Implementing Technology into Clinical Practice: Speech-Language Pathologists and iPad Use

Rebecca Fleming, Caterina Minaudo

Supervisor: Lu-Anne McFarlane Reader: Julie Evans

Implementing Technology into Clinical Practice

ABSTRACT

Recent advancements in mobile technology and increased use of mobile devices are influencing service delivery in healthcare settings, including the field of speech-language pathology. Although limited research exists in this area, an increasing number of speech-language pathologists (SLPs) have expressed interest in using these tools within a clinical setting. This study is part of a larger project examining the use of iPads by speech-language pathologists in Alberta Health Services (AHS), a large, province-wide health agency. This component of the study examined SLPs' perceptions about iPad use before and after using the device for a 9 to 12 month period, how the iPad fit into their clinical practice, what benefits or limitations were reported, and what recommendations clinicians have for integrating iPad use in a clinical setting.

Both qualitative and quantitative data were collected through online surveys as well as initial and final focus groups. After dealing with initial challenges surrounding device setup and app acquisition, iPad use increased across the period of use. Clinicians identified a number of themes surrounding clinical iPad use, such as the need for IT support, time and education. Results and discussion also included suggestions for future iPad implementation within a large health agency.

LITERATURE REVIEW

As technology is constantly evolving, it is important for speech-language pathologists to be aware of current advancements, such as the proliferation of mobile devices in our society. Based on an ASHA survey, approximately 40% of speech-language pathologists (SLPs) used a smartphone and just under 50% used a tablet within their professional role (ASHA Leader, 2013). The use of iPad and iOS devices has increased interest in using various apps, with approximately 55-61% of SLPs interested in using apps for clinical practice (ASHA Leader, 2013). Incorporation of mobile devices into assessment and intervention will alter clinical practice within the field.

iPad Use in Speech-Language Pathology

Access to Devices. Clinical use of Apple iOS devices is relatively new in speech-language pathology; current research shows a growing number of individuals reporting use of Apple iOS devices within a clinical framework (Kagohara et al., 2013). Although the exact percentage varies across studies (ranging from 40-73%), there is evidence of substantial use of mobile devices in the field (Fernandes, 2011; ASHA Leader, 2013; Borys, Desjarlais, Sample, Wilson, McFarlane, 2014; Hinman, 2013).

Uses of iOS Devices. The use of iDevices can be seen across a variety of clinical settings such as schools, hospitals, outpatient clinics, and rehabilitation settings. The devices are used in a variety of situations and for a variety of purposes including assessment/intervention, data collection, alternative and augmentative communication (AAC), reinforcer/motivator, therapy materials, and educating and advising (Bruno-Dowling, 2012; Borys et al., 2014). Reported uses

went beyond therapeutic tasks and included training and in-service, video/audio recording, distance communication, and administration tasks (Bruno-Dowling, 2012; Borys et al., 2014).

The iPad and iDevices can be used with a variety of clients for different purposes; however, it is important to match client needs to device use. Considerations for using the device effectively include assessing client interest, examining intervention goals, choosing appropriate apps and measuring treatment outcomes (Munoz, Hoffman & Brimo, 2013). These considerations are important to ensure clients receive benefits from the use of this technology.

Benefits

Although the iPad is a relatively new tool in the field of speech-language pathology, benefits of this technology have been explored. One of the benefits of the device itself is its high level of accessibility for both clinicians and clients (Helling & Rush, 2011; Decurtis & Ferrer, 2011; Borys et al., 2014). It is easy to purchase, is generally affordable and apps are seen as cost effective (Helling & Rush, 2011; Decurtis & Ferrer, 2011; Borys et al., 2014). The device is easily portable and clinicians can store large amounts of data, making this a valuable and convenient clinical tool (Helling & Rush, 2011; Decurtis & Ferrer, 2011). In addition to clinical applications, the iPad also has a wide range of administrative functions that are considered advantageous to clinicians. These functions include email, note taking, audio/video recording, picture taking, access to Wi-Fi, and many other assistive technologies (Helling & Rush, 2011; Decurtis & Ferrer, 2011; Fernandes, 2011).

Benefits to clients have also been reported, including immediate feedback for clients, high client motivation/interest, use as an AAC device, and use in home practice (Borys et al., 2014). The benefits of iDevices with specific populations have been explored; there is some

evidence of positive use with individuals with developmental disabilities and increased quality of life and competence with individuals with aphasia (Kagohara et al., 2013; Hoover & Carney, 2014).

Limitations

Despite the many perceived and documented benefits of iPad use in clinical settings, there are limitations to consider. These include security concerns, infrastructure and support needed, limitations of the device and infection control, as well as concerns related to clinical use, such as appropriateness of the device for various populations and concerns about increased screen time for young children (Fernandes, 2011; Strugalla & Huges, n.d.; Borys et al., 2014; Manning, Davis, Sparnon & Ballard, 2013). Overall, there is a lack of evidence to support clinical use of the iPad in clinical settings (Borys et al., 2014). For the pediatric population, there is substantial concern regarding screen time for children, especially under the age of two years (American Academy of Pediatrics, 2013). Increased screen time in the preschool years has been associated with speech and language delays (American Academy of Pediatrics, 2013).

Clinical Readiness for Use. Despite the growing frequency of use, SLPs report limited training in clinical use of the devices and limited research examining effectiveness. It appears education and research are lagging behind use (Fernandes, 2011; Strugalla & Hughes, 2013; Borys et al., 2014).

Current Study

This study follows an earlier one, which surveyed speech-language pathologists working within Alberta Health Services (AHS). In follow-up to that survey, a small group of speech-

language pathologists were provided with iPads for clinical use and their experiences with the tools were explored. The following areas were addressed:

- What were clinicians' perceptions and beliefs about iPad use in their practice prior to implementation of the device and after a 9 - 12 month period of use?

- How was the iPad integrated into clinical practice?

- What benefits and limitations were reported during the first 9 - 12 months of use?

- What recommendations do clinicians have for future use of the iPad in their clinical settings?

METHODS

Agency

The project involved Alberta Health Services (AHS), which is responsible for delivering health services to the 3.9 million people living in Alberta. Approximately 550 speech language pathologists work in interprofessional 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. Clinicians provide services across the continuum from health promotion, prevention and intervention to end-of-life care. Although mobility devices were not yet approved for clinical use across the organization, 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, managers, information technology, privacy and security).

Participants

  Survey Participants. Seventeen participants were selected to receive an iPad for use in their clinical setting. Ninety-two of the 133 respondents to the original survey expressed interest in participating in this stage of the project. The 17 clinicians were selected to provide representation across geographic regions, populations served, previous experience with mobile technology and shared vs. individual use. Participants represented the follow regions: 4 in the Edmonton region, 3 in the Calgary region, 3 in the Central region, 4 in the North region and 3 in the South region. Across settings, 7 worked in an urban setting, 7 worked in a rural setting and 3 worked in a mixed setting. Participants described their full-time equivalent in AHS; the average was 0.87 with a minimum of 0.6 and a maximum of 1.0. Participants worked with the following populations: 3 with preschool children, 4 with school-aged children and 4 with adults. A total of 6 worked with a mixed population. One participant withdrew from the study after completion of the first online survey for medical reasons and was replaced by another clinician in the same geographic region and area of practice. One participant withdrew from the study preceding the last survey due to leaving AHS as an employer. One went on leave and one never did use the iPad. One participant did not withdraw from the study, but did not complete any of the surveys or participate in the final focus group.

Materials

  The *iPad Use Tracking Survey* was developed to collect information from participants about their experiences over their first months of using an iPad in their work setting. Both quantitative and qualitative data were collected on a wide range of topics including: 1) process of obtaining the iPad, 2) recommendations for iPad setup, 3) memorable experiences, 4) clinical

practice using the iPad, 5) population and clinical areas served with the iPad, 6) caseload

receiving services with the iPad, 7) reasons for not using the iPad, 8) iPad app list and rating

scale, 9) client and colleague reactions to iPad use, 10) needed supports and information. In the

final survey, additional topics included: 11) how iPad use was facilitated, 12) expectations

versus experiences, 13) future plans for iPad use and 14) suggestions for agencies and clinicians.

Apps were rated by clinicians using an *iPad App Rating Scale,* which provided a critical analysis

of apps based on best practice principles. This survey was delivered in an online format using

Feedback Server (DataIllusion, 2013).

Procedure

Introduction. This study was comprised of several components. The study commenced

with initial focus groups held via teleconference. After these focus groups, iPads were

distributed to participants for use over a 9 to 12 month period, depending on date of receipt of

the iPad. During this period, participants were asked to track their use of the device using the

online survey. The surveys were distributed 4 times throughout the period of use. Final focus

groups were held at the conclusion, once again by teleconference.

Initial & Final Focus Groups. The initial and final focus groups were each held for

approximately 45 to 60 minutes and conducted via teleconference in July 2013 and June 2014.

The number of participants in each group varied between 4 and 8. During the final focus

groups, two participants were unable to participate in the group interviews, and therefore

completed the focus group questionnaire individually via email. Researchers followed a

discussion guide and focus groups were audio recorded for analysis purposes. Topics included:

reasons for clinical interest in the iPad, previous iDevice experiences and availability, client

interest, clinical iPad uses, populations using iPad, supports, barriers, benefits to using the iPad, app selection, service partner reactions, experiences versus expectations, and future iPad use.

Receipt of iPad and Use over a 9 to 12 Month Period. After the initial focus group, 13 iPads were distributed for individual use. Two iPads were initially assigned for shared use among clinicians; however, one participant assigned to a shared device was on leave for the duration of the study. A second iPad was provided to another participant assigned to a shared device near study completion due to Information and Privacy concerns related to shared use. Clinicians began to use the iPad in their clinical settings and documented their experiences using the *iPad Use Tracking Survey*. Participants received information from AHS during the study about agency procedures and regulations for use, including confidentiality considerations and app request procedures. Clinicians participated in at least 2 learning sessions related to iPad use through AHS. Participants received information from AHS throughout the study including project guidelines, iPad configuration, device set-up, use of technology, choosing and evaluating apps. AHS also provided ongoing clinical support for participants through distribution of evidence based practice information, development and promotion of a University of Alberta resource website, access to an online discussion forum, a professional Community of Practice group for participants/project leaders and access to professional practice leadership within the organization.

Completion of Surveys Examining Use. Clinicians completed the *iPad Use Tracking Survey* on 4 occasions over the course of 9 months; the surveys were released on: October 23, 2013, January 17, 2014, March 19, 2014, and May 23, 2014. Participants also completed the *iPad App Rating Scale* for any apps they had used during that time period. The information gathered

from the *iPad App Rating Scale* is not included in this paper; however, it was shared as a

resource for the participants in the study and can be found at the following link:

http://tinyurl.com/spa900ipad.

Analysis

     Quantitative. This project was descriptive in nature. Quantitative descriptions were

used to provide information from selected components of the *iPad Use Tracking* survey.

     Qualitative. A qualitative description approach was used to analyze focus group data.

Comments from the focus groups were examined via a qualitative content analysis, where both

inductive and deductive categories were used (Berg, 2004; Hsieh & Shannon, 2005). A total of 3

individuals were involved in data analysis. The data was evaluated to discover themes, which

represented a message or idea presented by participants during the focus groups. Comments

that shared a similar message were coded together as a theme. Once each analyst coded the

comments thematically they met to discuss their themes, consolidate their information, and

identify overarching themes.

RESULTS

Initial Focus Group

     Prior to receiving their iPads, participants completed an initial focus group. In their

discussions, the following major themes emerged:

     Importance of Education. Education needs included learning how to setup the device

and use it in a clinical setting. Participants expressed an interest in conferences and tutorials as

educational resources. The participants also recognized the potential need for educating clients

and their family members. Another important factor was having the time to learn about the iPad and explore the multitude of apps.

Interest in iPad Use. Participants noted that clients, family members, colleagues and service partners expressed interest in using the iPad as motivation and reinforcement. They also discussed client/parent interest and openness to using the iPad, including receiving app requests from families. The participants also mentioned that iPads represent advancing technology in the field of speech-language pathology.

iPad Integration. The flexibility and variety of use when integrating the iPad into clinical practice was discussed among participants. The ability of the iPad to serve as a resource in clinical practice for clinicians to use was touched on, as well as the various areas outside of direct clinical practice that could benefit from iPad use. These included the use of the iPad as an AAC device, use for administrative functions (e.g., sending emails, taking notes), and ability to collaborate with other professionals. The clinicians also described the variety of populations that the device could be used with (e.g., pediatric versus adult populations).

Clinical Support. Clinicians outlined various types of support required to facilitate the use of the iPads. These included support from management or colleagues, policies surrounding iPad use (i.e., confidentiality and infection control), policies regarding access to iPads through different service delivery models (e.g., home practice, family programming), institutional implications of device loss or breakage and technological support for healthcare professionals using mobile devices clinically.

Logistics. Clinicians considered the financial costs of the iPads and apps, and available funding to purchase various apps. This led to a discussion surrounding the logistics of acquiring

and using apps, such as sharing the iPad or availability of use due to infrastructure (e.g.,

wireless internet access). The experience with iPads by the clinicians was also considered an

accessibility concern, as clinicians anticipate that experience with the device would dictate the

amount of device use.

iPad Use Tracking Surveys

Response rate across the four surveys was between 12 and 15 (n= 17) participants. Detailed

results from these surveys are beyond the scope of this paper and will be reported elsewhere

(McFarlane, Fleming & Minaudo, 2014). The survey content included questions surrounding

experiences with the iPad, reviewed apps, clinical use and populations served and suggestions

for future use. A description of results from the broad topics surveyed is presented in Table 1.

Table 1. Selected iPad Tracking Survey results

Survey Content	Selected Results
1. Process of obtaining the iPad	Survey respondents documented this topic extensively; participants reported difficulties requesting and receiving apps dominated early survey responses. The length of time between the initiation of the study and the subjects beginning to use free or requested apps was reported to vary from 3 days to 7 months.
2. Recommendations for iPad setup	This topic was discussed in focus groups; see *Final Focus Group results* for more information.
3. Memorable experiences	Reported elsewhere (McFarlane et al., 2014)
4. Clinical practice using the iPad	Reported elsewhere (McFarlane et al., 2014)
5. Population and clinical areas served with the iPad	The iPad was reportedly used in a variety of ways including assessment, individual intervention, group intervention, family programming, home practice, and consultation. The details are in Figure 1 with survey results collapsed across populations.
6. Caseload receiving services with the iPad	The mean percentage of caseload which included use of the iPad across the 4 time periods showed increases over the 4 measurement periods: 19%, 31.79%, 37.86%, & 49.58%. When

	individual profiles were examined, all survey participants except one increased the percentage of their caseloads that received service with the iPad over the course of the study.
7. Reasons for not using the iPad	Clinicians ranked reasons for not using the iPad on a scale of 1 to 4. These reasons included: client/service partner not interested in iPad use, iPad not appropriate for the client/service partner, no suitable apps for this client/service partner, and other. The category of "other" was the most common response highlighting difficulties related to setup of the device and/or receipt of apps.
8. iPad app list and Rating Scale	112 unique apps were reportedly used by respondents in the surveys. Clinicians provided ratings for 56 of these apps.
9. Client and colleague reactions to iPad use	This topic was discussed in focus groups; see *Final Focus Group results* for more information.
10. Needed supports and information	This topic was discussed in focus groups; see *Final Focus Group results* for more information.

Figure 1 presents the amount of device use between surveys one to four for various clinical areas.

Figure 1. Amount of iPad use across surveys one to four.
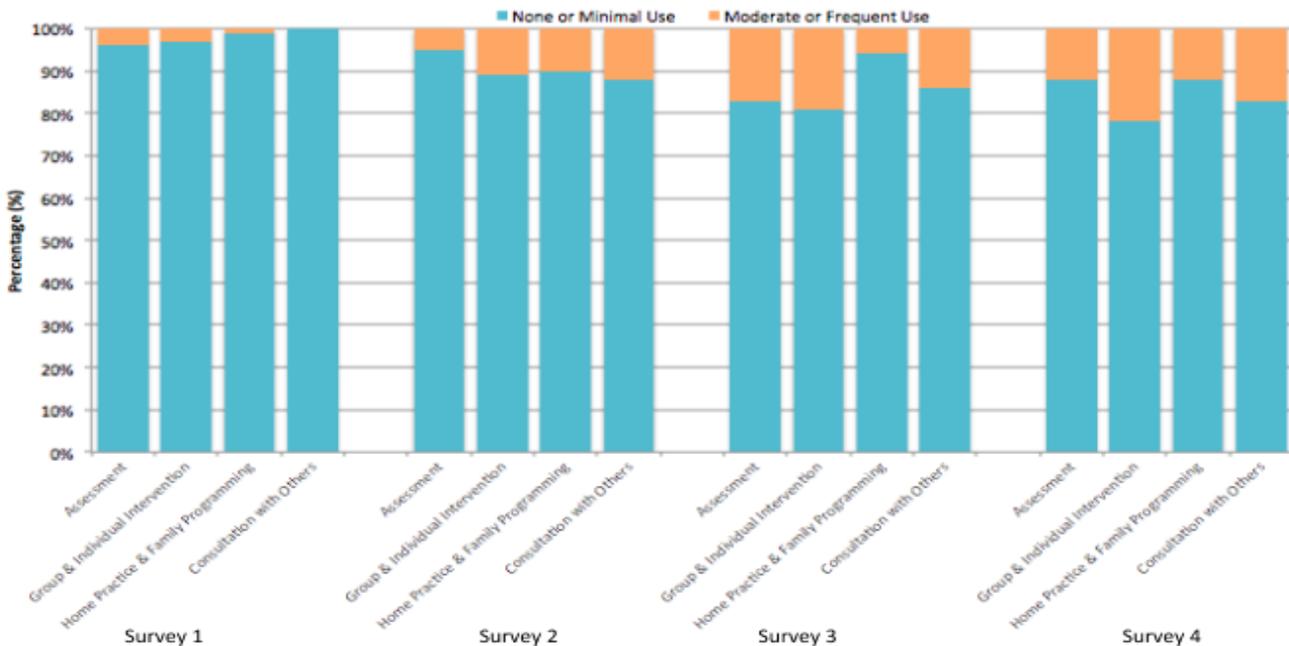
Final Focus Group

Following completion of the four surveys, final focus groups were conducted. The following themes emerged:

Clinical Uses of the iPad*.* Clinicians reported using the iPad in the following areas: material development, audio/video recordings, data collection, treatment (e.g., social skills, language, fluency) reinforcement, activities for home practice, accessing online resources, providing app suggestions, and for educational purposes to clients and caregivers.

Rationale for iPad Use*.* Participants discussed the iPad as a mainstream tool, with many clients and service partners having access to the technology and expecting SLPs to have knowledge of the device and how to use it. Clinicians reported positive reactions from their clients, families and colleagues. The device was considered motivating for clients across a variety of populations and ages. For example, clients were engaged and motivated to use the device.

Benefits and Features of iPad. The most notable benefits reported included the reduction in materials required, device portability and adaptability for use with a wide range of clients. Clinicians reported that the device was easy to use and offered many functions, such as audio/video capabilities, Internet access, as well as the ability to connect to other technological devices, e.g., SmartBoards and projectors. Other benefits noted by clinicians included the iPad's many administrative functions, such as email, text, and access to their calendar.

Considerations for App Use. Clinicians discussed several factors that need to be considered when selecting and purchasing apps. Clinicians commented on *app availability*, and *app flexibility*, highlighting the large number of apps available for a variety of clinical purposes.

Clinicians also noted their need to be able to individualize apps to their clients' specific needs. Participants in this study were provided clear *app selection criteria* and guidelines for *app pedagogy* (i.e., whether the app was based on treatment hierarchies that SLPs would use in treatment) to ensure they were critically examining apps during selection.

The SLPs identified a number of helpful resources and strategies for app selection, including recommendations from clinicians, colleagues and friends, Google searches, University of Alberta iPad Resources website (https://rehabilitation.ualberta.ca/ [departments/communication-sciences-and-disorders/resources-for-clinicians-and-](https://rehabilitation.ualberta.ca/) [researchers/ipad-resources)](https://rehabilitation.ualberta.ca/), trying lite/free versions and guiding their purchasing decisions using EBP.

Barriers to Clinical iPad Use. Many clinicians reported substantial difficulties with setting up the device, as well as challenges to infrastructure, such as reliable Internet access. Lack of time was identified as a major barrier to using the iPad. Clinicians reported requiring a significant amount of time to familiarize themselves with the device, explore and learn new apps, the process of requesting and purchasing apps and limited availability of devices shared by clinicians. This barrier contributed to limited availability for device use. Clinicians also noted that the apps themselves had limitations, such as not being sufficient for the individual clients needs. Participants also reported barriers that arose as a result of software incompatibility (i.e., a lack of transferability between iPads and PC systems).

Required Supports for iPad Use. As a result of the barriers and limitation that arose for clinicians using the iPad, several supports were suggested to facilitate iPad use in a clinical setting. The most apparent of these was Information Technology (IT) support. Clinicians noted

that having IT support that was readily and easily accessible allowed for more effective troubleshooting when they were having technological difficulties. Focus group participants also commented on the value of receiving resources and information through special interest groups involving other iPad users, as well as being able to learn from a mentor with knowledge and experience in using the iPad as a clinical tool. Once again, time was identified as an important factor in being able to explore and learn about new apps and troubleshoot technology concerns.

Importance of Education. Education was considered critical to implementing iPads into clinical practice for clients, families, SLPs and service partners. SLPs need to receive initial and ongoing training on how to use the device and app selection. Clinicians also noted that service partners would benefit from iPad education on device orientation, additional resources, and how to effectively use the iPad to target speech and language goals. Clients and families would benefit from app recommendations, guidance on how to use the device as an interactive tool, as well as education on critical app selection and what makes an app appropriate for use.

Future Use. Policy and procedure development was a main theme explored by participants. Clinicians suggested developing clear guidelines for using the iPad (e.g., confidentiality), streamlining the app request/purchasing process and using personal devices Clinicians recommended having a standard set of apps preloaded onto each device to allow for more immediate use upon receiving a device and having devices available for loan to increase accessibility for clients. Participants additionally suggested developing discussion groups for the purpose of sharing information on iPad use. Participants of this study also discussed a number of factors to consider when making decisions about distributing iPads throughout the agency.

These considerations included the clinician's level of interest and/or motivation to use the device, the caseload of the clinician, and the clinician's employment status (i.e., full time equivalent). Additional factors to consider include the benefits for each population/setting, the device purpose (e.g., assessment, treatment) and availability of clinician time. Trial periods were discussed as an opportunity to gauge clinician engagement in the device prior to distribution, as well as considering whether or not the device will be shared. The participants of this study also suggested that SLPs could play a role in future app development. Research on the effectiveness of using the iPad in a clinical setting was also identified as a consideration for future. Finally, clinicians felt that it was the responsibility of employers to provide accessibility to the device, and it was the clinician's responsibility to understand how to use the device.

DISCUSSION

This study was conducted to understand the perceptions, processes, barriers, benefits and limitations to implementing clinical use of iPads by speech-language pathologists in a large health agency. It allowed the agency and the researchers to identify successes and difficulties and to plan for future use of the devices. Three areas dominated the information obtained through initial focus groups, surveys and final focus groups: IT support, Time and Education.

Importance of IT Support

IT support emerged as a theme throughout this study as an anticipated and perceived barrier and as a strategy for successful implementation of iPads in a clinical setting. Comments provided by clinicians in early surveys were characterized by multiple difficulties with device setup, as well as delayed acquisition of apps. These were expressed as barriers to using the

device and likely contributed to the overall lack of use of the device until these issues were

resolved. In contrast, during the final focus group, clinicians acknowledged the helpfulness of IT

support that was provided, once the difficulties became apparent. The need for technological

support when there was difficulty with the device or its functions was reiterated and its

importance was heavily emphasized.

> *"I think the IT support - that's been extremely helpful in just troubleshooting and getting*
>
> *those apps that we had applied for and gotten approval for, getting them finally on the*
>
> *iPad."*
>
> *"IT support is critical so making sure there's that direct link like we had with [IT] so that if*
>
> *there are problems then there's somebody who can help through it."*

The delay in iPad use due to setup and app acquisition is apparent in Figure 1, which

shows the amount of device use across clinical areas was minimal until survey four. This

resulted in less opportunity for the clinicians to use the iPad in their clinical practice. During the

final focus group it was apparent that, although the initial IT difficulties were a source of

frustration for many of the clinicians, participants expressed enthusiasm for the device once

these issues were resolved.

Importance of Time

Another recurring theme throughout the study was time. Initially, time was mentioned

as a potential barrier to using the iPad. Throughout this study it became increasingly apparent

that time was crucial for successful device setup, education, and app selection, exploration and

app acquisition and use:

"I think the most important thing I would want you guys to know is just make sure that it's very clear to whoever is going to be using it that it is a huge time commitment. That was kind of the biggest eye opener for me. "

" I agree that time is a huge factor with this. Often times I would go and download a bunch of apps, but then wouldn't necessarily use them right away. So when I got around to it I kind of forgot how it worked."

"I guess my expectations were I didn't expect it to be as time consuming as it actually ended up being. I think I expected to have way more apps on my iPad by now than I actually do. Just because clinically with such a heavy caseload just not enough time to even trial as many apps as I'd like to."

Time was also a predominant theme of the final focus group. Although clinicians indicated that the iPad assisted in time management, they also described the required time commitment needed to use the iPad. This was described in the following quote:

"The most valuable resource that I had limited availability to was time. A lot of time is required to look up new apps, review them and determine if they would be appropriate for a specific client or population. I found that even all the other resources [...] such as websites with app reviews, and emails from other colleagues, still required a lot of time to review."

Importance of Education

The participants also emphasized the importance of education throughout the study. In the initial focus group, clinicians described the need to learn how to setup and apply the iPad to their clinical practice.

"I would need a lot of training in terms of the different AAC apps that are out there and also how to … I have no idea how to train clients on how to use an AAC."

"It would be nice to have a list of apps that have kind of been tested by somebody ahead of us."

The final focus group reiterated the importance of education surrounding the knowledge of specific apps while also discussing the need for ongoing training for device use and app selection. The importance of access to a variety of resources was mentioned:

"I think as well, not just talking with SLPs in the group, but talking to my other colleagues here. And my TAs too that I had, they have been a wealth of knowledge [...] So that has been really good, just sort of networking with other clinicians. And then anything online, whether I did Google search for apps or looking through iTunes at what's new. And any emails I've gotten over the last year or so [...] And I did also like the shared list that showed what apps other SLPs were requesting or find useful, I thought that was really good."

Clinicians described the value of being able to learn from other individuals and colleagues about the iPad. The availability of *mentorship* was described in the following quotes:

"[The] importance of having at least one mentor available either in your office or your schools. I had 2 fabulous mentors at 2 of my schools and that really helped me to keep going and I learned a lot from them."

"For me, being able to have the mentors, the other people around me and around the province to talk to, I think that's been the biggest support for me personally."

In addition to reflecting on the importance of IT support, education and time, clinicians highlighted benefits of iPad use, client/service partner reactions and suggestions for future use.

Benefits of iPad Use

Despite difficulties with iPad setup and app acquisition, participants identified a number of device benefits. Reflections on ways of using the iPad were identified through the theme of *iPad Integration*. Clinicians perceived benefits of improved portability of resources, adaptability and flexibility in practice. The devices were used across all aspects of clinical service and for administrative and related functions. These features improved time management for some, as outlined by these clinicians:

> *"During recess time I'm able to look at my calendar and answer emails quickly instead of bringing things like my big laptop and everything which is really helped with time management."*

> *"Colleagues like physical therapists, occupational therapists are really thinking that it would be useful for the time management piece especially. Checking emails at recess as they go to schools and outlook calendar and those kind of things. They've mentioned like, 'Oh, gee I wish we had access to those'".*

Client and Service Partner Responses to Device Use

There was an initial concern and hesitation about whether clients and specific populations would be interested in using the device:

> *"I think it's hard to gauge sort of the interest for clients because it really depends. When we have young clients they often have an iPhone and they're really interested, if they're more elderly they seem less interested."*

Despite the initial concerns, clinicians noted that use of the iPad received a positive response from all clients and family members:

"I'm getting phone calls [from parents] saying, "this is great, do you have any more that we can look at", and there's a big buy-in with my population."

"I think for the most part a lot of my clients are very interested."

Clinicians acknowledged that knowledge of the iPad and ability to advise clients, families and service partners in its use was an important part of their practice.

"I feel like now I have a better handle on how to thoughtfully look up an app [...] I feel like I'm a better partner to them and I'm a better support for them because a lot of times they do look to us as sort of experts."

Recommendations for Future iPad Use

Drawing on their experience with their iPads, clinicians in the final focus groups described factors to consider when implementing mobile device use into clinical practice. Recommendations included streamlining the policies surrounding the app request and device setup process. This could be facilitated by having a standard set of apps pre-loaded onto the devices before the clinicians receive them, to reduce the frustrations experienced surrounding app request processes and minimizing the impact of time constraints.

Clinicians also referenced the importance of ongoing policy development in the areas of confidentiality, information sharing and guidelines for AHS and personal device use. One such example was:

"I could use it if Alberta Health would allow it and the perimeters that we'd be allowed

to use it within Alberta Health protocol and freedom of information and sharing of

information."

The importance of sharing resources through discussion groups was also touched on in

the final focus group, as exemplified by the following quote:

"I think it would be really good to be mentors and be able to help mentor people within

our staff or be paired up with somebody who would like to do it. I think it would be nice

to have an interest group so we can continue this."

The need for distribution criteria to determine which clinicians would receive an iPad

was also highlighted in the final focus group. Suggested criteria included clinician motivation or

interest, clinician caseload or employment status, and the purpose of device use (e.g.,

assessment or treatment). These areas are exemplified in the following quotes from the final

focus group:

"You have to decide what your department wants to use it for. Are you going to use it for

clinical use, are you going to use it for assessment use, are you going to use it for both."

"I think it is definitely important to consider the population that the SLPs are working

with and just who is going to get the most benefit from using these iPads [...] I really

don't think I use it as much with my preschool clients as I did with my school age clients

and I thought it was much more beneficial for me to use with my school age clients."

" I think the most important thing would be that the [SLP] would have to want it and

consider it to be a good idea. I don't think that if somebody isn't inclined to enjoy using

technology or want it, [...] I don't think it would work if you don't have that interest or inclination."

Ultimately, appropriate use of the device was seen as a shared responsibility between employers and clinicians; this is exemplified in the following quote during the final focus group:

"It is the responsibility and duty of the SLP to stay informed about changes in service delivery and devices (such as an iPad). It is also the responsibility of employers to have these readily available to their staff and subsequently, to their clients, so that it can be used in therapy, and ideally, left with client to practice independently."

Upon discussion surrounding their future use of mobile technology, clinicians participating in the focus groups expressed enthusiasm surrounding the continued inclusion of the iPad within their clinical practice. Most discussed the intent to continue using and learning more about the iPad:

"I would love to keep incorporating mobile technology into my practice. I think that's the wave of the future."

"I'm planning to explore more apps. I've got three purchased apps and I was waiting for those to come out and get more experience using those before I ordered more."

Limitations of the Study

A limitation of this study was the initial delay in device setup and app acquisition. This resulted in fewer opportunities for many of the participants to use the iPads in their clinical work. The survey results reflect this limitation, as device use was recorded as minimal during the early surveys and increased as these issues were resolved. It was apparent that clinicians involved in the study were excited about the potential uses of the iPad in their practice, but had

insufficient time to realize its full potential. Another limitation was the small number of participants in the study, reducing generalizability to a broader population. Several participants did not fill out all four of the surveys, which additionally reduced the breadth of response and may have skewed the results/perceptions. . Another limitation to this study was that subjects were all from one agency. This limited the study's ability to generalize to other work settings and agencies.

Implications for Future Research

This study added to the existing research exploring clinician perspectives on iPad use. By following a group of clinicians over time as iPads were piloted in their work setting, considerations for agencies and for clinicians were identified. However, more research is needed to explore the efficacy of device use across clinical populations. Furthermore, client responses to using the iPad must also be examined. In order for clinicians to make evidence based decisions about iPad use in SLP practice, treatment outcome data is needed. Examining treatment outcomes while using the iPad during intervention is an additional area of research where much is yet to be explored.

CONCLUSION

This study examined clinician perspectives during the process of receiving and integrating iPads into clinical practice. The quantitative results showed an overall increase in use of the iPad in various areas (e.g., assessment, home practice) and in percentage of use with caseload. The initial struggles with setting up the device and the app request process were a focal point during the early surveys and final focus group. The major factors influencing iPad

use were IT support, education and time. Considerations for the future included additional

guideline development and the creation of learning groups or communities of practice to

support continued development of iPad expertise within the agency.

Despite the difficulties many encountered in device setup, clinicians reported an

enthusiasm for continued use and a belief in the clinical value of the devices.

"I can't really see myself going backwards, [...] I just think this is a part of our future and

I'm excited about it and [...] I feel more confident now and feel like I make better choices

so I think that it's exciting. I think it's a very exciting time for us."

REFERENCES

American Academy of Pediatrics. (2013). Council on communications and media; Policy

statement: children, adolescents and the media. *Pediatrics, 132(5)*, 958-961.

Apple Inc., (2011). Samsung Complaint. *Apple Inc's Complaint.* Retrieved from

http://www.apple.com/pr/pdf/110415samsungcomplaint.pdf

ASHA Leader (2013). At a glance: January 2013. *The ASHA Leader, 18(22)*. Retrieved from

http://leader.pubs.asha.org/Article.aspx?articleid=1775780

Backhouse, M. (2012, November 26). iPad use in pre-schools sparks call for guidelines. *The New

Zealand Herald.* Retrieved from http://www.nzherald.co.nz/technology/

news/article.cfm?c_id=5&objectid=10850108

Berg, B.L. (2004). *Qualitative Research Methods for the Social Sciences*. 5th Edition. Toronto:

Pearson.

Bruno-Dowling, S. (2012). How many SLPs are really using iPads? *Early Intervention Speech

Therapy* [web log] Retrieved July, 2013 from http://community.advanceweb.com/blogs

/sp_1/archive/2012/03/13/how-many-slps-are-really-using-ipads.aspx

Conley, R., Fournier, A., Hanson, K., O'Brien, C., & McFarlane, L. (2011). There's an app for that:

Clinician perspectives on the iPad as an intervention tool for children. *University of

Alberta Research Project Poster.* Retrieved from http://www.speechpathologyand

audiology.ualberta.ca/iPadResearchandResources/PediatricResearchProject2011.aspx

Data Illusion (2013). Feedback Server (Version 5.3.3) [Software]. Available from

www.dataillusion.com

DeCurtis, L.L. & Ferrer, D.M. (2011). Embracing iPad Technology with Toddlers Using Traditional

Therapy Techniques. [Power Point Slides]. *American Speech-Language-Hearing*

Association. Retrieved from http://www.asha.org

Fernandes, B. (2011). iTherapy: The revolution of mobile devices within the field of speech

therapy. *SIG 16 Perspectives On School-Based Issues*, *12*(2), 35--40.

Flores, M., Musgrove, K., Renner, S., Hinton, V., Strozier, S., Franklin, S., & Hil, D. (2012). A

comparison of communication using the Apple iPad and a picture-based system.

Augmentative and Alternative Communication, *28*(2), 74-84.

Helling, C & Rush E. (2011). Making Evidence-Based Decisions about Speech Generating Devices

and Apps. Retrieved from http://www.asha.org/Events/convention

/handouts/2011/Helling-Rush/

Hinman, S. (2013, Spring). Apps for audiology and speech-language pathology. CASLPO Today,

11(2), 17-19.

Hsieh, H.-F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis.

Qualitative Health Research, 15(9), 1277-1288.

Hoover, E. L., & Carney, A. (2014, February). Integrating the iPad into an intensive,

comprehensive aphasia program. *Seminars in speech and language* (Vol. 35, No. 01,

pp. 025-037). Thieme Medical Publishers.

Iancono, T. & Cameron, M. (2009). Australian speech-language pathologists' perceptions and

experiences of Augmentative and Alternative Communication in early childhood

intervention. *Augmentative and Alternative Communication, 25(4),* 236-249.

iPad Resources (n.d.). *University of Alberta.* Retrieved November 11, 2014, from

https://rehabilitation.ualberta.ca/departments/communication-sciences-and-

disorders/resources-for-clinicians-and-researchers/ipad-resources

Kagohara, D. M., van der Meer, L., Ramdoss, S., O'Reilly, M. F., Lancioni, G. E., Davis, T. N.,

Rispoli, M., Lang, R., Marschik, P.B., Sutherland, D., Green, V.A., & Sigafoos, J. (2013).

Using iPods® and iPads® in teaching programs for individuals with developmental

disabilities: A systematic review. *Research in developmental disabilities*, *34*(1), 147-156.

Manning, M., Davis, J., Sparnon, E., & Ballard, R. (2013). iPads, droids, and bugs: Infection

prevention for mobile handheld devices at the point of care. *American Journal Of

Infection Control*, *41*(11), 1073--1076.

McFarlane, L., Fleming, R. & Minaudo, C. (2014). *Implementing Technology into Clinical Practice:

Speech Language Pathologists and iPad Use.* Unpublished manuscript, University of

Alberta, Edmonton, AB.

McNaughton, D. & Light, J. (2013). The iPad and mobile technology revolution: Benefits and

challenges for individuals who require Augmentative and Alternative Communication.

Augmentative and Alternative Communication, 29(2), 107-116.

Munoz, M., Hoffman, L.M. & Brimo, D. (2013). Be smarter than your phone: A framework for

using apps in clinical practice. *Contemporary Issues in Communication Science and

Disorders, 40,* 138-150.

Strugalla, E., & Hughes, S. Therapeutic Use of Personal Electronic Devices: An Updated Survey of

Speech-Language Pathologists. *E-Hearsay, 3(2)*, 4-9.

Packman, A & Meredith, G. (2011). Reprint of: Technology and the evolution of clinical methods

for stuttering. *Journal of Fluency Disorders, 36,* 195-205.

Theodoros, D. (2012). A new era in speech-language pathology practice: Innovation and

diversification. *International Journal of Speech-Language Pathology*, *14(3)*, 189-199.