

The iPad as a Clinical Tool

The iPad as a Clinical Tool in Speech-Language Pathology: Clinician Perspectives

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ABSTRACT

The rapid growth of mobile technology within society is changing service delivery in health care settings, including speech and language services. Despite limited research in this area, use of mobile devices as a clinical tool continues to grow. This study documents speech-language pathologists' perspectives on current and future use of the iPad in clinical practice.

The study is part of a larger project examining the use of iPads by speech-language pathologists (SLPs) in Alberta Health Services (AHS), a large province-wide health agency. This component of the project examined SLPs' perspectives about the use of iPads and the supports needed to use this technology within a large health agency. Through use of an online survey, SLPs employed by AHS explored the benefits and limitations to using the iPad as a clinical tool. Both qualitative and quantitative data were collected. Clinicians identified a number of benefits and limitations of the iPad, and reported that their approach to using the device was similar to that of any other clinical tool. Results also revealed the challenges clinicians and organizations will face when implementing this technology.

LITERATURE REVIEW

Technology is constantly evolving, and the field of speech-language pathology is influenced by this evolution. As more mobile devices are introduced and adopted by clients, it is important for speech-language pathologists (SLPs) to remain informed about their uses, benefits, and limitations. This paper focuses on a specific technology, Apple devices using an iOS operating system, specifically, iPad, iPhone and iPad touch (iDevices). These are all multi-touch graphical user interface devices which allow the user to download and use a variety of applications (apps), some which are relevant to speech-language pathology.

Availability of technology and clinical uses

Research in the area of iPad use in speech therapy is sparse and limited to survey data based on small participant numbers. An informal survey of 302 SLPs in mostly American school settings (Fernandes, 2011) found that 72.9% owned an Apple device and 80.5% of those who owned one used it in therapy to provide a variety of services including articulation therapy (75.4%) and assessment (12.3%), language therapy (80%), Alternative/Augmentative Communication (AAC) (40%), fluency (16.9%), voice therapy (4.1%), and as a motivational tool in therapy (85.1%). Another survey explored satisfaction with use of the iPad in educational or clinical settings and found that 92% were satisfied or very satisfied with the tool and 93% felt that the apps they used improved their ability target Individualized Education Plan goals (Epps, Ekedal, Wingard & Blosser, 2011).

These studies indicate that the use of iPads in clinical and educational settings is common and that the devices can produce positive results. A recent review of 15 studies reported positive outcomes when iDevices were used to help individuals with developmental disabilities learn new skills or adapt behaviours in five domains: academic, communication, employment, leisure, and transitioning (Kagohara et al., 2013). However, the authors also noted that the studies were comprised of relatively small populations and that substantial gaps remain in the research. Clearly, the evidence base supporting the use of this technology is not keeping pace with the frequency and diversity of use. Exploration of the benefits and limitations of the tool may help provide guidance on the most effective uses of the tools in a clinical setting.

Benefits of iPad use in Speech-Language Pathology

The iPad is a tool that may enhance the therapeutic process and benefit both the SLP and the client. Researchers have identified numerous beneficial aspects of the tool relating to its low cost, practicality, and adaptability.

One benefit identified in the literature is reduced cost. After initial investment in the hardware, additional costs can be relatively low; a single iPad can replace a number of costly speech therapy tools (Helling & Rush, 2011; Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012). Unlike some other therapy tools, the iPad does not need to be purchased through specific speech-language pathology providers, so clients can buy the device and use it to carry out home practice as requested by the SLP (Helling & Rush, 2011; Decurtis & Ferrer, 2011; Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012).

In addition to the financial benefits, use of an iPad in the clinical setting offers many other practical benefits. The iPad is portable and can be used in any location where therapy is taking place (Decurtis & Ferrer, 2011; Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012). It can decrease preparation time for treatment sessions and it reduces the amount of material the SLP must transport between settings by giving them access to email, calendar, audio/video recording, and the internet (Austin-Chance & Cooke, 2011; Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). The ease of use of the iPad also emerged as an appealing feature in previous qualitative research (Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012; Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013).

One advantage of the iPad is that it can be adapted to clients' needs. It includes accessibility features for those with visual or hearing impairments (Fernandes, 2011).

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Additionally, many apps allow the adjustment or personalization of settings, such as entering pictures of a client, or changing a story to contain a client's name (Fernandes, 2011). The iPad presents and responds to a variety of sensory information (visual, tactile, and auditory), which increases client interest and facilitates successful therapy (Decurtis & Ferrer, 2011). Another positive aspect identified by clinicians is the wide variety of apps available for iPad users that are specific to speech-language pathology and that can be adapted for use in a therapy context (Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). As an AAC device, the iPad is a peer-accepted piece of technology, and an appealing communication alternative due to its large screen and low cost in comparison to other AAC devices (Helling & Rush, 2011).

Disadvantages of the iPad

Although the iPad is an appealing therapy tool for treatment, there are some potential disadvantages to this device.

The initial cost of the iPad itself can be a large investment (Fernandes, 2011; Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). This initial cost does not include the price of apps, some of which can be costly. Additional hardware such as speakers or cables may also be required for users who work in a loud environment or plan to use their iPad in conjunction with peripheral devices, such as projectors (Fernandes, 2011). This device, like others, is not indestructible, and the SLP should be mindful of the potential risk of dropping or damaging the iPad (Helling & Rush, 2011; Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013).

Due to the iPad's small size, this device can also be easily lost or stolen (Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). The potential for theft also poses a threat to client

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confidentiality, requiring that organizations take time to develop and enforce security policies and that the devices are thoughtfully configured. Such measures include password protection, appropriate levels of encryption, and the ability to remotely erase data from the iPad (Apple, 2012).

Incorporating the device into therapy also requires technology support for clinicians and organizations. While the portability of this device is appealing, many hospitals and schools do not have wireless capabilities, which are required for some apps and functions, and may limit the usability of the device in these areas (Fernandes, 2011; Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). Additionally, Apple iOS devices use a different operating system than computers and other portable technology. Adopting the iPad may require training time and costs for those SLPs who are unfamiliar with this system (Helling & Rush, 2011). Due to the quick evolution of this type of technology, SLPs and agencies need to maintain and support different generations of the product. Clinicians must also keep up to date on apps as they evolve (Gosnell, 2011).

Selecting apps that are appropriate and effective for specific clients can be difficult. Minimal research into app selection has been done, although one study cites a list of principles that should be considered when selecting new apps. Humphreys, Gibson, Miller, Palmer, and McFarlane (2013) state that an app should: be engaging, facilitate acquisition of a target skill or skills, allow for naturalistic, meaningful interaction with a communication partner, allow for individualization, be based on evidence or sound pedagogy, allow for accountability in collecting data on client progress, and allow for efficient application to the client.

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The iPad may not be an appropriate tool for all clients or in all environments. Even though the device offers many accessibility features, it can still be difficult for someone with motor or cognitive difficulties to operate independently (Humphreys, Gibson, Miller, Palmer, & McFarlane, 2013). For some, iPad use may decrease social interaction and some children may have difficulty transitioning between iPad activities (Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012). It is often a major goal of therapy to promote generalization of learned behaviors into the client's natural environment (Conley, Fournier, Hanson, O'Brien, & McFarlane, 2012) and many apps are not designed to support naturalistic activities.

Study Purpose:

This component of the project examined SLPs' clinical perspectives about iPad use, prior to a pilot project providing iPads to selected clinicians throughout the province. This study aimed to supplement the literature providing clinical perspectives on use, implementation, and organizational barriers that are foreseen when introducing the iPad into clinical use. Through use of a survey distributed to all speech-language pathologists (SLPs) employed by Alberta Health Services (AHS), the following broad questions were addressed:

1. What opinions do SLPs have about use of the iPad as a clinical tool?
2. What are the current levels of iPad use and knowledge amongst participating SLPs?
3. What barriers to, and facilitators of, iPad use are foreseen by SLPs?

METHODS

Participants

All speech-language pathologists working for AHS at the time of the study were invited to complete an on-line survey examining clinician and client needs and perceptions regarding

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use of mobile technology. Of the potential 614 speech-language pathologists, 133 completed the survey. With an overall response rate of approximately 22%, responses to this survey were slightly below the benchmark for studies conducted at the organizational level (Baruch & Holtom, 2008). The clinicians that responded had an average of 13 years clinical experience with a range of 1 to 43 years. Each of the agency geographic regions were represented: 28.57% from the Edmonton region, 22.56% from the Calgary region, 15.79% from the North region, 21.05% from the Central region, and 12.03% from the South region, with 52.27% in an urban setting, 34.85% in a rural setting, and 12.88% in a mixed setting. Both full-time and part-time clinicians were represented. The responding clinicians also worked with a range of age-groups; 39% of respondents reported that adults made up a part of their caseload, 48.87% reported the same for preschoolers, and 36.16% for school-aged children.

The Agency

Alberta Health Services (AHS) is responsible for delivering health services to the 3.9 million people living in Alberta. Approximately 550 speech language pathologists work in inter-professional teams to provide services to all age groups and service sectors including community, acute care, rehabilitation hospitals and continuing care. SLPs work across sites and settings to deliver care to clients in their homes and communities. In rural and remote locations, one SLP may be responsible to travel up to 100 kilometers to reach clients and provide services across the continuum from health promotion, intervention, and prevention to end of life care.

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At the time of this study, SLP clinicians and leaders were concerned about a possible gap in service delivery options due to limited availability of the popular mobility device, Apple iPad. In order to investigate the potential of the iPad and associated therapeutic applications as an effective therapy tool, the following factors were considered: potential benefits to clients and clinicians; possible unforeseen barriers and risks; how to ensure privacy and safe storage of information; clinician education needs related to information, privacy and security, and clinical use; processes for approving and purchasing apps in a large organization; information technology supports required to implement and sustain iPad use; and clinician and client factors that would support optimal use of the devices

Mobility devices were not yet approved for clinical use across the organization, though there was some limited iPad use in specific sites and settings. This project provided the opportunity for a controlled and focused experience across the organization (including clinicians, practice leaders, information technology, privacy and security).

Procedure

This component of a larger research project examined information derived from an initial survey of clinicians. In the second phase, a group of 17 clinicians were provided with iPads for clinical use. Their experiences over a 9 month period will be reported in a separate paper.

The **iPad Use in SLP** clinician survey was distributed to all SLPs employed by AHS prior to distribution of the iPads. Results were collected through an online format. It asked about clinicians' experiences using iPads, whether or not they used their iPads in therapy, what kind

of information they needed to incorporate this technology into their practice, and estimates of their clients' interest in using the technology as part of speech-language pathology services.

Analysis. Both qualitative and quantitative data were used to examine the information collected. Data from the qualitative questions were analyzed to discover themes via summative content analysis (Berg, 2004; Hsieh & Shannon, 2005). These themes were derived from a common idea or comment expressed by the participants. Four individuals were involved in independently analyzing the descriptive data from the survey. After thematically coding each of the clinician responses, analysts met to consolidate all of the coded information into one overall coding structure. Based on this coding structure, similar clinician responses were grouped into common themes. The final list of themes indicated comments made by multiple respondents and identified as important or noteworthy by multiple analysts. Data from the quantitative questions of the clinician survey was also tabulated, with means and ranges used to describe the results.

RESULTS

Descriptive analysis of the results focused on clinician experience with mobile technology. Estimates of client interest are also presented and followed by qualitative analysis of the survey responses.

Quantitative Results

All participants (N = 133) were asked to provide information about their experience with, access to, and knowledge of, iPads. The number of respondents to each question varied between 131 and 133, with the exception of the question which asked whether the device was used at work, with 101 respondents.

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When clinicians were asked about their experience with iOS devices: 92% reported they had previously used applications on the iPad and 43% indicated familiarity with other smartphones or tablets. Over three-quarters (77%) of participants had regular general access to an Apple iOS device, with 82% reporting use of the device for over 1 year. Only 1% had never utilized an iOS device. Approximately two-thirds (66%) of participants indicated they used their iOS device at work and, of these individuals, 64% used a personal device, 18% used an agency device, and 16% received their device through other means.

Participants varied in their self-ratings of knowledge of and confidence with the tool. As rated on a sliding scale from 1-100, knowledge ratings ranged from 2 to 100 with a mean of 54 and confidence ratings ranged from 14 - 100 with a mean of 65. Participants also varied in their self-ratings of effectiveness of use with a range from 7 – 100 and a mean value of 73. When asked to rate their interest in using, or continuing to use, an iOS device as a clinical tool with their clients and service partners, participants reported a mean value of 84 with a range from 1-100 on a sliding scale of 1 (not interested) to 100 (very interested).

Finally, participants reported a mean value of 44 and a range from 1-100 on a sliding scale when they were asked to estimate the proportion of clients that have expressed interest in using an iOS device in clinical service. They were also asked to estimate the portion of their clients that currently have access to an iOS device outside of the clinical environment. In response to this, clinicians reported a mean value of 50 and a range from 1-100 on a sliding scale from 1 (none) to 100 (all).

The participants who reported employing an iOS device at work (N = 67) provided additional information describing how they use it. All the following questions were answered

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by these 67 participants. Nearly all (94%) indicated that they used the device for clinical purposes, with almost half using the iPad with more than 10 clients. A relatively small percentage of these individuals (12%) utilize their iOS device for clinical purposes in almost every session. The majority of participants reported utilizing the device at work less frequently: 15% used it 4 to 7 times a week, 26% used it 1 to 3 times a week, 24% used it 2 to 4 times a month, and 22% used the device at work once a month or less. The devices were also used for educational purposes (60%), administrative tasks (36%) or other areas (13%).

The subgroup of 67 respondents who use the iPad at work also provided information about using and selecting apps. Over one third (35%) had used 16 or more different apps. An additional 46% had used between 4 and 15 apps, and the remaining 18% had used three or less in clinical practice. To learn about new apps, the majority of participants (94%) consulted multiple sources such as other colleagues (93%), the App Store (70%), professional associations (55%), blogs (39%), and app developers (22%).

Qualitative Results

Themes that emerged from the written survey responses of clinicians are organized into the following sections: Benefits and Limitations of the iPad, Interactions and Memorable Experiences, Clinical Uses of the iPad, and Resources and Supports needed. Individual respondents could make multiple comments for each question or leave out a question that was not relevant to them, much as would occur in a focus group. A range from 58 to 128 individuals provided responses to these qualitative questions.

Benefits. Question 27 examined perceived benefits of an iOS device in clinical practice. The themes identified in responses to this question are discussed below.

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Responses referencing perceived benefits of the iOS device included many relevant and recurring themes. A general category of the iOS device as a Beneficial Therapy Tool was identified, encompassing the following themes: Assessment and Intervention, Home Practice, Common Household Item, Feedback, Motivating and Engaging, and Client Interest. Specifically, the theme Assessment and Intervention in all speech and language domains was identified as a benefit of the iOS device. Participants felt that home use of the device would facilitate generalization of skills across environments. Similarly, Common Household Item was another theme that emerged, acknowledging that many families already have access to this technology. This was represented by the following comment made by one of the clinicians surveyed:

“Children are being exposed to this technology at young ages and are learning through this mode. This is becoming part of our culture and clinicians will need to incorporate iOS devices in treatment, in order to remain current and relevant in the field. Many apps are available and clients already use them. Knowledge of these will help in guiding clients in selecting what is appropriate and how to use them in combination with other treatment approaches.”

Another theme related to treatment use was Feedback. The iOS device allows for immediate feedback for clients. Motivating and Engaging were also common themes present throughout clinician responses. Participants stated that many clients are highly motivated by the iOS technology and this tool can be used to engage individuals who otherwise might be hard to engage. Client Interest was another theme present, showing that clients and families have high levels of interest in using the iPad as a therapeutic tool.

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The category of potential Benefits to the Clinician included a general group of themes including Data Collection, Material Reduction, Decreased Preparation Time, and Ease of Use. The theme of Data Collection referenced the iPad's value in storing and collecting client data. This theme, along with Material Reduction and Decreased Preparation Time, were frequently occurring across clinician responses. Ease of Use was another major theme, due to the device's accessibility, portability, and applicability across settings. Some of these benefits are summarized in the following comment from a participant:

“As a rural, traveling therapist (with a very full trunk of resources), a device is attractive as it would allow me to carry a large range of resources in a compact way. It is a great alternative to piles and piles of binders with diagrams and worksheets!”

Another theme referenced the iPad as a Socially Acceptable alternative to other communication devices, specifically in the area of AAC. As previously stated, the iPad is common throughout households and motivating for many clients. Therefore, clients who use the iPad as an AAC device may be less isolated by their device.

Affordability was another benefit that emerged from the responses. Clinicians see the iPad as a relatively cost effective device, especially when considered in the context of currently available AAC devices. They also noted that once the initial investment has been made, many apps can be purchased for less than ten dollars, and many are free. The cost is appealing as many families are willing to invest small amounts of money into apps. These apps can then be used in the clinic and at home encouraging generalization across settings.

The final theme acknowledged Limited Benefits in using an iOS device clinically. Although this theme was not prevalent throughout clinician responses, it is important to note

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that clinicians recognized that the device may not be appropriate for some clients or in certain environments. The following example demonstrated this perspective:

“Limited benefits for acute stroke. Useful if the right programs can be found (however that can be time-intensive). They have had very limited practical use in my clinical practice.”

Limitations. Survey question 28 examined the perceived limitations of the iOS device in clinical practice. The themes identified in response to this question are discussed below.

Discussion of the limitations of an iOS device brought forth many important themes. The first general category was lack of Structural Supports. Limited access to iPads and WiFi as well as the need for Technical Support were the major themes that emerged in this category. Clinicians participating in this study identified and articulated the challenges of implementing new technology with the following statement as an example:

“I have no Wifi access and there is only one iPad for the whole office. This means it is shared among 20 or more SLPs. We are restricted to what is already pre-loaded as we cannot access the internet unless it is someone physically connected to a port in the wall.”

Another related theme is the nature of the iPad as an Evolving Device. Clinicians noted that the device is constantly changing, and requires frequent software updates.

Limited Knowledge about the device for both clients and the clinician was referenced. Clinicians stated that the older population may struggle to learn how to use this device. Lack of information in the current literature was also noted, and this poses a challenge in applying best practice principles. Additionally, the time required to train clinicians and clients to use the iPad,

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and the difficulty making app recommendations with the limited knowledge that most clinicians currently have were also discussed. The following clinician's statement speaks to this issue:

“(The limited benefits include...) not knowing all of the many ways to use individual apps. I feel some apps can be used in a variety of ways beyond what they were intended. It would take a lot of extra planning time to evaluate each individual app and determine the many ways to use it.”

The next limitation identified was Cost. In contrast to the theme in Benefits that referenced the cost as a positive aspect, respondents also reported the cost associated with the initial purchase of the iPad, and additional investments such as cases and apps to be limiting.

Inappropriate Tool was another limitation; Clinicians reported that an iPad may be distracting for some clients, less effective than other therapy tools, or not appropriate for the client at all. It may also cause an overreliance on technology. This is demonstrated in the following quote:

“It can become an inappropriate crutch for both the child and parents or teachers. Users do not always realize that vigilance and hard work are still required with speech apps. Sometimes the game aspect of some apps distracts from the treatment aspect so as a therapist I need to be able to provide guidance in what programs will meet the goals that have been set.”

The last general category of themes was Issues of the Device itself. Within this category, the theme Fragile, and Infection Control /Security were also noted to be potential concerns. Clinicians were concerned that client confidentiality may be compromised if proper security

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measures are not taken, or if the device is stolen. Security limitations may also prevent clinicians from saving or recording data on the device.

As indicated in the themes above, there are a number of perceived Benefits and Limitations to using an iPad as a clinical tool. The themes described a variety of perspectives about the iPad as a clinical tool, and considerations for clinicians and their clients.

Interactions and Memorable Experiences with the iPad. Two survey questions examined clinician's previous experiences with iPads. Question 23 explored how use of an iOS device modified clinicians' interactions or service plans with clients, while question 33 asked clinicians to describe memorable interactions with clients. Results from these questions were examined together, as many of clinicians' previous experiences using the iPad related to how use of this device has modified their interactions with clients. Many common themes emerged and are discussed below.

A general category of Positive Modifications was used to group themes that referenced ways the iOS device enhanced interactions with clients. The iPad has been used to Support Existing Clinical Activities, such as providing an alternative way to collect data, allowing use of video for feedback, as well as providing a way to practice targets at home. Clinicians also noted that the iPad allows for Material Reduction and Reduced Preparation Time. The theme of Video/Audio recording demonstrated that the device can be used to collect data and provide feedback to clients. The theme of Use of Videos emphasized that many clients have used the device as a way to take and share video information with the clinician. Interactions with clients were also noted to improve due to the Connectivity of the device to the Internet, which allows access to resources and email. Because of these benefits of this technology, the iPad was

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reported to be useful as a tool to provide Education for Clients and Service Providers. The theme of Beneficial Use By Other Agencies recognized that the device is currently being used by agencies, such as schools. Clinicians also noted that using the iPad has improved Interaction and Collaboration with these Service Partners in using and selecting apps, as exemplified in the following response:

“Most of my classrooms now have the technology so it allows me to stay current, provide speech language related PD (professional development) to my teachers and give them suggestions on how to use the technology in a more communicative way in the classroom.”

General themes of Positive Interactions were also emphasized in the results of these questions. A theme of the iPad’s Cool Factor emphasized that use of this device is seen as “normal” and therefore reduces social barriers. A related theme that emerged was that the iPad Supports Participation. Clinicians have noticed that use of the device has allowed clients to interact with others, supporting their overall social and educational participation. Within the theme of Client/Family Motivation, clinicians noted that not only are children motivated to use the iPad, but adult clients also show interest in using this technology in treatment:

“My favourite is an 85 year old lady with expressive aphasia and apraxia, who was so determined to use her iPad/iPhone that she went to “Apple School” and came to therapy to teach me what she learned.”

Not only have clients and families emphasized their motivation to use the iPad in treatment, clinicians have also received Positive Input from Families who have had experience using it in therapy. Clinicians also noted evidence of Positive Treatment Outcomes when using

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the device with clients. Clinicians also emphasized that the iPad has been Effective for Home Practice. The theme of Personalized Therapy addressed the ability of the iPad to allow clinicians to specifically design treatment for each individual client.

Another general category of themes includes the Challenges clinicians encountered in interactions and experiences they have had with clients. Lack of Access to the device was common and was noted to influence the clinician's ability to give advice on app use. This led to reported feelings of limited credibility, with some clinicians pointing out that parents are often surprised by the limited access to current technology. Another challenge highlighted was that Careful App Selection Is Necessary. This tied in with another theme noted: the Complexity of App Selection. Clinicians reported struggling with choosing appropriate apps for their clients due to the wide selections of options available. Clinicians also noted that some clients have used the iPad and selected apps inappropriately based on their cognitive or motor abilities. Use of the Tool as a Toy was another common challenge reported; clinicians noted that use of the iPad in treatment is difficult as some clients see the device as a toy rather than a treatment tool. Clinicians noted that this creates another challenge – Education Needed for Families and Other Professionals. Clinicians also highlighted that Support from Caregivers is Needed; in order to use the device, clients often require support from their caregivers. The theme of Unrealistic Expectations emphasized that some clients and other professionals have unrealistic expectations about the benefits the device can provide. Overall, a common challenge noted in the responses was that the iPad is Not Appropriate for Everyone.

The theme of No Changes referenced clinician's perceptions that use of the iPad has not modified interactions with clients, but has enhanced or supplemented them.

Clinical Uses of the iPad. Two survey questions explored how the iPad could be used clinically. Question 25 focused on how clinicians would use the device themselves, while question 31 asked how it could be used with clients or other service partners. Most of the themes identified were present in response to both questions and are discussed below. Typical clinical activities were identified under the Assessment/Intervention theme. Many clinicians identified specific goal areas for these activities, such as Fluency or Articulation. This theme was related to the Home Practice theme, which highlighted the ability to use treatment apps in sessions and at home. A number of themes highlighted uses outside of direct assessment and treatment with clients. The Educating and Advising theme included the provision of information to clients, families, as well as other professionals. The theme included the use of the iPad as a resource, and also emphasized the importance of assisting service partners and clients to select appropriate applications and use them in a therapeutic way. The following quote illustrated this theme, as well as the related Use in other Settings (schools) theme:

“Having access to a device would also allow one to become more familiar with the apps out there and would allow me to better educate my school partners on the best way to use these devices with their students. This is especially important when most of our schools (especially the rural ones) have enough iPads for each student.”

Use of the iPad as an AAC device was considered a separate theme from Assessment/Intervention. While intervention can include AAC training on the iPad, many clients using the iPad for AAC will use it independently as a communication tool, rather than as an intervention material to practice other skills. The use of the iPad as a cost effective, appealing option for AAC was seen as one of the tool’s strengths.

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Reinforcement/Motivation was present in the responses to both questions. Tracking Progress was also identified as a potential use of the device for clinicians, clients, and service partners.

Many themes emerged that highlighted unique uses of this technology outside of direct clinical use, including Video/Audio recording, Distance Communication, and Administrative tasks (such as scheduling, emailing, etc.). The Flexibility of Use theme highlighted the multipurpose quality of the device as a defining feature. Benefits or outcomes of the varied uses of the iPad, such as Reduce Materials and Increase Productivity were also identified.

Finally, a theme of Barriers was identified in these questions, though not prompted by the questions themselves. The Barriers were varied and included challenges related to policies about iPad use, access to internet, app limitations and need for organizational support.

Use in other Settings, Flexibility of Use, and Barriers were only present in response to question 25. Distance Communication was only seen in response to question 31. All other themes were present in responses to both questions.

Resources and Supports. The survey asked participants three questions regarding the resources or supports that would be necessary or helpful when using an iPad in a clinical setting. Questions 22 and 26 both asked what resources assist clinicians when using the device. Question 22 asked about previous use while Question 26 explored what supports clinicians believed would be helpful in future use. Question 32 asked participants what resources or supports would be most helpful for clients when they used the device. As many of the themes identified in these responses overlapped, they are discussed together.

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A theme that appeared in all three questions was Training/Education. Participants suggested that clinicians and clients required easy access to both formal and informal training that would help them to effectively use the device. The formal education programs referenced included workshops, internet resources, and information provided by professional associations in the form of blogs, webinars and workshops. In terms of informal training and education, many participants indicated that information shared among friends, family members, clients and colleagues was especially useful when integrating the device into their clinical practice. Learning from Other People was a theme. One participant noted:

“My colleagues and I also discuss and ‘app share’ during some of our meetings - we will hook one of our iPads up to the projector and do a run through of what an app does, who it works well with, cost, etc. This has been extremely helpful - it's always nice to have a "trial run" before purchasing some of the apps.”

Also, many responses suggested that the process of sharing information among colleagues should be more formalized in the form of SLP-specific blogs or discussion groups. Many participants suggested that Access to a Knowledgeable SLP or Other Professional would be important to ensure that clients used the device in an appropriate way.

A second theme identified in all three questions was Apps; participants indicated that they needed ways to access and learn about new apps. Many emphasized the need for a comprehensive list of apps that would allow them and their clients to use the device in a manner appropriate for therapy. In order to effectively use an iPad, one participant suggested that clients need a “selection of appropriate apps and not just angry birds [sic].” Connected to

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this is the need for Time to Practice and Learn. Participants indicated that they needed to be able to review the apps to figure out how they might be beneficial in the clinic.

A third theme identified in all three questions was Access to the iPad. For many participants, access to iPad was restricted by organizational policy. For others, Access to the iPad included their employer supplying a device they could use in clinical practice. Need for Independent Use of the devices was also identified as a theme. In the environments/situations where the devices were already available, many participants indicated that it was difficult to share a small number of devices among many clinicians.

Many of participants suggested that Organizational Support of iPad Use would greatly improve their ability to use the device. This theme is connected to several other themes identified in both of these questions. One example of this is the development of Policies to Clarify Use; clinicians wanted to know how they are allowed to use the device, what kinds of information they can record on it, and how the device needs to be configured to best protect their clients' information. Similarly, many participants suggested supports that might be described as Logistics. This included access to technical support, Wi-Fi, guidelines for appropriate procedures, and electronic charting. Access to wireless Internet was an important logistical concern. As one participant wrote:

“Our facility would need to have Wi-Fi available so we can download apps, use apps that require Wi-Fi, and be able [to] access email and the Internet for teaching purposes.”

Participants also indicated that they would need access to Funding in order to use the device for clinical purposes. Many indicated that they were buying their own apps and downloading them at home. Additionally, some participants suggested that the funding could

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be used to purchase add-ons such as mice and keyboards that would facilitate their clients' use of the device. In terms of organizational support, one final theme emerged when clinicians were asked what kinds of support and resources have facilitated their clinical application of the iPad; some simply indicated that, at the time of the survey, iPad use had not been approved, so support for their use was not available.

In terms of resources and supports needed by clients (Question 32), responses frequently fell into two final themes. Participants suggested that their clients benefitted from having Previous Knowledge of the device. Many indicated that their clients already owned a device or multiple devices, so they were well equipped to integrate the device into their therapy. Participants also suggested that clients need the Physical Ability to use the device, meaning that they require adequate motor control and sensation to properly manipulate items on the screen.

DISCUSSION

Participants in this study were limited to SLPs working for a large provincial health authority where the use of iPads was not approved for clinical practice. The participants had a wide range of previous clinical experience, worked in diverse clinical and geographic regions and had a range of experience using iOS devices as part of their clinical practice. Although this diverse group of clinicians had some differing perceptions about iPad use in their settings, there were many common themes in their responses to questions exploring the links between technology and clinical practice.

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Although the majority of participants reported interest in using an iOS device as a clinical tool, they also thoughtfully weighed the benefits and limitations of the iPad in their therapy settings, and showed evidence of using clinical knowledge and reasoning to make decisions about use of the device. As with any other tool, the responses indicated that those clinicians who have been using the iPad have assessed the therapeutic value of the technology by weighing the pros and cons, seeking advice from colleagues, critically examining their clinical expertise, and looking for research about the iPad and its potential uses in the clinical setting. This suggests that they are trying to adhere to best practice principles when integrating the device into their practice in spite of the limited amount of research evidence outlining effective use of iPads. Rather than treating the device as a universal remedy for all therapy goals, many respondents have cautiously integrated iOS devices as another tool that can be utilized on a case-by-case basis. In some instances, the use of an iPad is seen to be efficacious, cost-effective and appropriately suited to the individual skills and preferences of the client. For example, they might be motivated to use the device, it may serve as an affordable AAC option for a non-verbal client, or it may facilitate home therapy. Conversely, many respondents demonstrated awareness that the iPad can be used improperly; it may not be well-suited for all clients and some respondents reported encountering situations in which clients used the tool incorrectly.

The research also revealed some contradictory opinions regarding the benefits and limitations of using an iOS device in therapy. An example of this is cost. Some clinicians described the iPad as a cost effective tool in comparison to some other clinical tools or devices, but many also stated that the price of apps, additional components and the initial investment into the iPad could be a barrier for clients and employers. Another example of contradictions

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revealed by the study can be found in clinicians' descriptions of the iPad as a Home Practice tool. Clinicians reported Home Practice as one of the benefits of using the iPad as a therapy tool, yet they also reported a major limitation of not knowing which apps are appropriate for individual clients and not having the tools to engage in best practice when making decisions about app recommendations.

One over-arching connection appearing throughout the results is that research, clinical knowledge and organizational readiness are lagging behind the advancement and proliferation of this technology. Participating clinicians believed that their knowledge was insufficient to respond to client's and service partners' questions about iPad use. They are facing difficult questions. How can they find time in their busy schedules to sort through the plethora of apps available and differentiate the great apps from the mediocre or detrimental ones? How do they identify and help clients who have embraced the technology to use it in appropriate ways? What guidelines and policies are available to help them with the logistics of setting up and maintaining a device? Despite the fact that the majority (66%) of clinicians are using the iOS device at work, they rated their overall confidence when using it at 65%. Many respondents reported that due to lack of knowledge and literature on the iPad, they feel they cannot provide the best services to their clients, especially when the demand for the iPad is so strong. Some respondents indicated that they were unable to serve clients who were asking about therapy options using the iPad because they had not had the opportunity to explore apps or trial the devices. Many clinicians reported that this barrier made them appear "out of touch" with the technological advancements of our society.

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Clinicians also suggested they lack confidence when choosing appropriate apps, with 94% of them turning to their colleagues' suggestions and 70% merely scanning the app store. However, in the qualitative data, some respondents described using more formalized methods of sharing information about new apps. They are making time to learn about the iPad: for example, they "app share" during meetings and they trial "lite" versions of apps clients have shown an interest in. This dedication of time suggests that clinicians are motivated to explore and use this technology and that they are seeking alternative ways of integrating the technology in the absence of the research traditionally associated with evidence based practice.

Establishing use of iPads in a clinical setting is a challenge for a large organization. Clinicians in this survey identified infrastructure, IT support, policy development and implementation as important components to support iPad use by clinicians. Clinicians also identified funding, removal of barriers and restrictions, client confidentiality, infection control, access to wi-fi, and control of app downloads as issues requiring consideration prior to wide-scale distribution of iPads within their agency. Clinicians reported that changes in infrastructure were required, funds are needed, and policy must be created and implemented. These are barriers that may affect other large-scale organizational settings. Making these kinds of large-scale changes takes time, but the relative easy accessibility of iOS devices creates additional urgency: this tool is widely available and the list of apps is growing rapidly.

As technology continues to permeate the world of speech-language pathology, additional research is needed to guide informed decisions about iPad use. Although there is emerging evidence, further data is needed to support or refute the benefits of the iPad in the therapeutic process. Future research including considerations of organizational barriers and

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potential solutions will assist large agencies or health regions in setting policies and procedures to guide and support use of the iPad as a clinical tool. Future research should also address clinical perspectives on best practice principles surrounding iPad use in speech therapy. In order to become a more effective and reliable tool, its effectiveness needs to be shown through a larger body of evidence. Additionally, speech-language pathologists must ensure that their therapeutic focus remains client centered and evidence-based. This means that the SLP must ensure that all therapy is targeted towards the specific needs of the client, and they must find the most suitable treatment alternatives for that individual. Patient preferences and values, scientific evidence, and clinical expertise are all essential aspects of evidence-based practice.

The authors of this paper believe that the iPad is a valuable clinical tool to add to the clinician's repertoire of therapeutic devices, as there appears to be benefits for both the clinic, administrative, and home practice settings. Clients are highly motivated by the tool, it provides and alternative means of treatment, and it is accessible to the majority of the public. However, it is important that SLPs keep the client's best interests in mind when choosing therapy tools, and recognize that this may or may not be an appropriate option for each individual.

CONCLUSION

This study summarizes the information obtained from 133 speech and language pathologists working with diverse populations in a variety of settings throughout Alberta Health Services. The research suggests that those using iPads in therapy do so with awareness that the device is simply a new tool that comes with its own benefits and limitations. The decision to use an iOS device in therapy appears to involve complex interactions involving the resources available, the client's needs, the clinician's skills with the device, and the amount of support

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organizations can provide. Further complicating this decision is the fact that iPads and similar devices are rapidly becoming more common. Currently available research, organizational readiness, and clinicians' knowledge are not sufficient for evidence-based decisions about clinical use. This survey revealed that clinicians are lacking time and resources to confidently integrate the device into their practice. The study also revealed some of the challenges faced by organizations when clinicians begin to employ this new technology. Despite these barriers, clinicians identified many benefits to using an iOS device in the clinical setting, which make these resources worth pursuing. Given further research in this area to address and find solutions to these barriers, this survey revealed that clinicians feel the iPad could be an extremely valuable clinical tool.

Limitations of the Study

Several limitations of this study were identified. First, this research was conducted within the context of a single agency (Alberta Health Services). As such, it is impossible to know how well the findings apply to other agencies and organizations. While the population surveyed was from diverse backgrounds and served a wide range of populations, they worked within the same organizational culture and were guided by agency policies. As participation in this survey was voluntary, a response bias may have skewed the results; clinicians sharing similar or strong opinions may have been over-represented.

Future Research

The results of this study indicate that more research is needed to aid clinicians when they integrate an iPad into their practice. A more extensive body of research needs to be gathered/created around app efficacy, the effectiveness of the device in comparison to more

traditional speech and language therapy tools, and the effectiveness of the device as an administrative tool for clinicians. Further research into which populations would benefit from integration of a device into their therapeutic process should be carried out and evolution of the research needs to move beyond just examining the use of the devices in AAC. Finally, studies need to be done to aid organizations in providing clinicians the support they need to integrate this technology into their practice, including development of organization wide policies and learning opportunities surrounding confidentiality, information security, technical supports, and infection control (Kagohara et al., 2013).

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