

Social Skill Enhancement of Children Having Autism Using Technological Interventions: A Review

Parulpreet Singh, Sumit Kumar

Lovely Professional University, Phagwara

parulpreet.23367@lpu.co.in

Abstract: - Autism Spectrum Disorder (ASD) or autism is a pervasive neuro-development disorder that is exemplified by differences in communication and social interaction as well as the presence of repetitive behaviors and restricted interests. ASD is often defined as a general health crisis, in large part of world because of the great unmet requirement for appropriate interventions, support and services for individuals with ASD, throughout their life span. Technology is influencing the world of ASD cure, treatment and research in a rapid and big way. In this research, we have explored the use of Microsoft Kinect and software interaction to provide social skills instruction to the children with ASD.

Introduction

Technological interventions have found to be very helpful for children having ASD and their parent, because those technological interventions are often very highly motivating, can be easily customizable, and are cost-effective relative to the expense of a medical intervention and therapist. Social skills are described as “the capability to perform those action which are essential to make child enable to get social satisfaction and accomplishment”. Disabilities related to social skills and social interactions are prime symptom related to ASD, but how they exhibit in children vary from one individual to another and at some extent it's also depends on IQ level and age of child.

Statistics and Data

Autism spectrum disorder is an important cause of neuro-developmental disability throughout the worldwide. Its estimated prevalence is 1% in the United Kingdom and 1.5% in the United States of America [2,3]. There have been various epidemiological surveys to determine the prevalence estimates of ASD during the past decade. The data based on these surveys showed an increase in the prevalence of ASD worldwide. The prevalence was estimated to be 61.9/10,000 globally in 2012 [1].

India is a populous country of nearly 1.3 billion people with children ≤ 15 years constituting nearly one third of the population. It has been estimated that more than 2 million people might be affected with ASD in India [2]. Most of the reported studies on ASD are based upon hospital based data and thus lack information on the prevalence estimates of this disorder in India [3-5]. There are only a few studies focusing on its prevalence in the community settings. Furthermore, lack of uniform application of fully validated and translated autism diagnostic tools makes it difficult to estimate the exact prevalence of ASD [6]. There is also under recognition of the disorder due to a delay in the diagnosis of ASD at a young age [7]. ASD not only affects the

child and the family but also has direct and indirect cost implications on the nation as resources have to be utilized in providing health care, support for education, and rehabilitative services for these children [8].

ASDs keep on being right around multiple times increasingly regular among boys (1 of every 42) than among girls (1 of every 189). Studies have been led in a few mainlands (Asia, Europe, and North America) that report a predominance pace of roughly 1 percent. A recent report detailed a 2.6 percent commonness of autism in South Korea. Figure 1.1 shows the number of autistic children per ten thousand in some of the countries.

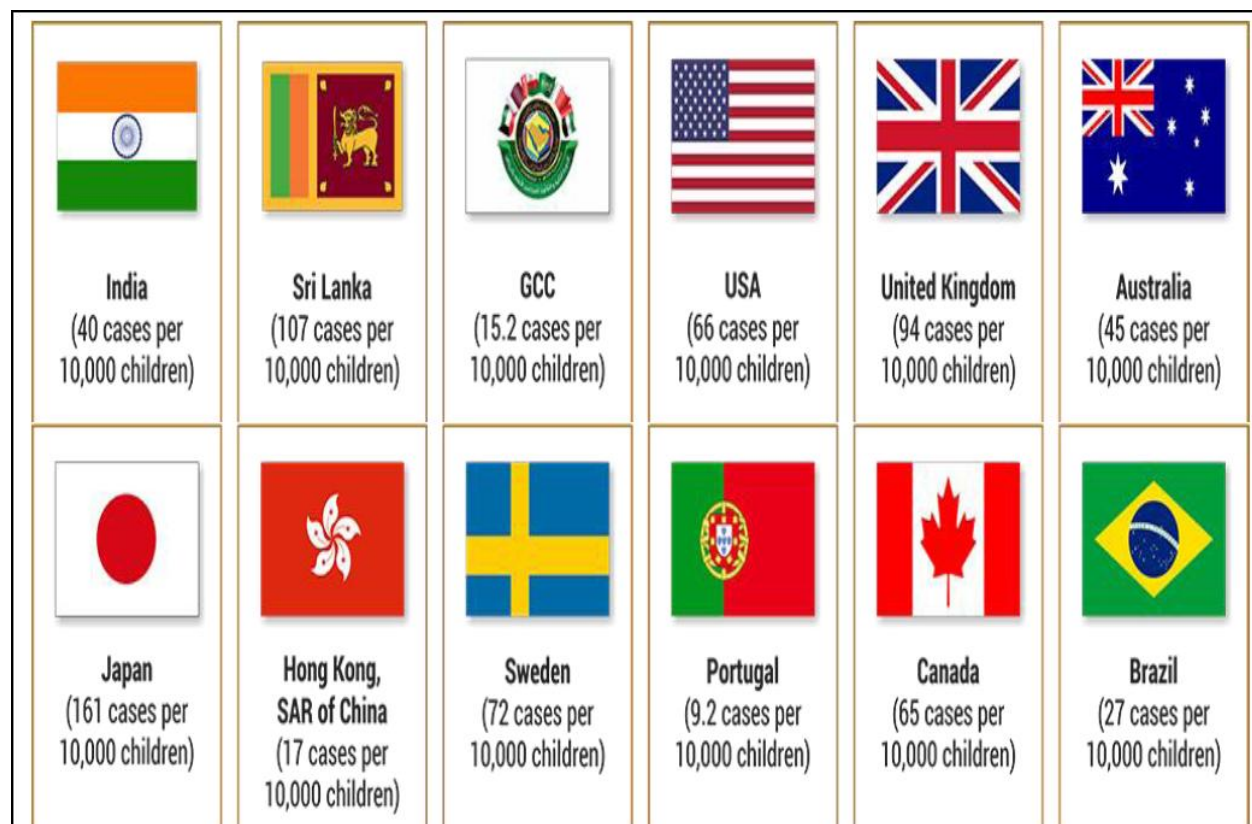


Figure 1.1:- Autism Statistic in various countries of world

Myths and Reality

Myth: People with autism don't need companions.

Reality: People with autism presumably battle with correspondence and social aptitudes, which may make it hard to cooperate with obscure individual. They may appear to be timid or disagreeable, however that is on the grounds that they can't express feeling or convey their longing for connections.

Myth: People with autism can't feel or express any emotion.

Reality: Autism doesn't make an individual unable to feel or perceive the emotions, it is just the way they express emotion in different way rather than one expecting so it is more that people

should understand emotion of children with autism rather than expecting emotion in a way they want.

Myth: People with autism can't comprehend the feelings of others.

Reality: Autism frequently influences a person's capacity to comprehend implicit relational correspondence, so somebody with mental imbalance probably won't recognize bitterness dependent on one's non-verbal communication or mockery in one's manner of speaking.

Myth: People with autism are mentally impaired.

Reality: Often, autism carries with it similarly the same number of excellent capacities as confinements. Numerous individuals with mental imbalance have ordinary to high IQs and some may exceed expectations at math, music or another interest.

Myth: People with autism will have mental imbalance for eternity.

Reality: Recent research has indicated that youngsters with autism can make enough improvement after concentrated early intercession to "try out" of the autism finding. This is more proof for the significance of tending to autism when the primary signs show up.

Myth: People who are not determined to have autism will never show qualities.

Reality: like the attributes of the individuals who have been analyzed. Qualities related with autism exist on a continuum that incorporates those considered "typical" and can be shown to a lesser degree by those not determined to have autism.

Myth: Autism is Mental Retardation.

Reality: Autism is a neurological issue. Investigations of the individuals with autism have uncovered variations from the norm in cerebrum structure and synapse levels.

Signs and Symptoms Related to ASD

Signs and Symptoms play major role in early detection of ASD in children and play great role in easy and early screening and diagnosis of children with ASD. Signs and Symptoms related to ASD varies with person to person and generally changes with age. Some people are hyper sensitive whereas some are hypo sensitive.

Some of common signs and symptoms are as follows:

- 1) Deficits in social-emotional reciprocity.
- 2) Unable to express their emotion.
- 3) Unable to act or response as per others emotions.
- 4) Issues related to eating habit.
- 5) Sudden changes in likes and dislikes with respect to food item.
- 6) gastro-intestinal disorders.
- 7) Deficits in developing and maintaining relationships.
- 8) Lack in proper physical and eye contact.
- 9) Faces problem while interacting in group.
- 10) Resists change in the environment and surrounding.
- 11) Deficits in non-verbal communication used for social interaction.
- 12) Talk is abnormally loud or silent.
- 13) Find it difficult to keep up a conversation.
- 14) Often uses short, same sentences or incomplete sentences while talking.

15) Some may make verbal sounds and whistle while listening (echolalia).

Literature Related to Interventions

J. Andrés Sandoval Bringaset al [9]: this paper has represented the utilization of computer games by youngsters and youngsters have gotten normal, which has started the enthusiasm of investigating the full advantages that can be accomplished with these apparatuses in the instructive and social fields. Using computer games can give intelligence, increment mental action and advance social cooperation among different individualist.

Mohd Z. A. Aziz et al [10]: in this paper, authors has built up an instructive application for mentally unbalanced kids which causes them to improve their everyday aptitudes pursue the way toward learning by tuning in to the sound in the wake of communicating with the image of the article. The application additionally causes their folks to comprehend the necessities of their kids since it can keep away from any undesirable miscommunication, Children with ASD can communicate with the image and the sound discourse related with the image will be played. Youngsters with ASD can utilize this application to express what they are attempting to stand up dependent on pictures.

Murat Olcay OZCAN et al [11]: In this paper, authors have spoken to the capacities of Microsoft Kinect and explored the examinations that utilize Kinect innovation for recovery purposes, because of its greater fame as a versatile, minimal effort, markerless human movement catch gadget with simple programming improvement. Because of these focal points and the progressed skeletal following capacities, it has become a significant device for clinical appraisal, non-intrusive treatment, and restoration. Kinect shows an incredible potential with its minimal effort and movability.

Bertram O. Ploog et al [12]: In this paper utilization of Computer Assisted Technology (CAT) is assessed. Since significant advances in mixed media PC innovation over the previous decades have made refined PC diversions promptly accessible to people in general and when consolidated with the perception that most youngsters, incorporating those with Autism Spectrum Disorders (ASD), demonstrate a proclivity to PCs, specialists perceived the capability of PC innovation as a viable and effective device in research and treatment. This paper avoided web based methodologies, to upgrade social, informative, and dialect improvement in people with ASD by isolating the tremendous writing into four fundamental regions: dialect, feeling acknowledgment, hypothesis of psyche, and social abilities. This review likewise outlined the gigantic guarantee of CAT to upgrade aptitudes of people with ASD.

Fong et al [13]: this paper proposes individuals with autism for the most part feel entirely good in unsurprising conditions and appreciate interfacing with PCs, in this paper investigation of four individuals was done, which are influenced with autism they were presented to humanoid. Robot over a time of a while the longitudinal methodology permitted kids time to investigate the space of robot-human, just as human-human association. In view of video material reporting the connections, a quantitative, just as the subjective examination, was directed.

Gwynette et al [14]: in this work, authors have introduced the utilization of Electronic and internet based life assume a noticeable job in the lives of youngsters and adolescents. Proof recommends youth with ASD use media uniquely in contrast to normally creating friends.

Philipp Michel et al[15]: In this paper, authors exhibited an outline of a portion of the past and present employments of innovation in the conclusion, treatment and general investigation of ASD and related conditions, just as alluding to conceivable future research bearings. Past experience has given us that innovation can and makes a colossal distinction in determination and treatment, writers talk about various mechanical developments utilized for ASD kids like Robotics, Eye Tracking, Virtual Reality, Multimedia Toys, Mind Reading Devices and Assistive Technology.

Altaniset al [16]: In this work, authors introduces about the primary exceptionally positive discoveries from an exact examination about the viability of the utilization of a Kinect learning game

for youngsters with motor impairments. This game pursues the standards of a recently exhibited methodology, called Kinems, which advocates that exceptional teachers and specialists should utilize learning games that through epitomized touch less cooperation. Youngsters with dyspraxia and other related issue, for example, mental imbalance, Asperger's Syndrome, and Attention Deficit Disorder, can improve related aptitudes. These games are inventive and are played with hand and body signals.

Understanding Social Skills

Those skills that we use to interact with each other, with surrounding and environment. These are simple natural rule which one follow in their day to day life activities. Having good social skills simply means people share space with others effectively or adapting to others effectively across settings.

Examples of Social Skills

Some of examples are as follows:

- 1) Unwritten social rules of the environment.
- 2) Sharing space with others.
- 3) Thinking about others in the common environment.
- 4) Learning to adjust behavior depending on a situation.

Strategies for Developing Social Skills

It is difficult for youngsters with ASD to learn social aptitudes, yet you can utilize the procedures beneath to support your kid. Social aptitudes preparing can assist kid with creating social abilities in an organized manner.

a) Keen Play

Playing around together assists youngster with rehearsing turn-taking, adapting to winning and losing, and adhering to rules. Inciting youngster to alternate and adhere to rules will enable him to learn. Rehearsing an ability in various play circumstances will assist youngster with figuring out how to utilize the expertise all the more comprehensively.

b) Role Playing

This can assist youngster with learning and practice the aptitudes she needs to play with others. Work on discussing things like what kid has viewed on TV or what he did on the end of the week.

c) Video Modeling

Take a stab at taking recordings of the social aptitudes we need to educate. We can show feelings by videoing individuals in social circumstances. We can likewise utilize this system to assist kid with feeling increasingly great in new and troublesome social circumstances.

d) Social Stories

Social Stories can help with clarifying social standards. For instance, we could utilize a Social Story to disclose why it's critical to play with others.

e) Visual Prompts

Visual prompts may assist kid with adapting new abilities or recollect social aptitudes he/she has just learned. We could utilize picture prompts to assist kid with figuring out how to play a specific game

Technological Interventions

Innovation is transforming human in such a fast ways which nobody has ever envisioned and the space of autism has not stayed extraordinary. The utilization of innovative mediation to show youngsters with ASD is certifiably not new idea. Indeed, computer aided technology helped innovation has been being used to show understudies with ASD from most recent 4 decades.

Innovative interventions are useful for preparing kids with ASD in light of the fact that these mediations can be effectively tweaked, set aside less effort to structure and diminish the expense of a specialist and worry for taking early arrangement. These unique kids have uncommon needs and consequently require an alternate sort of learning systems just as access to mechanical mediations that offer additional methods for building joins for a person. This increased center incorporates administrations and mediations joined with mechanical advances that reclassify how backing and guidance can be given.

There are different sorts of rising innovation devices, for example, Virtual Environment (VE), Collaborative Virtual Environment (CVE), Assistive Technology (AT), restorative robots, language devices, mixed media handheld gadgets, versatile applications, Computer Assistive Technology (CAT), Electronic Screen Media (ESM), floor/tabletop projectors that have been utilized to improve distinctive social and different abilities in kids with ASD.

Mechanical innovation has been uncovered to bid kids with ASD. The robots could be utilized to detect various conditions under which some social prompts should be shared. These can be modified in like manner and enable kids to cooperate consistently in a tweaked situation. Correspondence shortage is one of the significant weakness of kids with ASD. Upgrades in language usefulness may improve instructive incorporation, broaden group of friends and at last, increment autonomy. Language remediation programming is promptly accessible and helpful to use than language teachers. These language instruments are not limited by area or time and in this way, such devices are advantageous for homes and learning focuses.

Ongoing progressions in versatile/handheld gadgets and portable applications are helping kids with ASD from multiple points of view. These gadgets can be utilized to upgrade correspondence, engine abilities, improve social creative mind and support. The advantage of cell phones, for example, an iPad or any android tablet is their transportability, smallness and whenever anyplace utilization. Distinctive applications for empowering correspondence, perusing/composing upgrade, turn taking, sequencing and so on are giving promising outcomes during intercessions.

Multitouch tabletop is a moderately new model in human-PC association that gives a common interface to help communication among co-found clients. The tabletop projector bolsters normal connections and takes into account motor abilities and uncertain control. Floor projections can likewise be utilized to cause the earth intelligent and numerous games to can be made arrangements for individual or gathering use. The primary points of interest of such instruments are that these are programmed, protected and less tedious as opposed to customary strategies, where everything is planned manually. VE can reproduce a virtual world that is intelligent, redone and safe. It offers the point of view for clients to find social circumstances and comprehend diverse conduct reactions for a scope of recreated social cooperations. It has been seen that VEs are especially valuable for youngsters with ASD and may give the most reasonable technique to social aptitudes preparing.

Regardless of immense capability of VE, this condition has not been broadly received into the learning focuses.

Conclusion

Games based on daily life activities can play big roles in improving social skill. One can easily customize games as per requirement or as specific to particular social skill for children to improve their respective social skill. Children find it easy to associate with these games since these games involve scenes related to their daily routine and don't involve any complex set of rule to be followed. Even parents, family members and teacher can also help in playing these game at initial level without any need of specialization or special training. Our main goal is to improve Social skills in autistic children, in addition to social skill our game will also help in improving motor skills as well as sensory skills. Kinect based games have been developed earlier also for the children with ASD but they were primarily focused to improve motor skills only.

References

- [1] Elsabbagh, Mayada, Gauri Divan, Yun-JooKoh, Young Shin Kim, ShuaibKauchali, Carlos Marcín, Cecilia Montiel-Nava et al. "Global prevalence of autism and other pervasive developmental disorders." *Autism research*, Vol. 5, no. 3, pp:160-179, 2012
- [2] Krishnamurthy, Vibha. "A clinical experience of autism in India." *Journal of Developmental & Behavioral Pediatrics* Vol. 29, no. 4, pp: 331-333, 2008.
- [3] Singhi, Pratibha, and PrahbjotMalhi. "Clinical and neurodevelopmental profile of young children with autism." *Indian Pediatrics* Vol. 38, no. 4, 384-390, 2001.
- [4] Jain, Rahul, Monica Juneja, and SmithaSairam. "Children with developmental disabilities in India: age of initial concern and referral for rehabilitation services, and reasons for delay in referral." *Journal of child neurology* Vol. 28, no. 4, pp. 455-460, 2013
- [5] Kommu, John Vijay Sagar, K. R. Gayathri, ShobaSrinath, Satish Chandra Girimaji, Shekhar P. Seshadri, and GururajGopalakrishna. "Profile of two hundred children with Autism Spectrum Disorder from a tertiary child and adolescent psychiatry centre." *Asian journal of psychiatry* Vol. 28, pp. 51-56, 2017.
- [6] Rudra, Alokandanda, Saoni Banerjee, NidhiSinghal, Merry Barua, ShaneelMukerji, and BhismadevChakrabarti. "Translation and Usability of Autism Screening and Diagnostic Tools for Autism Spectrum Conditions in India." *Autism Research* Vol. 7, no. 5, pp. 598-607, 2014
- [7] Daley, Tamara C., and Marian D. Sigman. "Diagnostic conceptualization of autism among Indian psychiatrists, psychologists, and pediatricians." *Journal of Autism and Developmental disorders* Vol. 32, no. 1, pp. 13-23, 2002.
- [8] Barnett, W. Steven, and Leonard N. Masse. "Comparative benefit–cost analysis of the Abecedarian program and its policy implications." *Economics of Education Review* Vol. 26, no. 1, pp. 113-125, 2007.
- [9] Bringas, J. Andrés Sandoval, Mónica A. Carreño León, Italia Estrada Cota, and Alejandro Leyva Carrillo. "Development of a videogame to improve communication in children with autism." *In XI Latin American Conference on Learning Objects and Technology (LACLO)*, pp. 1-6. IEEE, 2016.
- [10] Aziz, Mohd ZA, Syahrul AC Abdullah, Syed FS Adnan, and LucyantieMazalan. "Educational app for children with autism Spectrum Disorders (ASDs)." *Procedia Computer Science* Vol. 42, pp. 70-77, 2014.

- [11] OZCAN, Murat Olcay, Tugce DOYURAN, and Burak BEYNEK. "A Survey on the Use of Microsoft Kinect for Physical Rehabilitation.", 2017.
- [12] Ploog, Bertram O., AlexaScharf, DeShawn Nelson, and Patricia J. Brooks. "Use of computer-assisted technologies (CAT) to enhance social, communicative, and language development in children with autism spectrum disorders." *Journal of autism and developmental disorders* Vol. 43, no. 2,pp. 301-322, 2013.
- [13] Fong, T. W., IllahNourbakhsh, and Kerstin Dautenhahn. "A survey of socially interactive robots, *Robotics and Autonomous Systems*." Vol. 42: 3-4, pp. 143-166, 2003.
- [14] Gwynette, McLeod Frampton, Shawn S. Sidhu, and TolgaAtillaCeranoglu. "Electronic screen media use in youth with autism spectrum disorder." *Child and Adolescent Psychiatric Clinics* Vol. 27, no. 2,pp. 203-219, 2018.
- [15] Michel, Philipp. "The use of technology in the study, diagnosis and treatment of autism." Final term Paper for CSC350: Autism and Associated Developmental Disorders, 2004.
- [16] Altanis, Giannis, MichalisBoloudakis, SymeonRetalis, and Nikos Nikou. "Children with motor impairments play a kinect learning game: first findings from a pilot case in an authentic classroom environment." *J Interact Design Architect*, Vol. 19,pp.91-104, 2013.
- [17]Luhach, Ashish Kr, and Sumit Kumar. "Layer Based Security in Internet of Things: Current Mechanisms, Prospective Attacks, and Future Orientation." *In International Conference on Smart Trends for Information Technology and Computer Communications*, pp. 896-903.Springer, Singapore, 2016.