned to in-person instruction as long as everyone’s health and safety were kept in mind.

Speech-language pathologists, though, faced a new challenge by returning to in-person instruction—face masks (ASHA, 2020c). Face masks cover the bottom half of people’s faces which prevents most speech-language therapy from being possible. For example, face masks make it difficult for people to understand each other, block visual cues, and block both SLPs and students from observing each other’s mouth movements (ASHA, 2020c). In response to masks hindering therapy, masks can be altered (clear paneling on the front of masks, face shields) and there are other solutions such as voice amplifiers and videos and pictures for demonstration, but telepractice continued to be the best option for many SLPs (ASHA, 2020c).

This study was a response to the COVID-19 pandemic and its impact on speech-language pathology treatment. The goal was to examine the use of technology in the practice of speech-language pathology during the outbreak of COVID-19. This study evaluated the quality of therapy when provided over technology and the overall experience of students and SLPs throughout the pandemic. As such, the guiding research question for this study was, how did the pandemic-induced teletherapy affect the social-emotional status of students and SLPs, transform the learning environment, and impact the overall quality of speech-language therapy?

**Methods**

This nonexperimental mixed methods qualitative phenomenological study focused on speech-language pathologists’ shared experiences using technology in therapy prior to and during the COVID-19 pandemic. This study worked to evaluate how the role of technology transformed in treatment due to the COVID-19 outbreak and if technology is an effective tool based on the participants’ experiences. The goal was to examine the role of technology in effective speech-language pathology practices as the pandemic forced a change from in-person therapy to teletherapy. The use of technology in therapy, professional development and training regarding technology, and SLPs’ experiences were examined. In addition, the quality of virtual treatment, ability to perform one’s job, and accessibility to students were important factors in determining the effectiveness of teletherapy during the pandemic.

**Participants**

The seven participants of this study were ASHA licensed-speech-language pathologists in schools and private practice throughout the United States. The seven participants were Natalie, Emily, Samantha, Elizabeth, Anna, Taylor, and Joanne (all pseudonyms). Natalie, Emily, and Joanne were located on the East Coast. Samantha and Taylor were in the Midwest. Anna practiced in the South East, and Elizabeth moved between schools located on the West Coast and in the Southwest during the pandemic. Natalie, Emily, Samantha, Elizabeth, Anna, and Taylor were interviewed during the first phase of data collection, and Joanne was interviewed during the second phase of data collection. They ranged from one to seventeen years of practice as speech-language pathologists, and their students were K-12 students. The participants were selected using convenience and purposive sampling. Participants were found through personal connections and the internet, and they were all selected because they are SLPs.

**Instruments**

The instruments used to collect data in this study were questionnaires (Appendix A and B). Both questionnaires included around 20 questions asking about the SLPs’ experiences prior to and during the pandemic with technology, amount of training, perception of technology, student motivation, and more. Zoom was used to conduct the interviews. Verbal consent and consent forms were used to gain approval from participants to record the audio of the conversations. NVivo was used to code the conversations.

**Procedures**

There were two phases of data collection in this study. During both phases, prior to the interviews beginning, participants were asked verbally for consent to record the audio of the interview. Next, they were emailed a consent form to sign.

In the first phase of the data collection, six of the seven participants were asked the same in-depth questions (Appendix A) about their experiences with technology in speech-language therapy. Participants were asked different follow-up questions depending on their responses to the questionnaire. The audio of the conversation was transcribed. The conversations were thematically coded using initial and axial coding for theme using NVivo.

Once the data from the first phase was categorized and analyzed, the second phase of data collection began. In the second phase of data collection, a new questionnaire was created based on the initial themes. The seventh participant was then interviewed over Zoom and asked to reflect on the findings of the first phase. The seventh participant’s reflections were then coded and analyzed in comparison to the initial data.

**Results and Discussion**

 The analysis of the interviews revealed three common themes—social-emotional, learning environment, and effectiveness—in the experiences of speech-language pathologists regarding teletherapy during the pandemic. These themes functioned both independently and jointly to influence the SLPs’ perception of teletherapy.

**Social-Emotional**

 The interviews revealed the social-emotional impact (Table 1) of the pandemic and virtual school on both the students and the speech therapists. Despite the SLPs and students experiencing the pandemic in different ways, both groups suffered tremendously. Technology allowed for therapy to continue, but a lot was lost between the transition from in-person to online.

 According to the SLPs, many of their students receiving speech-language services normally gained a lot from interacting with their peers. However, there were minimal gains during the pandemic. Students missed their friends, and students with social language goals suffered. They were missing opportunities to learn how to engage and communicate with their classmates (Therrien & Light, 2018). Samantha stated, “I'm not sure how effective teletherapy is for them because they just really need to be in with their peers.” Joanne explained, “that those avenues [for social interaction] were just totally closed off to them for a long time… they really yearn for that connection and that interaction, and I think, that weighed heavily on their psyche.” On top of that, students had to learn new social cues specific to virtual learning. By being thrown into a new learning environment (teletherapy), speech-language students had to learn a completely new set of social skills, which did not come naturally to many of them (Kamei & Harriott, 2020). Emily explained that “the kids… [were] relearning social cues and… the rules of virtual learning… so it was hard.”

Participants discussed how their students missed each other a lot and longed to be with their friends. Samantha said, “these kids… are missing that social interaction piece so much,” and Elizabeth echoed this sentiment by saying, “I think it makes kids depressed when they’re on their own… they miss each other.” For the students who had returned to in-person school, social distancing and masks continued to prevent students from interacting with each other like they had prior to the pandemic. Though, despite these barriers, Joanne stated, “kids are really resilient, to be honest. They wear their mask [sic], they keep their distance. They've been doing an awesome job and following what the new normal school looks like.” While students’ social skills were declining from the lack of interactions, some students enjoyed being socially isolated. Joanne shared,

students who have autism who have trouble taking perspectives and sharing… actually, I think… a lot of kids with autism actually preferred remote learning, because they can, they don't have to have small conversations, they can put themselves on mute, and learn the content. So I think getting them back really adjusted to whatever their social-emotional goals were, they haven't had to really target them in the remote setting. It's been harder to target them. And so I think the regression, we're going to see or have seen already, it's been pretty profound.

 Many of the SLPs did virtual group speech therapy sessions with their students. In the interviews, the speech therapists discussed how their students enjoyed group sessions. Group sessions allowed students the opportunity to feel socially connected and facilitated moments for students to learn from each other (Walker et al., 2018). While it was not the same as being in-person, it was still an opportunity for the students to see each other and interact. Emily said that it provided the students with a sense of “normalcy”—something that was greatly lacking. Natalie and Samantha described their students as “excited” and “giddy” when doing virtual group sessions, and they allotted some of the therapy time for the children to interact. When discussing group sessions, Emily reflected, “It was entertaining, like those are my most fun sessions, by far. But, whereas was it effective? Probably not.”

 Students were greatly impacted psychologically. Like the rest of the world, children were overwhelmed, and students’ stress negatively impacted their health, well-being, and academic growth (Kong, 2021). Emily described how some of her students had developed severe emotional difficulties during the pandemic. One student developed “extreme anxiety,” so Emily worked closely with a social worker. Other students of hers developed “ticks and severe separation anxiety from their parents.” Joanne reflected that “anxiety levels were high” for both the students and their parents, and she said, “I think depression rates definitely increased.” On the other hand, Anna said that her student with characteristics of selective mutism benefitted from teletherapy because the “added layer of distance for her [student] has kind of been more helpful.” As a result of the distance, her student began engaging and participating more. While there were immediate signs of how the students were suffering psychologically, emotionally, and socially, Samantha and Joanne both reflected that a complete understanding of the impact of the pandemic, teletherapy, and virtual school on students will probably not be known for at least a few years. Experts believe that students’ academic success, job opportunities, social development, and quality of life will be permanently affected because the pandemic occurred in such a crucial and influential time of their speech and language development (Tohidast, Mansuri, Bagheri, & Azimi, 2020).

 Many of the SLPs noted the difference in student attitude depending on the children’s age. The participants explained that younger students (early elementary) were easily entertained and could be put in front of the computer by their parents, but Taylor described how it was “hard to maintain their attention” and, therefore, “difficult over Zoom in terms of… progress.” Younger children have shorter attention spans, so they could not easily pay attention during teletherapy for long periods of time (Brain Balance Achievement Centers). On top of that, the added distance of virtual therapy made it difficult for SLPs to keep their students focused. Meanwhile, upper elementary and middle school students were very unmotivated and did not to engage. One participant said it was “trickier to navigate” the older students who would not turn on their camera or audio. Emily felt that her older students felt that teletherapy was “stupid.” At this age, students were becoming more independent and developing a better understanding of themselves, so they were resisting authority and were more self-conscious. Additionally, motivation decreases as students get older, which was illustrated by the SLPs’ experiences (Lazowski & Hulleman, 2016; Scherrer & Preckel, 2019). Overall, it was clear to the SLPs that their students were losing a lot while doing virtual school.

 The students were not the only ones struggling. The speech therapists generally appeared to be exhausted and overwhelmed. The pandemic, and especially during the beginning while everyone was in lockdown, put a lot of pressure and stress on people. As adults, SLPs worried about their families, friends’, and students’ health and well-being, had to take care of their families, and continued providing therapy virtually so that their students would not fall too far behind (Sylvan et al., 2020). The SLPs described their experiences with teletherapy and the pandemic as “weird,” “draining,” “not quite as rewarding,” and “challenging.” Samantha explained how she had to adapt professionally while also taking care of her own children. Sarah said that she “had so much anxiety about the job”, and she ultimately left the school where she worked during the 2019-2020 school year to work in private practice.

**Learning Environment**

 In the spring of 2020, all the SLPs transitioned to virtual therapy as the world went into lockdown. In the fall of 2020, some transitioned back to in-person instruction, some remained virtual, and others went back and forth between in-person and virtual (hybrid) depending on the status of the pandemic. Every school, school district, and state took different approaches during the 2020-2021 school year, causing diverse working conditions amongst the interviewed SLPs.

Despite these differences, the participants all identified factors that influenced the learning environment (Table 1) of the students. A couple of the participants noted how being at home was distracting for students. Natalie explained how for some students it was difficult to work because their parents and siblings were around while other students struggled to stay on task without the guidance of a guardian. Natalie went on to say that “the environment of their home can play a role in how successful they are.” Additionally, participants explained how background noise in the students’ homes disrupted therapy and made it hard for the therapists to work with their students. Background noise challenged the progress of students (Harmon et al., 2021). Ultimately, Natalie reflected how being at school “level[ed] the playing field” for students because they were all in the same environment.

All seven of the SLPs mentioned parent involvement in their interviews. Some talked about it negatively, some talked about it positively, and some reflected on their dependency on parents. The SLPs with negative perceptions of parent involvement explained how parents would stand over their children’s shoulders and would constantly question the therapy that the SLPs were providing virtually. Natalie said this made her “uncomfortable.” On the other hand, Samantha appreciated the involvement of parents. In an email following the interview, she wrote,

I have parents who show up to virtual sessions each week with their kids and are now a part of therapy. They are learning ways to interact and help their child at home. I had very little contact with parents when I was doing all of my therapy in school and parents are typically much more involved now!

Lastly, participants explained they relied on parents to make sure students attended virtual therapy and to create conducive learning environments for the students. Joanne described how, “Kindergarten to third grade, but really K to 1, for them to access remote learning, their parent needed to be heavily involved…it put a lot on these parents... the parent was… keeping them accountable.” In this sense, SLPs depended on parents to fill in the cracks that the speech therapists could not virtually. There was the potential for parents to improve the quality of their children’s therapy. Research indicates that open communication between SLPs and parents, trust between parents and SLPs, and parents’ willingness to learn about their children’s needs all benefit the quality of teletherapy (Fairweather et al., 2019; Law et al., 2020).

Anna shared that she had a student who had been doing super well with virtual therapy. He was engaging and participating month after month, but suddenly his grades dropped drastically and his participation decreased. When his teachers reached out to his family, they discovered that his mother had returned to work, so no one was able to supervise him. As a result, his parents and teachers decided it would be best for him to return to school in person, which was an option at his school. While this was a decision made for his educational success, his return to school meant that he was putting himself and his family at risk of being exposed to COVID-19. During the pandemic, parents were put in positions where they had to make impossible decisions. On top of parents being potentially responsible for their other children and jobs, students, especially younger elementary students, depended on the support of their parents to navigate technology and needed their parents to work with their SLPs to schedule therapy (Law et al., 2020). Without this support, students struggled to attend and engage in teletherapy.

SLPs also reflected on how they could not monitor their students’ computer screens, so they did not know if their students were following along or playing games. Natalie said it was “hard to just like not be able to share resources in the same way where like I'm modeling something on my paper and they're looking on their paper.” Joanne explained both the pros and cons of a virtual learning environment. She stated, “It… opened up parent communication way more regularly because they’ll just come on at the end or before. And so that was a positive about being in their home. The negatives were like they had to come in from… swimming in the pool. And they had to come in or say their sister's having snack, and so it was loud or distracting.”

Lastly, technological difficulties and barriers influenced the students’ and SLPs’ learning environments and, therefore, therapy. During teletherapy, the participants experienced “Wi-Fi problems,” “bad [audio] feedback,” loud background noise, and students not being able to or refusing to turn on their cameras and microphones. Some students of the participants did not even have access to technology or Wi-Fi to do virtual school. Without support systems set up at home, such as a parent, guardian, or sibling available to help, some students were overwhelmed by technical difficulties, and this was another reason students did not engage in teletherapy (Short et al., 2016; Cramer, 2019). Technical difficulties, therefore, have the potential to hinder the general success and growth of students.

**Effectiveness**

 Much of the interviews were spent exploring the effectiveness (Table 1) of teletherapy. These discussions revealed various factors that impacted the effectiveness. These various factors were both positive and negative and very much varied depending on each SLP’s personal experiences.

All the participants were asked if they had received training in teletherapy before and during the pandemic. Prior to the pandemic, they all said they had not received teletherapy training in neither graduate school nor professional development. The only form of training anyone had received before the pandemic was in how to use technology as a supplemental tool. One participant was in graduate school during the beginning of the pandemic, and her program did not offer training in telepractice. During the pandemic, some SLPs received minimal training. When the speech therapists had received support, they said it was brief. Natalie explained that much of her training was colleagues sharing information they had figured out on their own. The training of SLPs, parents, and students is critical in the effectiveness of teletherapy, so the lack of training was consequential (Bryant et al., 2017; Chmela, 2013; Taghizadeh & Hasani Yourdshahi, 2019). Technology training allows for telepractice to be as effective as possible, so the lack of training indicated that teletherapy during the pandemic could have been more effective (Kurland et al., 2018). When asked if there should be more training in teletherapy in the future, Joanne stated, “[because of] how accessible clients can be from all over the world or how you can be in grad school one place and living in another I think, the whole world of accessibility really the door open when we realized we could be doing a lot of this stuff, personally. So I wouldn't be surprised if there were more opportunities offered around.”

The uncertainties surrounding the legality of teletherapy were mentioned by almost all participants. When the pandemic began, it was unclear whether it was legal for SLPs to meet with their students virtually and if it was legal for students to meet in groups virtually. Emily said, “we didn't know… if it was legal to meet with our students on Google meets.” Participants discussed following ASHA protocols and having to get families to sign consent and compliance forms. Taylor worked at a private school in a city that is located close to two neighboring states. While she is a certified SLP in the state where the school is located, she was not certified in the two other states where some of her students lived, so she had to navigate getting proper licensure. She reflected on the experience sharing that “trying to figure that all out was very challenging.” Additionally, she shared that students went on vacation with their families to other states, and she had to pause those students’ therapy until they returned to states where she was licensed. Joanne also had students traveling, and she reflected that “states do have different regulations around what's expected and it does create a headache and a lot of research has to be done.” The nuances of the legality of telepractice complicated the speech therapists’ experiences which highlights the potential need for states to reconsider laws.

While some SLPs returned to in-person instruction, social distancing and masks became a new challenge. The speech therapists said they wore masks and sometimes face shields during therapy. Also, some schools had plexiglass barriers. Masks, though, prevented SLPs and students from seeing each other’s faces making therapy very difficult. When SLPs are unable to see their students’ faces, they are unable to provide appropriate feedback and treatment (ASHA, 2020c). Clear face masks and face shields were also challenging because, as Emily said, “they just fog up.” Therefore, SLPs and students sometimes briefly pulled their masks down during therapy to work on something specific. Emily reflected that “it is easier to do… [articulation therapy] virtually because doing… [it] is probably easier virtually than it is with a mask on.” Joanne echoed this sentiment.

Attendance was frequently noted in the interviews. Three of the participants stated that students attending speech therapy sessions was a challenge. Emily had 45 to 50 students in her caseload, and 7 to 10 of them did not attend teletherapy sessions. She reflected on how stressful it was to repeatedly reach out to the students and their parents but never hear back. Elizabeth said that she would log on for teletherapy and “see if anyone shows and see if anyone pays attention.” Later, she shared that around 50% of her students never attended. Joanne said,

I had about 30%... showing up… Some of my coworkers had closer to 20 to 15%... I think kids were maybe showing up for their classroom. But… I think they [the parents] were just so drained, and they're… fighting with their kids about getting them on for anything… they prioritize their Gen Ed… So I think there were times where either the schedule is too much the parents forgot, or they just didn't want to have to fight that battle.

 All the participants said that prior to the pandemic they considered technology to be a “helpful tool” in certain contexts because it motivated students to engage in their work. Natalie enjoyed using Google Docs prior to the pandemic because “it allows you to be on the same document as your student, but without like being over their shoulder. I can make sure they're on task but like in their mind they're doing independent work.” Emily said that students were “less anxious” when doing assessments on the computer because the students would “sit at the desk and do work on… [her] computer… it was a little easier to pump them up for an assessment.” Samantha reflected, “I would tend to use technology more as like, a treat, kind of like, uh, you know, if they had a good couple weeks, then we would do a game on the iPad.” When used properly as a tool, technology has the ability to successfully target the needs of students (Meinzen-Derr et al., 2019). Technology, such as iPads, can be very helpful because they are small, portable, and easy to use, but students need training and practice with the technology for it to be effective (Meinzen-Derr et al., 2019). Anna and Elizabeth, though, described disadvantages to technology even prior to the pandemic. Anna shared that prior to the pandemic she was “trying to discourage technology, especially with these populations of kids you want them to interact…. We were mostly trying to eliminate technology… There are so many kids that get distracted by it.” Elizabeth said, “sometimes with the preschoolers if they really would not work with me, I might use it as an incentive to get them engaged but I’m not a huge fan of technology.”

Once the pandemic hit, technology shifted from being a supplemental tool to the source of therapy. The shift in the role of technology changed the SLPs’ opinion of technology. While Samantha said she was “surprised at how my kids have been able to pay attention and sit… through teletherapy”, other SLPs said that students were “not motivated at all” during teletherapy and that it is “really hard for them to be motivated and engaged.” It is difficult to maintain student’s attention over the computer. Natalie reflected that certain times of day are harder for students to focus. When talking about a specific student, she explained how

when we were all home and our schedule used to flip flop. So I've either see him first period or last period, depending on the day… when I saw him first period, he'd come on…, ready to go, engaged. And if I signed last period, I… couldn't keep him on the camera for more than 10 minutes… he was done.

The speech therapists shared stories about their students being distracted by their phones, siblings, and background noises. Participants said that they suspected their students were playing games during therapy sessions but could not monitor the children’s screens. Elizabeth had a student “jumping off of furniture” during a therapy session and was distraught because she could not do anything to stop the child. During the pandemic, students lost motivation as their psychological needs for *competence, autonomy,* and *relatedness* were not being fulfilled (Deci and Ryan, 1985). Students no longer had the opportunities to feel as if they were making impactful contributions to a classroom, they had no control of their life as the pandemic imposed on all domains of life, and they were isolated from their peers and teachers.

Generally, the transition to teletherapy negatively impacted student motivation and engagement and left the SLPs lost on how to manage them. When asked about how they plan to use technology during in-person treatment in the future, the participants all said that they much prefer hands-on therapy. Most of the speech therapists said that they will continue to use technology as a supplement because they have discovered helpful virtual resources during the pandemic. Joanne explained,

I'm going to continue to use some of these activities… I think some of them are better than the ones I had. They involve weightless cleanup…. And they can also promote carry over the parents could do in the home... I think when it’s the right students, it's really effective.

Elizabeth, though, said that her experience had been “horrible,” so she does not want to use technology at all moving forward.

While much of what the SLPs shared was about the challenges of teletherapy, participants did identity some positives in their experiences. Natalie reflected how teletherapy is an “amazing” and “fantastic” “alternative” given the circumstances. Anna said that virtual therapy pushed her to be more “creative” and “to make [therapy] engaging and… fun.” Taylor shared that her school was supportive and that the administration was “very, very thoughtful.” Additionally, Samantha said that she felt that most of her students were receiving “good therapy” despite all the difficulties.

**Limitations**

The major limitations of the study were the sample size and the variations in the personal experiences of the speech-language pathologists. Of the 162,600 speech-language pathologists in the United States, only seven were interviewed (U.S. Bureau of Labor Statistics, 2021). This study, therefore, does not necessarily represent the experiences of all SLPs during the pandemic. For example, some speech-pathologists only practice teletherapy, so they likely had very different experiences than the participants in this study. Additionally, speech therapists work in a variety of settings, but all the participants in this study worked in schools during the pandemic. To improve the design of this study, a broader survey sent to numerous speech therapists across the United States could have obtained a more objective insight into the role of technology in speech-language pathology. Additionally, the seven participants had varying backgrounds in familiarity with technology, personal perceptions of technology, access to resources, and years of experience as a SLP. These differences in their personal experiences influenced their perceptions of teletherapy and their experiences during the pandemic.

**Recommendations**

Samantha reflected, “I think the biggest challenge of it is that all happened so fast… we didn't have time to figure it out before we were thrown into it.” As the world continues to move forward in the pandemic, it is important to consider what could have been done better for similar situations in the future. The interviews revealed two main areas in need of improvement: training and teletherapy equipment.

There is extensive research about the importance of technology training. Everyone—SLPs, students, and parents—should be trained for telepractice to maximize the impact of teletherapy. With technology becoming more and more integrated into society, the demand for teletherapy will likely only increase. While it is more realistic to train students and parents when the need for teletherapy presents itself, SLPs can be more effective and skilled if they are trained in telepractice. Speech-language pathology graduate programs are the perfect environment for future SLPs to learn about teletherapy. Linking Kids to Speech-Language Pathologists (LinKS) is a program at the University of Kentucky that trains SLP graduate students in teletherapy, and it has successfully prepared many SLPs for telepractice (Lowman, 2017). Graduate programs should model or borrow concepts from LinKS. Additionally, professional development is important for those who are already practicing SLPs. A certain number of telepractice professional development hours should be required by states.

In her interview, Taylor stated, “I know with formal training there's like specific equipment that you're supposed to use and things like that so maybe if I was set up for teletherapy I would enjoy it more.” Taylor was the only participant to mention telepractice equipment, and she did not have access to it. While no one was prepared for the pandemic, SLPs moving forward should have access to teletherapy equipment such as voice and speech translators, sound amplifiers, frequency adjusters, and signal systems. This equipment would enhance the quality of teletherapy.

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Table 1*.* Common Themes Revealed in Interviews, derived after cycles of coding.

|  |  |
| --- | --- |
| Social-Emotional | “Definitely… a need for some of these kids… they are missing that social interaction piece so much… a lot that I have social language goals for. I'm not sure how effective teletherapy is for them, because they just really need to be in with their peers.”“Their outlook on life and themselves totally decreased.” |
| Learning Environment | “Being at home is extra hard because there are other people that either are or aren't… around and the environment of their home can play a role in how successful they are.” |
| Effectiveness | “I think this was such a tough situation for everyone to be thrown into… It's taken a lot of effort and a lot of work to kind of get it to really be functional.” |

**Appendix A**

*Questionnaire; Questions for Interviews #1-#6*

**Provide Context for Study**

Back in February, I planned to do my thesis on how technology is used as a tool during in-person treatment. With the COVID-19 outbreak, though, it has taken a life of its own with therapy becoming completely virtual. Throughout this interview, I will try to gain a complete understanding of what your practices looked like in regard to technology prior to the COVID-19 pandemic versus now.

**Introduction Questions**

How long have you been a SLP?

* + Where have you been a SLP? Just schools? Hospitals? Private practice?

How long have you been a SLP in your current context?

Do you have a certain specialty? Or do you treat students with all differences and disorders?

Who are the students you typically treat?

Age? / Grade level?

What sort of background do they come from?

Range of severity of students’ differences and disorders?

**Prior to COVID-19**

How did you use technology during in-person treatment?

Were you trained (in grad school, in professional development, et.) to use technology in face-to-face treatment?

If so, where and how many hours of training did you receive?

From your experience, is technology a helpful tool? Does it enhance the quality of the therapy you provide?

How responsive were your students to using technology for therapy?

**During COVID-19,**

Once schools closed in March, did you transition to teletherapy?

If no, what did you do to provide therapy, or did it halt for the time being?

Prior to the pandemic, had you received training in teletherapy?

If so, where and when and how many hours of training? How much did it prepare you for the jump to telepractice?

If not, what did you do to prepare for virtual therapy?

What sort of training have you received since the pandemic occurred? How many hours? Who provided the training?

* + Overall, what has been your experience with teletherapy?
		- What challenges have you experienced?
		- How have you navigated those challenges?

How does online school in general affect your students with speech and language disorders?

* + - How do you feel your students were influenced by the decrease in social interactions with peers?
	+ How many of your students/clients did you continue to treat over teletherapy? All? None?

Please share how telehealth has influenced student/client motivation and overall

engagement in therapy.

* Is it difficult to keep students focused and on-task over the computer?
	+ Is teletherapy realistic for treating all students?
		- If not, why?
		- Are certain disorders easier to treat over telepractice than others? If so, which ones?
	+ Do you ever do virtual group sessions? If so, how often?
		- If so, how do virtual social interactions influence therapy?
	+ In your personal opinion, what role should technology play in therapy moving forward?

**IF SLP IS DOING IN-PERSON TREATMENT OR HYBRID THERAPY**

How has it been being back in-person?

Given the current situation, what are the benefits and challenges between face to face and virtual therapy?

Do you wear masks during therapy?

If so, how do masks impact the quality of treatment?

Are you using technology during treatment? What sort of technology? Do you feel technology enhances the quality of treatment?

**Appendix B**

*Questionnaire; Interview Questions for #7*

**Social Emotional**

1. Various participants discussed how their students greatly missed their friends and were suffering from the lack of social interactions.
	1. How did you observe this in your students? How did this impact your students? Did it impact your students differently than students not receiving speech-language therapy?
	2. What do you feel they lost from being disconnected?
	3. Being in-person, how has masks and social distancing continued to impact students’ abilities to socialize?
2. Participants shared how excited and giddy their students were for virtual group sessions.
	1. Did you do virtual group sessions with your students?
	2. Did your students respond the same way?
3. Participants described psychological impacts of the pandemic on students. For example, students developing severe separation anxiety. Also, a student with selective mutism thriving from the extra layer of distance virtually.
	1. Did you observe any psychological impacts of the pandemic on your students? More negative than positive or vice versa?
4. Many of the SLPs noted the difference in student attitude depending on children’s age. Generally, it was said that the younger students could easily be put in front of the computer, but it was very difficult to maintain their attention. Meanwhile, older students (upper elementary, middle school) were very unmotivated and would not engage.
	1. Have you observed a difference in attitude between age groups?
	2. How has the impacted the effectiveness of therapy?
5. Participants described their experiences with teletherapy and the pandemic as “weird”, “draining”, “not quite as rewarding”, and “challenging”. One participant said she “had so much anxiety about the job”.
	1. Can you relate to what these SLPs said? How did the pandemic and teletherapy impact you, emotionally?

Learning Environment

1. A couple of the participants noted how being at home was distracting for students.
	1. Did you observe this? Was being at home a productive or distracting learning environment for your students?
	2. What was most challenging about being at home? What was most beneficial?
2. All six of the SLPs mentioned parent involvement in their interviews. Some talked about it negatively, some talked about it positively, and some reflected on their dependency on parents.
	1. What was your experience with parent involvement during teletherapy?
3. I heard a lot about how technological difficulties and barriers influenced the learning environments and, therefore, therapy. Technological difficulties and barriers include access to Wi-fi, access to technology, audio feedback, background noise, students refusing to turn on camera and microphone, and being able to manage students over the computer.
	1. How did technological difficulties and barriers impact your experience with teletherapy?

Effectiveness

1. All of the participants were asked if they had received training in teletherapy prior to and during the pandemic. They all said they had not received teletherapy training prior to the pandemic in neither graduate school nor professional development, and most participants noted minimal training during the pandemic.
	1. Was this your experience?
	2. Following the pandemic, do you think this should change? Should there be more training in teletherapy specifically? Do you think teletherapy is going to play a larger role in therapy practices?
2. All the participants mentioned the legality of teletherapy as a challenge – getting consent forms, practicing across state lines.
	1. How did this impact your transition to virtual therapy?
3. Now being in-person, how does wearing masks and/or face shields and social distancing impact your therapy?
4. Did all of your students continue to attend therapy once it was online? Was it difficult to make sure students showed up?
5. When asked about how they used technology prior to the pandemic, the participants described technology as a helpful tool that motivated their students. But once the pandemic hit and technology became the source of therapy, they found their students to be unmotivated and disengaged.
	1. Do you agree? Did your students’ motivation decrease during teletherapy? If so, why do you think this was the case? Just the impact of the pandemic? Impact of school being virtual?
	2. Do you think technology is motivating only when used as a supplemental tool?
	3. Did you find certain activities or approaches to therapy motivated and engaged your students more during teletherapy?
	4. Post-pandemic, what do you think should be the role of technology in therapy?