Using iPad apps to support meaningful communication:

Educational resources for parents

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ABSTRACT

This project focused on knowledge-translation through the development of educational tools to support parents in using apps in ways that encourage interaction and language use. Best practice principles related to early language learning were used to guide the development of resources. The goal of resource development was to transfer the principles of language learning to the application (app) environment. Apps were selected and reviewed based on a pilot study conducted in concert with *Alberta Health Services* (Borys, DesJarlais, Sample, Wilson, & McFarlane, 2014; Fleming, Minaudo & McFarlane, 2014)*.* These studies indicated a need for education regarding iPad use for parents and teachers. To meet this need, educational screencasts and app demonstrations were created to highlight strategies that expose children to meaningful social interactions with communication partners and focus on targeted areas of speech and language development. Three key areas of language development were included: early narratives, early sentence development and early literacy skills. The resources are accessible on the *University of Alberta's Communication Sciences and Disorders* website: https://rehabilitation.ualberta.ca/departments/ communication-sciences-and-disorders/msc-in-speech-language-pathology.

LITERATURE REVIEW

Proliferation of digital of technology

As the use of digital technology is increasing in daily society, the field of speech-language pathology (SLP) needs to consider the impact that technological devices have on speech and language development and remediation. According to Gosnell (2011),

"portable electronic devices such as the iPhone, Droid, BlackBerry and iPad, collectively termed mobile devices, have changed the way we interact with the world, from social connections to work and entertainment" (p.10). Many homes now have portable devices with education and entertainment applications designed for use with children. According to Watt (2010), children's access to technology is readily increasing and children are frequently in contact with technological devices used in a variety of ways, both entertainment and educational.

The iPad provides access to a variety of applications specifically designed to target the development and remediation of speech and language skills, as well as access to general applications that can be adapted to encourage language development (Snape & Maiolo, 2013). Fernandes (2011) notes that iPad apps can be used to help parents facilitate language development in the home environment. Understanding the current research surrounding benefits and limitations of digital technology as a general tool and as a support for speech and language development is important prior to recommending its use to parents.

Benefits

General benefits

Researchers have identified several benefits of the iPad as an educational tool, including its practicality and accessibility. In regards to practicality, the iPad is relatively affordable compared to other devices of its kind. Also, the device can be conveniently purchased through local realtors or online stores and acquired by the general public with relative ease (Borys, et al., 2013; Gosnell, 2011). The physical design and durability

of the iPad allows it to be easily transported and utilized in a variety of settings (Conley, Fournier, Hanson, O'Brien, & McFarlane, 2011)**.** This convenience may encourage families to use the iPad as a means of playing with their children and encouraging learning, when typical toys or objects are not available.

The iPad has an intuitive and user-friendly design that is accessible to users of a variety of ages and capabilities. This accessibility was exemplified in research conducted by Beschorner and Hutchison (2013), where fourth grade students successfully navigated the iPad while engaged in small group literacy activities. Also contributing to the accessibility of the iPad is the development of newer, more interactive touchable interfaces. Plowman and Stephan (2003) report that a touchable interface may be more suitable for children, as it allows for easier physical manipulation.

Potential speech and language benefits

The iPad is a tool that has been used to support and remediate speech and language. One rationale for this use is the motivation of children to engage with the device and the apps that accompany it. Current research indicates that previous exposure to the iPad has resulted in an increased level of client interest in the device, leading many clients to inquire about using it in treatment (Borys, et al., 2013). Gosnell (2011) suggests, "clinicians can use this interest to their advantage through the many 'dedicated' speech applications available" (p.10). Parents can also capitalize on this interest, by using the apps with their children in an interactive manner to enhance overall speech and language learning in the home environment.

The iPad has many education and entertainment applications that can help facilitate speech and language learning. The benefit of these apps is that many are designed specifically to target speech and language, while others can be repurposed to target areas of speech and language learning. Gosnell (2011) explains, "through imaginative client-centered creativity, the SLP may use a broad range of apps not expressly designed or intended to target speech, language, and communication objectives to entice clients to engage actively in and enjoy intervention"(p.10). This is also true of home programming, where parents can use interactive strategies to support their child's in speech and language development using a variety of iPad apps. Despite these perceived benefits, concerns about the use of mobile devices with children have been raised, especially as it relates to speech and language learning. Watt (2010) describes the need for fully informed evidence based research, examining both the benefits and concerns of using technological devices to encourage language growth.

Concerns regarding the use of the iPad for speech and language development

While there are many potential benefits to using the iPad to support speech and language development, it is also important to consider concerns associated with its use. The increasing popularity and prevalence of mobile devices has generated concerns about the use of these tools by young children. Current themes associated with the misuse of the device surround the concepts of excess screen time and solitary use.

The American Academy of Pediatrics (2011), reports that many children have substantial exposure to media devices (i.e. greater than two hours a day). The organization reports a relationship between language delay and increased screen time

for children younger than two years of age (American Academy of Pediatrics, 2011). The American Academy of Pediatrics (2011) states that children who spend an extensive amount of time using media are spending less time being read to and/or reading. They found that these children are more likely to have underdeveloped reading skills in comparison to age-matched peers from households with low media exposure (American Academy of Pediatrics, 2011). Therefore, it is recommended that screen time for children over the age of two should be limited to less than one to two hours per day, and screen media exposure should be discouraged for children under the age of two (American Academy of Pediatrics, 2011). Education for parents is essential to reduce overall screen time and guide media use in ways that support, rather than hinder, speech and language development.

According to Ofcom (2008), the current trend in households over the past several years involves children using various modes of technology without adult supervision. Children younger than one year of age, who have been exposed to screen media for an extended period of time without adult facilitation, have a heightened susceptibility to developing later language delays (American Academy of Pediatrics, 2011). Therefore, prolonged use of screen time in a household may interfere with a child's speech and language development, due to limited opportunities for interaction and time spent in play. In homes with media devices, families have reported a decline in the quantity and quality of the social interactions that take place (Watt, 2010). Chang, Rakowaky, and Frost (2013) reported that when children did not have access to iPads they were more likely to engage in social interaction and pretend play, thus increasing

their exposure to emerging concepts and vocabulary development. To best facilitate

language development, iPad use must be conducted in an interactive manner. Watt

(2010) argues for the publication and exposure of guidelines geared towards supporting

families interactive use of media devices in the home in order to promote language

learning. Thus, to serve as a prerequisite for appropriate iPad use, it is important that

clinicians and parents have a thorough understanding of interactive device use,

application components, and associated targeted areas of language development.

Supporting interactive and targeted app use by families

Education for parents is essential to reduce overall screen time and to support

media use in ways that foster, rather than hinder, speech and language development. In

order to enhance language learning, education for families will center on the

importance of an interactive experience and include applications in areas that support

speech and language development.

Current use of mobile devices and apps

According to Rideout (2013) approximately half of children from zero to eight

years of age have used a mobile app. This finding has increased from 16% in 2011, and

supports the notion that children's use of technology is on the rise (Rideout, 2013). The

category of educational games (i.e. apps that are designed to target learning through

technical play) was reported to be the most frequently used grouping (Rideout, 2013).

Rideout (2013) also reported that 13% of parents used media as a way to occupy their

child while the parent completed routine tasks of daily living. When the iPad is used to

keep children occupied, it results in children using the device on their own with little

involvement of other children or adults. This was confirmed by Ofcom (2014), who found 37% of children aged three to four are using the tablet to play games on their own and 22% watch video clips such as music videos, comedy clips, or trailers on the tablet (Ofcom, 2014). In addition, the percentage of children playing on their own on a tablet increased to 41% for children aged five to seven (Ofcom, 2014). However, the use of an iPad as solitary play is not the only way that children are using the device. Parents are also using the device as a form of behaviour management to provide a distraction and avoid challenging behaviours. (Rideout, 2013).

Educational Needs

The typical use of apps by parents as described above is in stark contrast to criteria recommended by SLPs for selecting apps or other activities to support speech and language learning (Conley et al., 2011). Two primary areas of educational need have been identified. Parents require education on how to use devices in an interactive way and specific direction on how to target areas of speech and language by identifying a goal . Addressing these two areas of need will help parents facilitate speech and language development through the use of mobile devices.

The importance of the iPad as an interactive tool

Two of the key recommendations for appropriate app use by Conley et al. (2011), relate to interaction, or emphasizing that apps should expose the client to language use in a meaningful social interaction with a communication partner. Parish-Morris, Mahajan, Hirsh-Pasek, Golinkoff, and Collins (2013), considered the effect of parent-child interactions on story comprehension, by comparing the use of traditional

books to electronic books. When using the electronic books, parents spent more of their time talking about their child's behaviours (e.g. 'wait for the sound to finish'), rather than relating the story back to their child's life (Parish-Morris et al., 2013). Thus a traditional book was found to be more beneficial to a child's language development, because of the interactive nature of the parent-child interaction (Parish-Morris et al., 2013). Educating parents on how to use apps and devices in an interactive manner, will help avoid the tendency for parents to focus on the child's behaviour or the mechanics of using the device or app. Specific information and examples will help parents to connect the interactive experience to something significant in the child's life, creating opportunities for meaningful communication, which in turn will facilitate speech and language development. By providing education to parents on interactive strategies to guide iPad use, a variety of different apps can be tailored to encourage speech and language development.

The importance of setting a goal

When using an iPad specifically to support speech and language learning in preschool children, a goal can help direct the interaction. This focus will reduce the demands on the child's attention and memory by concentrating effort on one area instead of multiple domains and will therefore increase the likelihood that the targeted skill will be learned (Conley et al., 2011). Education for parents regarding specific areas of speech and language development as well as teaching strategies to help their child learn and focus on a specific concept will provide opportunities for increased practice. Several areas of speech and language development that parents can effectively target

with their preschool children have been highlighted to demonstrate app use in this project. These areas are discussed below.

Selecting key areas of language development in the preschool years

Some key areas of language development for children of the preschool years (i.e. ages two to five years) include narratives, early literacy skills and early sentence development. These areas were selected to show a variety of developmental skills related to speech and language. Once the developmental areas were selected, iPad apps were identified to support interactive activities related to these domains.

Narrative skills

Fey, Catts, Proctor-Williams, Tomblin, and Zhang (2004) provide evidence to suggest that children who have language disorders are often limited in their abilities to produce narratives, as compared to age-matched peers. This may lead these children to be at risk for difficulties acquiring pre-literacy skills. It has been suggested that targeting narrative skills during the developing language stage can help to support emerging literacy abilities (Bishop & Edmundson, 1987; Petersen, Gillam, Spencer, & Gillam, 2010).

In order to achieve the milestones of narrative development, children progress through several stages. At the age of two years old narratives primarily consist of labels and descriptions. As children continue to develop their narrative skills, they begin to organize their stories to include a beginning, middle and end. By the age of five, children tell narratives that include a central focus, high point and resolution (Paul & Norbury, 2012).

The development of narrative skills at each of these stages can be supported through the use of interactive and developmentally appropriate activities. Culatta (1994) presented several recommendations for using story re-enactments to support narrative development in the context of language intervention. These recommendations include having the child listen to simple stories with a focus on the basic elements of story grammar, acting out the events of the story, and re-enacting the story with toy props.

Early Literacy skills

Early literacy skills develop during the preschool period between two and five years of age. These skills are an important foundation for learning to read. Rhyming, alliteration, and letter sound correspondence are key skills that emerge. Fernandez-Fein and Baker (1997) report that, at ages three and four years, children's rhyme and alliteration scores were significantly related to reading abilities two years later. Book awareness also begins to emerge during this period. This includes an increased interest in books, understanding of how to use a book, where the front cover is, how to turn pages and learning to follow print from left to right (Paul & Norbury, 2012). Children at this age become more aware of environmental print such as stop signs or familiar advertisements, and will recall these from memory or use.

In order to achieve the milestones of early literacy development, children progress through several stages. Awareness of rhyme emerges between 24 to 30 months and the ability to produce rhyme develops between 30 to 36 months (Paul & Norbury, 2012). Alliteration skills emerge between the ages of two to five years. Letter

sound correspondence, also known as print knowledge, develops in a sequential

manner between two to five years of age. This includes learning the alphabet song,

along with recognizing and naming letters and learning that letters have sounds.

Additionally, children begin to understand that clusters of letters separated by spaces

form words and that words are made up of sounds (Paul & Norbury, 2012). An

understanding of these milestones can help parents acquire developmentally

appropriate expectations for their child and in turn understand developmentally

appropriate strategies to encourage early literacy skills.

There are many different strategies and activities that parents can use to support

their child's development of early literacy skills. Examples of interactive and

developmentally appropriate activities to support early literacy skills include reading

stories that include models of alliteration and rhyme, engaging in discussion concerning

these types of words, and sorting pictures that rhyme or start with the same sound.

Early Sentence Development

The developmental markers noted in the area of morphosyntax are valuable

tools for monitoring a child's expressive language abilities across the preschool years.

Complexity of grammar and utterance length is expected to grow in congruence with a

child's age (Paul & Norbury, 2012). In order to promote a child's language development,

a strong syntactic foundation provides a platform for various developing language skills

to build upon.

In order to achieve the milestones of early sentence development, children

progress through several stages. According to Owens (2010), as children near the end of

the preschool years, they should acquire a mean length of utterance (MLU) that consists of approximately five morphemes. As MLU expands between the ages of three to five years, a child's use of complex sentences begins to increase. Children begin to use the conjunctions 'and' and 'because' (three to four years), as well as 'when', 'so', and 'if' (four to five years), to conjoin simple phrases with one another (Lanza & Flahive, 2009).

Early sentence development can be supported at these stages through the use of interactive and developmentally appropriate activities. Emphasizing and highlighting tense markers, expanding and elaborating utterances so that they are more complex, and correcting the use of inappropriate pronouns and articles are all techniques that can be utilized by any individual when interacting with a preschool aged child (Paul & Norbury, 2012).

Summary of key areas of language development

During the preschool years children are learning at a rapid rate. Key areas of language learning include narratives, early literacy skills and early sentence development. Narrative skills allow children to construct stories that can facilitate later reading abilities. In addition, early literacy skills are also important to later reading abilities and allow children to explore sounds, a foundation for learning to read. Early sentence development can help children develop syntax and semantic skills, allowing them learn to expresses themselves through language. As mentioned above, there are many strategies and activities that parents can use to support their child's skills as they relate to narrative, sentence, and early literacy development. Apps can be a valuable

tool and can help children develop skills in these areas. However, apps must be

developmentally appropriate and used in ways that support an interactive experience.

Helping parents find appropriate apps

Incorporating best practice principles in the selection and implementation of

iPad applications has resulted in a need for the development of reliable forums that

teachers and parents can access. Resources are currently available that provide

guidelines on interactive iPad implementation and appropriate applications

recommended for home use (e.g. apps4Stages, BridgingAppsTM, Geek SLP). The

struggle now is teasing out valid resources from those that have been generated by

uninformed individuals or application developers to promote their own product. The

University of Alberta Communication Sciences Department has developed a website

dedicated to the clinical and academic review of applications. The website features links

that have been reviewed by students and deemed appropriate for use by clinicians,

teachers and/or parents (Colburn, LaMothe, Leenheer, Mueller, & McFarlane, 2014).

Similarly, graduate students from *Curtin University* provided a comprehensive review of

iPad use in speech therapy, which included academic reviews of communication apps, a

summary of the current literature surrounding the use of these tools, and a list of

websites to refer to with credible application referrals and evaluations (Snape & Maiolo,

2013).

Families can refer to such resources for suggestions on applications to use at

home with their children and for strategies to support appropriate use. To enhance the

understanding of available information, translation to a parent friendly context will

assist parents in selecting apps that will best support the speech and language

development of their child. To meet the goals of this project, rescreencasts, focused on

parent education were developed. The screencasts use non-clinical terminology to

explain key areas of language development to families and provide visual

demonstrations of strategies to enhance these domains through interactive iPad use.

PURPOSE

The purpose of this project was to develop educational materials for parents of

preschool children who are interested in using the iPad to support speech and language

development. The materials were created to help parents understand typical areas of

language development and how to use the iPad in an interactive way that supports

development of speech and language. By introducing interactive iPad strategies, the

materials developed served to emphasize that apps can expose children to meaningful

social interactions with communication partners, while focusing on important targeted

areas of speech and language development. These resources will be published on the

University of Alberta's Communication Sciences and Disorders website in a section that is

dedicated to parent education.

COMPONENTS OF EDUCATIONAL RESOURCES

Screencasts and app demonstrations highlighting key areas of speech and

language development were created to educate parents of preschool children on how

to best use the iPad to support their child's speech and language development. The key

areas of focus included narrative abilities, early literacy skills, and early sentence

development. These areas are not exhaustive to speech and language development and

were selected based on an effort to target a variety of language domains and salient

skills in preschool children. In addition, these areas were selected in response to the

perceived need for parental education in domains representative of overall preschool

language development. The screencasts that correspond to the targeted areas of

language development can be accessed at the *University of Alberta's Communication*

Sciences and Disorders website:

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

disorders/resources-for-clinicians-and-researchers/ipad-resources. See Appendix A for a

list of applications featured with video tutorials.

The first screencast is an overall introduction to iPad use for parents of preschool

children. It provides recommendations for age of introduction to iPad use, information

on app selection, and ways to use general, play-based apps in an interactive way to

encourage speech and language development. Video demonstrations of the apps 'Toca

Tea Party' (Toca Boca AB, 2013), 'My PlayHome' (PlayHome Software Ltd., 2014), and

'Cookie Doodle' (Shoe the Goose, 2011) were created to highlight the skills and

strategies discussed. The screencast and video demonstrations were designed to help

parents think about and use apps in new ways, as well as to encourage an interactive

language learning experiences.

The screencast based on narrative skills highlights typical development in this

area. Examples of how parents can support their children in the process of narrative

development highlight activities such as exploring books each day, talking about daily

events emphasizing what happened 'first,' 'next,' and 'last,' encouraging children to

make up stories, and acting out stories together. The screencast also includes a section

on how technology can help to encourage narrative development, and identifies specific

iPad apps that can be used to tell stories with children and that encourage children to

make up their own stories. The apps that are identified include 'Story Patch'

(Haywoodsoft LLC, 2010). You're the Storyteller: The Surprise' (Hamaguchi Apps, 2012),

and 'My Playhome' (PlayHome Software Ltd, 2014). Video demonstrations of the apps

'StoryPatch' and 'You're the Storyteller: The Surprise' have been created to highlight the

skills and strategies discussed.

The screencast focusing on early literacy skills highlights typical development in

this area. Examples of how parents can support their children in the process of early

literacy development include shared book reading, reading books that rhyme and books

that include examples of alliteration, as well as strategies such as talking about letters

and the sounds that they make. The screencast also includes a section on how

technology can help to encourage the development of early literacy skills. This section

identifies specific iPad apps that are conducive to helping develop early literacy skills,

including 'Pat the Cat' (JM Hawkins, 2013), 'Letter School' (Sanoma Media Netherlands

B.V., 2014), 'Alphatots' (Spinlight Studio, 2014), 'Elmo's ABCs' (Sesame Workshop Apps,

2011), and 'Build a Word' (@Reks, 2013). Video demonstrations of the apps 'Elmo Loves

ABCs' and 'Pat the Cat' have been created to highlight the skills and strategies discussed.

The final screencast focuses on early sentence development. Example strategies

of how parents can support their children in the development of early sentences include

repeating the child's utterances while adding additional words and using appropriate

grammar, as well as emphasizing and modeling tense markers and pronouns in their own speech. The screencast also includes a section on how technology can help to encourage early word combinations. In particular, this section identifies specific iPad apps that encourage early word combinations, including 'Noodle Words' (NoodleWorks Interactive, LLC., 2012) and 'Fun with Verbs and Sentences' (Hamaguchi Apps, 2013). Video demonstrations of these apps have been created to highlight the skills and strategies discussed.

Screencasts and app video demonstrations were created using an iPad (3rd Generation, Model number A1416, Apple Inc.), which was mirrored on a MacBook Pro using the program *AirServer* (AirServer, 2013), and captured and edited using *QuickTime Version 10.2* (QuickTime, 2012). An external USB microphone was used to ensure a quality voice recording (Snowball, Model number 78908Q, Blue Microphones, Inc.).

Supplementary Resources

The educational resources detailed above have been uploaded to *the iPad: Research and Resources* page of the *University of Alberta's Department of Speech Pathology and Audiology* website. This webpage also contains resources developed throughout previous iPad research studies completed at the *University of Alberta*, including educational presentations on iPad use, clinical rating scales for evaluating apps, and website links to additional valid iPad resources.

SUMMARY

While the educational resources that were created and dedicated to parent education do not target all domains of language development, they serve as a platform

to provide information to families using iPad apps with their children. These screencasts and app demonstrations highlight the use of apps as an interactive language learning experience and provide examples of strategies to support families in using the iPad effectively. The strategies demonstrated are skills that can be generalized to other applications and play-based learning techniques used outside of the specific examples and apps targeted within this project.

Future research could focus on how parents use the educational resources that have been developed. This will provide evidence to suggest if the resources have an effect on modifying the amount and type of screen time that their children are exposed to. Feedback from parents and clinicians who utilize these resources will be vital in ensuring the resources developed are effective in encouraging interactive and goal-focused iPad use. Research should use these findings to update current resources in order to continuously provide education that supports meaningful communication while remaining responsive to parent's needs.

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Appendix

A1. Applications featured with video tutorials

- Cookie Doodle

- Elmo Loves ABCs

- Fun with Verbs and Sentences

- My PlayHome

- Noodle Words

- Pat the Cat

- StoryPatch

- Toca Tea Party

- You're the Storyteller: The Surprise