

# **ASSISTIVE TECHNOLOGY FOR DISABILITIES: A CASE STUDY OF AUTISM IN TEACHING AND LEARNING OUTCOMES**

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## **ABSTRACT**

The educational trajectory for future learning methods has changed from traditional learning in the classroom towards assistive technology strategies. The evolution of assistive technologies in the education setting has undergone enormous changes in terms of achieving teaching and learning outcomes, particularly for students with disabilities. A number of studies have highlighted new teaching techniques. There has been a trend in moving towards e-learning technologies in (Agarwal, 2012) and (Kemp, 2015), where those strategies were part of pedagogy techniques in teaching children with special needs. In the past few years, the increase in using assistive technologies such as tablet computers in education to support teaching and learning has led to innovation of more educational computer programs. Young children with Autism Spectrum Disorder (ASD), who suffer from a lack of social communication interaction and understanding of social pragmatics, such as turn taking in conversation, and difficulty in starting or maintaining conversation between teachers and peers in the classroom, tend to become less communicative. Assistive technologies support systems have shown to be beneficial in improving and developing their mental level in relation to complex stimulation interaction (Reed, Stahmer, Suhrheinrich & Schreibman, 2013). Assistive technologies have been helpful for individuals with disabilities and could be affective supporting instruction tools in motivating them. Based on the Social Cognitive Theory (SCT), the environment has great impact on teaching and learning through creation of a good environment to complete work related tasks; the reciprocal model plays an important role; the assistive technologies message is a factor which impacts and creates a learning and observation process (Rasit, Hamjah, Tibek, Sham, Ashaari, Samsudin & Ismail, 2015). Motivation is the key to empower individuals with autism to achieve a high level of performance. Cognitively, learning occurs as the first phase through imitation, and then changes through the application of consequences. The learning environment offers a chance to interact as more communication can be done within the supporting system during learning when students engage with the application.

## **Key Words**

Assistive technology, Disabilities, Communication and Autism disorder

## **INTRODUCTION**

Traditional methods of teaching are gradually becoming less popular nowadays with the evolution of assistive technologies in the education settings. Technology becomes fully effective when they are integrated with traditional techniques. Lambrechts & Gaigg (2014) noted that the new methods have been moving towards e-learning technologies. The rapid development of technology had greatly influenced the development of innovative approaches to educational delivery systems. In the past few years, the increase in the use of assistive technologies (AT) in education to support teaching and

learning has led to the innovation of more computer programs, opening a new avenue or method for students to learn and explore how information can be delivered differently. Emphasis is growing for mobile learning as an assertive and supporting technology and on how it is important, especially for individuals with special needs and autistic children. This paper reports on a study conducted on some of the available AT available to aid in the teaching and learning activities. The findings are targeted to enhance the education performance of students suffering from Autism Spectrum Disorder (ASD).

## **LITERATURE REVIEW**

### **Assistive technology (AT)**

The increase and growth of AT over the past years have contributed to an increase in active participation rates of children with disabilities and helped develop specialization in different development domains. The use of AT is the core feature of high quality early intervention support in the development and learning outcomes of young children. The development of new technologies, for example the tablet computers, has become a popular tool in supporting early communication skills among children as such intervention tools have proven positive outcomes in the enhancement of learning. AT is defined as any technology that is able to teach, learn and engage learners by stimulating learning in non-traditional ways, and control learning environments and how much information is given. AT are intervention tools, which have shown improvement in students learning outcomes and developing their mental level in relation to complex stimulation interaction (Reed & Schreibman, 2013). The technology was used in the early years to educate children with disabilities, from birth until the age of 8, and it has given teachers the opportunities to perform better in teaching. Therefore, pre-training on the use of AT would help them get more accurate result incorporated with teaching procedures. Chen & Hsu (2014) assert that early use application on AT for learners with autism leads to improvement in their learning outcome. Makaton (2016) is a communication system application program that is able to assist children who have learning or communication difficulties. Whether old or young, using sign language, symbol or speech, the system helps the learner with disabilities communicate more freely. In addition, the Makaton system offers a lot of engagement. Wainer & Ingersoll (2011) said AT has built and maintained relationships between students and teachers, in addition to learning outcomes and transfers. AT should have positive outcomes that learners must be able to reflect on the experience, gaining genuine knowledge and perspective about the teaching process. A case study has been conducted (Marin, 2015) to analyze mobile technology as a viable supporting tool, and there is significant findings that show that the mobile technology can engage and teach important knowledge through designing an application program especially for teaching and learning specific information. One of the significant roles of technology is global development, as technology impacts the way information is shared. The elements important in mobile communication are to understand, develop and design appropriate tools suitable for the target users / audience or to enhance communication capabilities; specifically the ability to interact, rather than simply receive information from the sender (Jaffee, 2015). For example, technology has contributed to the improvement of those with disabilities to read more clearly by using lens that allows them to be able them to read visual stories on Tablets, which enable the user to have more engagement in the activities, especially when the contents include some visual stimuli. Teaching students with disabilities using AT depends on the design itself and learner's cognitive abilities. The result obtained show that the learners learning more with their sensory touch and feel materials (Mcewen, Zbitnew & Chatsick, 2016).

### **The impacts of AT in general education curriculum integration with Individualized Education Plan (IEP)**

Numerous studies have emphasized the importance of integrated technologies with the curriculum to support teaching procedures in terms of actual classroom practices for diverse learners. Evidence supports the effectiveness of AT in special education (Turner & Welinski, 2012). AT as a tool in the

educational setting enabled the children to participate in various activities, as the AT increased the independence of those with disabilities in carrying out their daily activities. The main goal is to let these children use AT in their class regularly. A new study by Wood (2015) tried to implement AT in the school curriculum and reported that AT allowed learners to interact and develop their physical, cognitive and social communication skills that are important skills for future growth. Learners who have disabilities do not have an education curriculum like other normal learners do in the school, because each individual differs in terms of character and cognitive abilities. Designing relevant education courses requires collaboration from specialist teams, for example teachers, psychologist, speech specialist and language therapist.

### **Education and world of AT Apps**

The educational process relates to how to deliver information, knowledge and facts, immaterial of whether they are audible, visible or readable. Education has become a right and necessity for all regardless of their nature or abilities. The law has provided that each individual who has the physical ability, mentality and skills to gain from education, can take the benefits of it. There is no difference between teaching adults or children, the only difference is in the strategies. "No child left behind" - this quote considers that both normal and disabled children have the same equal right to education. 13% of the learners have disabilities. One of the main enduring issues in special education is to give a chance to each individual to learn without obstructive environment. According to the National Association for the Education of Young Children, the best time to educate children with disabilities is from birth until the age of 8. Although many children have access to apps on AT such as tablets, they are not mainly for education and learning but instead primarily for entertainment purposes. AT is an intervention tool used to support traditional teaching in the classroom, and allows learners to be more independent. The collaboration between teachers and program strategy, together with the AT, brought about teaching methods that yielded important benefits for all students, and significantly contributed to the improvement in their outcome achievement. AT have various uses in the education sector and this developing technology increases every day to cater for the different disabilities, including for example, electronic vision enhancement systems for visually impaired young children to aid them in learning and understanding pictures as representations of objects. Similarly, AT helps learners who have autism to communicate. Based on surveys, communication skills are found to be amongst the top educational priorities in teaching. The use of AT requires a prompting technique and some delay before asking or requesting them same question, which is necessary to ensure learning. AT devices are used as support tools facilitated with a lot of visual graphics and gesture interface, so that touch may deliver meaningful contribution in several learning outcomes. Positive learning using AT promoted development of a new generation of AT successfully used in teaching communication to children with ASD or other development disabilities (Mulloy, Gevarter, Hopkins, Sutherland, & Ramdoss, 2014).

### **3. PROBLEM STATEMENTS**

Social communication skills are the most common problems identified with Autism Spectrum Disorder (ASD). Generally, ASD children have difficulties in understanding, expressing emotion and feelings, face difficulties with social pragmatics such as in turn talking in conversation, and have difficulty in starting or maintaining conversations. The lack of social communication interaction between teachers and peers in the classroom always result in students becoming less communicative.

#### **4. METHODOLOGY**

This qualitative research employed a case study approach to analyze how:

1. Case study will be author method as future consideration.
2. The sample of this study consists of a special education teacher and parents. Case study profile method will allow the author to examine how AT tools can achieve the learning outcomes within the education setting, to evaluate an on.
3. Direct observations including photographs of what author have observed .

#### **5. RESULTS**

This study, as a result based on the literature reviewed, has found that the AT as a supporting tool for disabilities produces a positive outcome. The work also showed improvement in the way that the students with disabilities completed tasks, therefore it could be concluded that they engaged the learner in the topic.

The recent growth of technologies has seen to the developed education technology. This technology helped improve learning, received information and has affected them. Based on (Turner & Welinski, 2012), Wood (2015) integrated the technology with the IPE curriculum has more learning skills benefits. Technologies have removed and eliminated the obstructive environment for more learning.

#### **6. CONCLUSION**

Based on the evolution of new technology, the learner's outcomes could be further improved. Treatment technologies are tools that are used to educate and teach the masses about any obstructions. These technologies have contributed to eliminate obstruction for more learning result. Treatment technologies are tools that are used to educate and teach without any obstruction. These technologies have contributed to eliminate obstruction for more learning results. AT has contributed to develop a method to teach and to deliver knowledge in the auditory or visual form. Some of the AT have facilities, for example, a touch interface (gesture), pictures resolution, sound and recode, making presentation, etc.

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