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The I-Pad Research Initiative: The Impact Of I-Pads as Engagement Tools For Children With Asperger's Disorder

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THE I-PAD RESEARCH INITIATIVE: THE IMPACT OF I-PADS AS ENGAGEMENT TOOLS FOR CHILDREN WITH ASPERGER'S DISORDER

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ABSTRACT

Children living with Autism Spectrum Disorder (ASD) often exist in their own world, devoid of interaction or engagement with others (Gilmour, Hill, Place & Skuse, 2004). The iPad Research Initiative, carried out by the Eastern Michigan University (EMU) Department of Social Work, assessed the effectiveness of the use of iPads to increase engagement and interaction between children with autism. Parents of children and youth with autism have found this technology to be effective and cost-efficient (Seshadri, 2012). In this research I examined samples from a larger research project to determine if young males between 10 and 12 years old and diagnosed with Asperger's Disorder (AD), engaged more with each other while using an iPad for an activity, than when engaged in a non-iPad activity. The results showed that the iPad is a form of learning technology that promotes positive and effective interaction between children with Asperger's Disorder.

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INTRODUCTION

"Autism" is a general term used to describe a group of complex developmental brain disorders. My research focused on young males, between 10 and12 years old, who have been diagnosed with a type of autism called "Asperger's Disorder" (AD). Currently, there are no definitive research studies that document the use of iPads as an engagement tool with children who have AD. However, case studies are referenced in several articles (Seshadri, 2012). The use of evidence-based practice is a focus of current research and discussion in the field of AD, where many methods are unproven.

Any attempt to investigate interventions is, therefore, important for students, families, and educators (Lacava et al., 2010). Large-group experimental designs should be completed to address efficacy claims and to focus on unanswered questions. This should include diverse populations, control groups and different settings.

Oakes and Silver (2001) state that people with autistic difficulties, such as Asperger's Disorder, often find the world confusing and unpredictable, and may have difficulty dealing with change. Computers are useful for children with AD, because technology is free of social demands and can provide consistent and predictable responses that can be repeated indefinitely, without fatigue. The iPad offers applications providing explicit routines and clear expectations, with immediate, consistent consequences for responding. The iPad encourages engagement by allowing the learner to take active control of the pace of learning, and the opportunity to make choices (Shane et al., 2012).

In Seshadri's article "iPad gives voice to kids with autism," (2012), Siddiqui, a parent of a child with AD, states, "What the iPad has done has given [my daughter] a sense of control that she never had before. She knows when you touch it, something is supposed to happen, and she knows she doesn't need to cry, she needs to point" (as cited in Seshadri, 2012, p. 1). In another study done by Oakes and Silver (2001), children with AD showed more enthusiasm for computer use than for toys, as well as demonstrating "increased learning, motivation, attention, response rates, intentionality, problem solving and referential communication. They also showed fewer behavior problems when using a computer, compared with personal instruction" (Oakes & Silver, 2001, p.301).

LITERATURE REVIEW

General Use of Technology for Children with Asperger's Disorder

Shane et al. (2012) indicate that the burgeoning role of technology in society has provided opportunities for the development of new means of communication for individuals with

AD. In the 1980s and early 1990s, augmentative and alternative communication (AAC) strategies began to be explored for individuals with AD (Shane et al., 2012). Speech-generating devices (SGD) were some of the first portable devices used to produce synthetic or digitized speech (Shane et al., 2012). SGD increased communication options for individuals with AD in new and unprecedented ways. Drawbacks to such devices include their cost and difficulty in programming and personalization. SGD typically uses specialized software that often can incorporate multimedia content.

Over time, developments in technology have played a crucial role in improving the quality, affordability, and accessibility of technology for members of the AD population. The development of hand-held media devices such as iPods, iPhones, tablets, and iPads promises a potential paradigm shift in AAC for children with AD (Oakes &Silver, 2001).

iPad Use for Children with Asperger's Disorder

The iPad is a relatively new technology that is now being used with AD children. The iPad is portable and relatively inexpensive, compared to Speech Generating Devices, which are larger, more expensive and cumbersome. Seshadri (2012) writes that a search for "autism apps" for the iPad in the online Apple Store brings up 764 hits, of which 142 apps were released in 2012. Shane et al. (2012) confirm that the iPad has specialized AAC "apps" with new opportunities for AD users. These small, portable devices can store, organize, and present large numbers of images and videos. Use of the portable devices reduces the need to limit communication opportunities to the tabletop environment, or to keep track of troublesome low-tech materials. It increases the ability of mentors and learners alike to quickly access scene cues "just in time" to take full advantage of each communication opportunity (Shane et al., 2012 p.1229). The iPad's built in camera can capture images for on-the-spot creation of social skills materials.

The Use of iPad Applications in Teaching Social Skills

The use of iPads is beginning to be evaluated as a tool for teaching social skills to children with AD. Seshadri reports

(2012) that Estrada, a parent of a child with AD, utilized iPad applications (apps) with her son and stated that "the most appealing facet of the iPad is its mobility" (p. 1). Before the iPad, when her son needed to learn a new concept in the middle of soccer practice, or while at a restaurant, he had no means of learning the correct social behavior until he worked with a therapist or watched a DVD some time later. With an iPad or iPhone, the possibility to learn new skills was immediate. The Wonkido website and mobile application offer a series of animations, each about four to five minutes in length, depicting various social skills such as "asking to play" and "going potty" (Seshadri, 2012). This app and website give parents a database of episodes to draw from to teach children with AD a variety of social skills.

Research shows that children with AD are learning to interact better with others because of technology. The EMU iPad Research Initiative was interested in determining whether children with AD would engage with each other in an educational game on the iPad more easily than in a non-iPad activity. New, hand-held media devices such as the iPad, along with relevant applications, are affordable, transportable, socially acceptable, and easy to acquire. These tools have allowed clinicians, parents, teachers, and mentors to use both dynamic and static scene cues with greater frequency, across multiple contexts, bringing the creation of a visually immersive environment closer to reality for children with AD (Oakes and Silver, 2001).

The "Sosh" app is an iPad application that individuals with AD can use for social skills. Dr. Mark Bowers, Ph.D., PLLC (2011), developed the Sosh app. Bowers (2011), a licensed pediatric psychologist with a private practice in Ann Arbor, Michigan, has been providing psychological services to children, adolescents, and their families for over a decade. Dr. Bowers specializes in neurodevelopment disorders and is an expert in social skills development. In addition to developing the Sosh app, he is the author of the book *Sosh: Improving Social Skills with Children and Adolescents*. The "Sosh," is a new approach to social skills development, a framework developed by Bowers (2011) over a 10-year period. The five components of the framework in the Sosh app have interactive activities that can be customized for a stu-

dent using an iPad, iPod or iPhone. Dr. Bowers (2011) named the components the "Five Rs", that serve as a roadmap for individuals who struggle with social skills, and also serve as a guide for parents, teachers, and therapists: (1) *Relate* (Connect with others), (2) *Regulate* (Manage behaviors*)*, (3) *Reason* (Think it through), (4) *Relax* (Reduce stress), (5) *Recognize* (p.33).

Social Skill Development

Social behavior such as initiating interactions, responding to others and developing peer relationships is challenging to adults and children with AD (Winner, 2002). Winner (2002) stated that "individuals with AD have social difficulties in: (a) initiation of communication, (b) listening and processing subtle sensitive cues, (c) abstract and inferential thinking, (d) understanding the perceptions of others, (e) gestalt processing, and (f) humor" (p.73). Asperger's Disorder affects a person's ability to socialize and communicate effectively with others. Such children may not learn the linguistic and social competencies that are typically gained through social interactions (Koegel & Koegel, p. 32).

Rao, Beidel and Murray (2008) indicated that children with AD generally have difficulty interacting with others and often are awkward in social situations (p.353). Early on in life, it is evident that children with AD may not engage in simple social behaviors such as "eye gaze, smiles, and responses to parents' attempts to prompt vocalization and play interactions" (Solomon, Goodlin-Jones & Anders, 2004 p.650). According to Koegel (1992), children with AD may actively avoid making eye contact, possibly to escape or avoid social-communicative interactions they perceive as difficult (p.60).

Many children with AD have some form of inappropriate hand movements, body postures and other nonverbal aspects of language (Rinehart, Bradshaw, Brereton & Tonge, 2002 p.763). They may develop odd repetitive movements, such as hand wringing or finger twisting. People with AD may not make eye contact when speaking with others. "They may have trouble using facial expressions and gestures, and understanding body language. They also tend to have problems understanding language in context" (Rinehart et al., 2002, p.762).

Effective social interaction and a rich social network are aspects of life that are often taken for granted. Macintosh and Dissanayake (2006) agree that without peer acceptance, a child is at a definite disadvantage, and rejection by peers can result in limited social learning opportunities (p.1066). Social relationships and friendships are important to children with AD, but generally they do not make friends easily. Unfortunately, individuals with AD have a difficult time in establishing meaningful relationships. "Children with AD are often separated from other developing children; . . . they are segregated, which hinders/limits their opportunities to develop friendships" (Macintosh & Dissanayake, 2006, p.1066).

METHODOLOGY

Social skills groups, consisting of boys between the ages of ten and twelve years old, met in the Autism Collaborative Center (ACC) on the campus of Eastern Michigan University. Social Work student interns facilitated the sessions on a regular basis between May 17 and August 2, 2012. Each session, with written permission of the boys and their families, was recorded for later analysis. The sample included two groups of five boys, one which met at 4:00 p.m., and the second at 5:00 p.m. Each session lasted 45 minutes. Two boys dropped out and two others participated inconsistently, leaving us with a sample of seven participants for the dates on which this study is based. Ten sessions were held for each group. Each session was divided into three 15-minute parts: (1) An introduction, which included an intern explaining the task, followed by a warm up exercise; (2) a non-technology interaction or game ("Non-iPad activity"), such as making paper airplanes, and (3) an iPad-based activity, in which the technology was shared by two or more boys.

I studied video footage of the social skills sessions for the boys' groups, then coded the videos on Observational Data Collection (ODC) forms (Appendix A). The ODC forms collect data on six specific participant behaviors (*eye contact, verbal communication, appropriate body language, appropriate social touching, sharing*, and *youth initiates social exchange*), and I tabulated the number of times a described behavior was observed: (a) between the two children; (b) between a child and a student intern.

Each participant had a unique identifier number. I coded a small sample consisting of 3 sessions from the Eastern Michigan University iPad Initiative Research. This paper reports results from 2 sessions from each group (June 14, 2012 and July 12, 2012). I observed the behaviors and/or interaction in the first and last 10 minutes of each session, than tabulated the behavior on the ODC forms.

I provided my research mentor, Dr. Janet Okagbue-Reaves Ph.D., with my comparative observations of the subjects' behavioral patterns with and without the use of the iPad. I then prepared a preliminary analysis of what I observed, and compared my results with my research mentor's. This paper offers a representative sample of a forthcoming larger study by Dr. Massie.

Participants

Students were self-selected from a pool of families at the ACC. The project was advertised; families applied and were admitted to the group. All seven participants in my data pool were of European American descent and had a formal diagnosis of AD. All were diagnosed using criteria from the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV; American Psychiatric Association 1994), or the DSM-IV text revision (DSM-IV-TR; American Psychiatric Association, 2000).

Setting

All sessions were held on Thursdays, and lasted for 45 minutes. The sessions were held in a classroom that had a two-way observation mirror. Before sessions, staff would cover up material that might have been distracting to the children, or move such materials to other classrooms. The room was set up so that the participants and student interns could sit at one table. Session recordings were made simultaneously on iPads by someone in the room with the participants, and a second person through the two-way mirror.

Every session followed the same procedure. When the participants arrived, Social Work interns put a schedule on the board, which was then read aloud. The interns and the students then played an icebreaker game to attempt to facilitate engagement

between the participants. The boys were then asked to participate in a non-iPad activity, which was followed by an activity in which the boys shared the iPad while playing a game called "Tiny Zoo." Over the course of ten weeks the participants worked together to build a virtual zoo, which required them to select and care for "animals." At the end of every session the participants worked together in the caring of the animals to keep them alive. Each session lasted no longer than 45 minutes. Three interns worked with each group of five boys, to allow for proper supervision of the participants.

Data Analysis

My analysis of the recording of the social skills sessions consisted of these steps: (1) we viewed the videos; (2) the participant's behavior was noted and tabulated on the Observation Forms; (3) we created a Coding System, and (4) we compared data from non-iPad activity to iPad activity. After all the observational data was tabulated, we summarized it by comparing social interaction behavior between the participants during the non-iPad activities and the iPad activities.

RESULTS

The social interactions between the seven boys included in this sample during the non-iPad activities and iPad activities are shown in Table 1., below. The results are based on six engagement behaviors: (1) eye *contact*, (2) *verbal communication*, (3) *appropriate body language*, (4) *appropriate social touching*, (5) *sharing and* (6) *youth initiates social exchange*.Visual inspection of the data revealed both improvements and inconsistencies for all participants. The greatest improvement was in the "Verbal Communication" and "Appropriate Body Language" categories, where participants more than doubled their engagements. Participant 2's verbal communication had a score of 33 with the iPad activity, improving his score by 16 points over the non-iPad activity. It is interesting to note that in the "Appropriate Social Touching" category all participants scored "0" in the non-iPad activity, however all but one participant showed gains in "Appropriate Social Touching" in the iPad activity. The category "Eye Contact" is fairly consistent for all participants. All participants at least doubled their engagement in the

	Eye Contact	Verbal Communi-cation	Appropriate Body Language	Appropriate Social Touching	Sharing	Youth Initiates Social Exchange
P* 1	11	9	3	0	0	5
P 1	12	22	7	3	9	11
P 2	14	17	4	0	2	7
P 2	14	33	7	3	9	12
P 3	13	12	2	0	2	4
P 3	4	18	7	1	8	11
P 4	2	8	2	0	1	2
P 4	3	8	2	0	4	3
P 5	1	2	0	0	0	1
P 5	4	7	4	1	4	3
P 6	3	3	0	0	0	3
P 6	5	13	2	0	11	9
P 7	0	1	0	0	0	0
P 7	1	6	11	1	3	4

Table 1. Social Interaction of Non-iPad and iPad Activities, June and July, 2012.
*P= Participant

category "Youth Initiates Social Exchange." Five of the six categories indicate that children with AD engaged better with one another when involved in an iPad activity, than in a non-iPad activity.

Engagement increased for all participants while using the iPad. Preliminary observation appears to support the previously reviewed data from the literature review. Once the additional research is completed by the EMU iPad Research Initiative, we can glean greater support for this initial data.

DISCUSSION

The iPad is an important tool in working with the AD population, however Shane et al. (2012) emphasized that "technology does not replace a methodical, clinical process that matches a person with communication assistance needs. The iPad alone cannot

enhance communication unless combined with an appropriate instructional approach" (Shane et al., 2012 p. 1229). Technology such as iPhones, iPods, tablets and iPads can give children with AD what most people take for granted: appropriate social interaction with others. The use of technology has decreased behavior problems in AD children that once could only be addressed with personal instruction. The literature review above, along with the EMU iPad Research Initiative, has shown that children with AD may benefit greatly from the addition of technology in their instruction.

Research Limitations

Since this was a small sample from a larger study, our results are based on limited data and must be considered with caution. I also observed a Social Work intern sitting between two participants during a non-iPad activity, yet she did not sit between the participants during the iPad activity, which may have influenced the participants' interactions. Other limitations included the poor placement of recording equipment, and the absence of some participants during some sessions.

CONCLUSIONS

The goal of this study was to see if the iPad increases engagement and interactions among children with AD. The use of assistive technologies, such as iPads and other computer software, to teach social skills to students with AD appears to be a promising methodology with the common strengths and needs of the AD profile, (Lacava et al., 2010). The EMU iPad Research Initiative will add to the research base in this area and will contribute to the increased understanding of available computer-based technologies that may be used to help teach social skills in individuals with AD. Individuals with AD can have great strengths, as the data from the ODC indicates: "They have strong visual performance skills, can learn and follow routines, and they focus their attention on special interests, rote memory and are honest" (Bowers, M., 2011 p.36). To further my research, I would like to conduct a survey of participants and their parents, to see if the iPad helped them with their social skills outside of the study.

APPENDIX A

OBSERVATION FORM

Youth-To-Youth Social Interactions

Participant Unique ID#_____

Social Behavior	Number Of Occurrences
Eye Contact	

Behavior Observed

Social Behavior	Number Of Occurrences
Verbal Communication	

Behavior Observed

Social Behavior	Number Of Occurrences
Appropriate Body Language	

Behavior Observed

Social Behavior	Number Of Occurrences
Appropriate Social Touching	

Behavior Observed

Social Behavior	Number Of Occurrences
Sharing	

Behavior Observed

Social Behavior	Number Of Occurrences
Youth Initiates Social Exchange	

Behavior Observed

Social Behavior	Number Of Occurrences
Other (Misc.)	

Behavior Observed

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