

iPad 2013: A Learning Tool for Students with Special Needs

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Abstract. Interactive technologies such as iPad are considered as perfect learning tool for students with special needs. Lately, educational researchers and technology specialists have coined the idea of using iPad as a learning tool for students with Autism spectrum disorder (ASD). However, our literature review on the subject matter shows that scientific investigations on using iPad with ASD students are scarce. Therefore, academic researchers should organize longitudinal studies examining this subject. In this work in progress submission, we have provided broad overview of our ongoing research focused on investigating as if and how iPad and similar interactive devices could be used for the betterment of students with ASD in Saudi Arabia i.e. supporting students with ASD in learning and play. This work in progress paper pinpoints recent work on this subject covering some of major challenges faced by the iPad for Autism research.

Keywords: Autism spectrum disorder (ASD), educational technology, information technology, information systems, iPad, learning.

1 Introduction

Interactive forms of technologies are considered to have a special place in the lives of young students. Various interactive technologies including iPad, surface table and other touch based interactive learning devices are known for contributed towards education, learning and play among young students. However, not all students are same when compared against learning, social and cognitive abilities. Few students possess cognitive disabilities since their biological birth and we refer them as students with special needs due to their inherited biological learning related disabilities (Vera et. al., 2005). Students with special needs face significant problems in learning and gaining instruction and even score below average marks in academic exams (Falcão and price, 2010). Other prominent characteristics of special needs students are weak concentration; poor recall and memorization skills, cognitive disabilities, reduced social, practical and academic development (Falcão and price, 2010). Due to all of the aforementioned differences in the cognitive abilities of students, their potential needs, expectations and requirements in context to interactive technologies, are also different

in contrast to ordinary students without any learning disabilities (Falcão and price, 2010). This has resulted in the need for adapting the interactive technologies as per the needs of the students with special needs.

Lately, developing appropriate interactive educational technologies for students with special needs has attracted the attention of multidisciplinary researchers from various disciplines including education, educational psychology, human-computer interaction and information systems (Alper et. al., 2012; Duncan and Tan, 2012). This reflects a popular sentiment among research community towards supporting educational needs of the developmental disorders e.g. learning disabilities.

The aim of our ongoing research is to understand various needs, expectations and requirements of students with special needs from interactive devices such as iPad for educational purposes. Our research philosophy is influenced from the user-experience research. This current research involves development of various processes and procedures within the framework of interactive technologies, so as to support students with special needs in variety of ways. Interactive technologies might help them in grasping difficult concepts in easy fashion, directly aide their learning in classroom as well as non-classroom environment, relives them from any sort of academic stress and/or embarrassment. The focus of this research is mainly on the Arabic-speaking students with special needs in Saudi Arabia. Based on our review of existing literature on the subject, it was found that design considerations and theoretical framework for designing interactive technologies for students with special needs in Saudi Arabia are missing (Al-Wabil et. al., 2012). Therefore, in order to bridge this gap in the existing literature, our ongoing research is focused on addressing “Can iPad be used as a learning tool for Students with Special needs”. This open research question involves examination of different aspects namely determining the impact of iPad use on the learning, academic performance, social, communication and concentration skills of students with special needs.

At present, cognitive disorders or learning disabilities among students can be classified into several different types e.g. Autism spectrum disorder (ASD), Dyslexia, etc. Due to the presence of several different types of cognitive disorders, we decided to focus on single type of cognitive disorder, which is ASD among students. There were two main reasons behind choosing only one type of cognitive disorder namely: 1) Recent statistics have shown that ASD is on rise among students and it is found to be the most common learning disability among young students these days. 2) By focusing on single type of cognitive disorder, we can examine different perspectives of this disorder in better way and investigate if and how iPad could support ASD students. ASD is recognized as a qualitative impairment in social interaction and communication, restricted repetitive and stereotyped patterns in terms of habits, activities and interests (Autistic Disorder, 2012). Autistic students have problems in understanding and processing the verbal instructions and even performing basic cognition based generalizations and abstractions. Some of the specific cognitive problems with ASD students are difficulty in filtering extraneous sensory information and motor control (Autism Spectrum Disorder, 2011; Autism, 2011). According to (CDCP, 2012), 1 out of every 88 students in the US in 2012 were diagnosed with ASD and this rate has increased by 23% compared to 2009 statistics. These statistics clearly reveal that tomorrow’s classrooms will witness sharp increase in the number of students with ASD.

2 Research Methodology

Innovative interactive technologies can support students with ASD by enabling them to express and communication in educational settings (Alper et. al., 2012). Recently researchers and practitioners have made various efforts at exploring how the existing interactive technologies such as iPad could be made better fit for the student with special needs in addition to designing newer technologies aimed at student with special needs (Alper et. al., 2012).

Lately, iPad has received immense response from people suffering from autism spectrum disorders (ASD) (Herbert, 2010). Some of the notable affordances of iPad that makes it ideal tool education for student with ASD includes lightweight, portability, affordability offered by touch screen as compared to single-use special education devices, screen size, low cost as compared to other special education devices, graphical scheduling aspects, support different applications and abundance of iPad applications available on Apple iTunes (Herbert, 2010). All these aforementioned reasons make iPad an appropriate candidate for integration into the educational for student with ASD and also for application developers so that they can develop applications that suit the needs of student with ASD.

iPad act as a reinforce agent due to its inbuilt support for various highly preferred reinforces for-example, iPad provide access to various reinforces such as game applications, viewing pictures, videos with friends and family (King, 2011). (King, 2011) argued that iPad is socially acceptable and socially appropriate and it provides engagement to individuals with autism who obviously suffer from challenging behaviours. (Mozaffar et. al., 2012) pointed out several design considerations that govern the potential use of iPad for student with ASD. These design considerations are: 1) students must be supervised when using iPad so as to ensure that full educational exposure and device safety. 2) iPad acts as an incentive and self-reinforcement agent for students with ASD. 3) iPad enables ASD student to self-regulate their activities within educational settings, verbally and physically communicate with their peers, perform turn taking and mentoring own peers. 4) Teachers particularly appreciated iPad's accessibility features, media and portability support and finally ease of using it.

3 Challenges in iPad for Autism Research

During the review of existing literature on the given subject, we found some of the prominent challenges faced by research dealing with developing interactive technology for students with ASD. These challenges are:

1. Although, large numbers of mobile applications are available for teaching and aiding students with ASD but there is a shortage of software applications specifically for adults i.e. ASD adults (Duncan & Tan, 2012).
2. Recent research has shown that iPad is not equally suitable for all students with ASD (Mozaffar et. al., 2012). Therefore, teachers need to adapt the usage of iPad based on the needs of students with ASD so as to attain maximum benefit from iPad technology.

3. There is a pressing need for a strong collaboration between academic researchers, technology designers and educational technology practitioners for the task of innovating interactive technologies aimed at students with ASD (Alper et al. 2012).
4. Since the research involving the development of interactive technologies such as iPad-based applications for ASD is still young so future research should consider practicing of longitudinal methods on examining the impact of iPad on learning and academic performance of students with ASD.
5. Recent research on the subject has shown that academic research currently lacks the design and development of iPad based applications for students with ASD however, private sectors has undertaken several initiatives in this regard such as: Apple iPad apps for students with ASD (Alper et al. 2012).

4 Conclusion

Educational technologies researched have seen a potential in iPad that it can be used as a learning tool for students with Autism spectrum disorder (ASD). Our literature review on the subject matter shows that scientific investigations on using iPad with ASD students are scarce and this research field is still in its young phase. Therefore, considering the importance of this subject, our ongoing research is focused on investigating as if and how iPad or similar interactive devices could with used as a learning tool for the students with ASD. This research further investigates into other aspects of this subject namely determining the impact of iPad use on the learning, academic performance, social, communication and concentration skills of students with special needs. We argue that through this scientific examination and research will result in the betterment of students with ASD in Saudi Arabia, a community which otherwise is often ignored or less studied.

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References

1. Vera, L., Herrera, G., Vived, E.: Virtual reality school for children with learning difficulties. In: Proceedings of the 2005 ACM SIGCHI International Conference on Advances in Computer Entertainment Technology (ACE 2005), pp. 338–341. ACM, New York (2005)
2. Falcão, T.P., Price, S.: Informing design for tangible interaction: a case for children with learning difficulties. In: Proceedings of the 9th International Conference on Interaction Design and Children (IDC 2010), pp. 190–193. ACM, New York (2010)
3. Al-Wabil, A., Dhir, A., Al-Musaaed, H., Al-Sheaha, A.: Screening Program for Learning Difficulties in Arabic Speaking Students: Design Considerations for Educational Interfaces. In: Workshop on Interaction Design in Educational Environments (IDEE), 15th International Conference on Enterprise Information Systems (ICEIS) (June 28, 2012)
4. CDCP: Center for Disease Control and Prevention, New Data on Autism Spectrum Disorders (2012), <http://www.cdc.gov/Features/CountingAutism/> (retrieved)

5. Autism, PubMed Health, <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002494/> (retrieved November 2011)
6. Autistic Disorder Definition, Autism Spectrum Disorder, ASD (2012), <http://education.qld.gov.au/students/disabilities/adjustment/verification/asd.htm>
7. Autism Spectrum Disorder (ASD) – Sign and Symptoms, Centre for Disease Control and Prevention (CDC), <http://www.cdc.gov/ncbddd/autism/signs.html> (retrieved November 2011)
8. Alper, M., Hourcade, J.P., Gilutz, S.: Interactive Technologies for Children with Special Needs. In: Workshop on Special Needs, IDC 2012, Bremen, Germany, June 12-15 (2012)
9. Duncan, H., Tan, J.: A visual task manager application for individuals with autism. *J. Comput. Sci. Coll.* 27(6), 49–57 (2012)
10. Herbert, M.: The iPad—Breaking New Ground in Special Education (November 2010), <http://techworkshops.pottsgrove.wikispaces.net/file/view/The+iPad%E2%80%94Breaking+New+Ground+in+Special+Education.pdf/248317743/The%20iPad%E2%80%94Breaking%20New%20Ground%20in%20Special%20Education.pdf>
11. King, M.L.: Effectiveness of the iPad in enhancing the mand repertoire for children with autism. Southern Illinois University at Carbondale. ProQuest Dissertations and Theses, 144 (2011)
12. Mozaffar, S.S.: iPad for Autism: How can the iPad serve as a teaching tool for students on the Autism Spectrum? In: Proceedings of the Fourth Annual Teachers College Educational Technology Conference, May 19-20 (2012)