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The role of technology in teaching to children suffering from autism spectrum disorder

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Abstract
Entering the technology in teaching to autistic exceptional children can make a variety in teaching opportunity and in comparison with teacher centered classical teaching, include advantages such as rapid feedback, individuate teaching, increasing of consideration and motivation and interaction and different teaching for them. Which cause qualification in teaching to these children. Therefore, this study considers on the role of technology to autistic children (ASD). According to our findings in the last researches, computer is used as an educational device in order to individuate teaching, creating self-esteem and getting far from monotonous classical teaching, cause improvement and increase of efficiency of teachers, increase of memorizing vocabularies and information of students in doing extra practices and also causes better and faster learning of autistic children therefore computer can be considered as a suitable device in learning and teaching of these children. Therefore, schools must be equipped to optimal training tools including computer and ancillary facilities and resolve possible issues including creating incorrect habits such as high dependency to technology, negligence from face to face training by trainer and low dominance of parents. The results of this study shows obvious growth of the number of research articles which are published in the last decade and their subjects are technologies of autistic children.

Key words: autism disorder, technology, teaching

Introduction

"autism" is a growth disorder which suppress the ability of the person in communicating with others. Autism can be introduced as a disease with spectrum disorder. This disease can have frequent symptoms which based on these symptoms, an autistic patient is graded from mild to severe. Although autism can be diagnosed by a series of behaviors, but autistic people can have a combination of these behaviors and necessarily must not show determined disorder behaviors at once (Jordan,2013). This disorder in autistic patients cause that the brain can't work properly in social behaviors and communicating skills and suppress the person from learning how to communicate and interact with others socially. Therefore, teaching to these children is important and must be considered. According to the instruction of Diagnostic and Statistical Manual of Mental Disorders (DSM5) from every 68 children one of them suffers from autism. This disorder is more common in boys 4 or 5 times and autistic girls may suffer from more severe mental disability. Autistic students are different from each other in terms of intelligence. They have lack of IQ and their IQ is lower than 70 (Kafman,2005; kont well, 1996).

Now, the spectrum autism disorder(ASD) has an effect on significant number of people who have problem in communicating and socializing, and it causes complexity in learning. Studies have considered using the technology and computer interventions in order to teach people with ASD language and social skills (Grynszpan, O.; Weiss, P.;

Perez-Diaz, F.; Gal, E, 2014). Especially, students in autism spectrum enjoy playing in a safe environment (Kapp, 2012).

Most of the diagnosed children with spectrum autism disorderare diagnosed after the age of 4, while spectrum autism disordercan be diagnosed in age of 2 by using from initial symptoms of autism and based on the standard tests. (unfortunately in our country most of referrals and diagnoses happens after the age of 4 and these children lost their best time of learning).

31% of autistic children suffer from mental disability and IQ lower than 70, 25% are in the boundary range means that their IQ is between 71 to 85 and the grade of 44% of them are medium and higher than medium, means their IQ is more than 85. But unfortunately in our country this conception has prevailed that people who suffer from autism has a kind of disability and unfortunately some experts have this idea and transfer it to families that an autistic child can't talk, can't eat, can't communicate, never can go to school and eventually leads to an isolated life!!!!!!

In types of autism spectrum disorder, these people just know and recognize level 3 or severe autism and for other levels especially level 1 they use phrases such as like autism and etc.

According to the last researches, interventions based on the technology (Knight, McKissick, & Saunders, 2013; Yoshida et al, 2020) and using from an especial kind of technology such as the technology with the help of the computer, for children suffering from spectrum autism disorders (Van Larhoun, 2021; Crowwell, Villango and Schmidt, 2012). We observed review of researches about the children suffering from ASD and technology by instructions of American Psychological Association (2010). Therefore, we reviewed the existed literature about the relationship between the technology, games, experience of the user, availability and development of the skills of those who suffer from ASD.

In this study, many of researches in the field of children suffering from spectrum autism disorder(ASD) and using from the technologies in the last decade are considered. Researchers have considered this topic from a multidisciplinary perspective and used from technology solutions for different purposes in autism researches in teaching field, psychology and technical science. But research implementation and publication of the researches has got far from each other and made it difficult to represent an overview.

Theoretical review and research literature

Autism history

Since the early 1900s the term of autism was used in order to mention to a wide spectrum of neuropsychological problems. But this word came from where and how the knowledge about autism changed?

The term of autism came from the Greek word of Autos which means yourself. This word describes a situation which the person is left out from social interactions, in other words the person has changed to a self-isolated. Eugen Bleuler a Swiss psychiatrist was the first person who used from this word.

In 1911 he used this word in order to mention to some of the related symptoms of schizophrenia. In 1940s American researchers used the word from the word of autism to describe children with emotional and social problems. Leo Karner, a doctor from Johns Hopkins university used from the word of autism to describe behaviors of some children which has isolation behavior. At the same time, Hans Asperger a German scientist identified a similar situation and called it Asperger syndrome. In 1960s most of researchers believed that autism and schizophrenia are related to each other. Then medical specialists found a separate conception about autism in children gradually. From 1960s to 1970s related researches to autism treatment focused on medicenes such as LSD, electric shock, and behavioral modification techniques. From 1980s to 1990s, the role of behavioral therapy and using from strictly controlled learning environments as the main treatment were proposed as the main treatment of autism's issue and related issues. Now base of the autism treatment is behavirol therapy and speech therapy (Jock et al,2020).

Autism spectrum disorder

Asperger syndrome was defined by Hans Asperger in 1944. In the fifth edition of diagnostic and statistical instruction of mental disorders (DSM-5) he defines autism spectrum disorder (ASD) as a disease which is characterized by defects in two main areas (Greenspan et al, 2014) of social relationships and social interactions and limitation of behaviors, interests and activities (Kapp,2012). Since 2013, Asperger disorder has recognized DSM-5, decomposition disorder in children, Ratt disorder and other related disorder as a part of ASA. However, most of researches still use from Asperger syndrome and ASA almost instead of each other. A study published by national institute of health in United States (NIH) in June 2018 estimated that 2.41% of children in the United States suffer from autism spectrum disorder. This rate represents an increase of 0.94% in comparison with 2010.

importance of using from technology in teaching to autistic children

Today, due to the growth of computer technology, the speed of information transfers and the issue of knowledge explosion, information and knowledge can be easily and quickly available for everyone, and school is no longer the only framework that the teacher wants knowledge, skills and values. Though, economic, social, cultural, and mass media frameworks play a crucial role in shaping students' perceptions (Arciuli, J.; Bailey, B, 2019). One of the consequences of is that students' standard level of knowledge disrupts coordination with educational courses. Using computer and internet help teacher to teach with new methods and having a wide range of educational programs and methods and focus on the role of the student by considering on the individual differences and more attention to needs, interests and talents of students can be useful and efficient in destroying and decreasing educational gap. Therefore, using from computer and internet has a positive effect on teaching to all of the students especially in educable mentally retarded students because the students become active

during and after teaching. Class would not be monetary anymore. Pervasively involves in teaching and a kind of multisensory training is made. By creating attractive and favorite education of the student and safely observing the real events related to education, the learning is deepened (Escobedo et al,2012; Silva et al,2017).

Teaching social skills to autistic children

Autistic children often have many problems in social encounters which most of them are obvious for us. These children have a very different experience about the world than other people, therefore it's not surprising that acts and interacts of other people are like a secret for them. When we get involve in social situations, we are very depended on our experiences and when we want to decide how to act in this situation and answer to others, this shared experience is the basis of our ability to feel and understand others (Fatemi, 2018). For the children who their body and perception answer very differently, it's not surprising that they often show unsuitable interactions. These children often are not aware of subtle differences in facial expressions or interactions of hand and foot during speaking. The movements which make us aware of our reactions to others. Raising one eyebrow causes we change the subject of the conversation (American Psychiatric Association, 2013).

Rehabilitation of autism spectrum disorder through auxiliary technology

Compensation role for rehabilitation disability through auxiliary technology such as video modeling, virtual fact, Image exchange communication system, and humanoid robot, is the main factor in explaining the use of assistive technology for autism spectrum disorder. According to the results of different researches, it should be considered that designing auxiliary technology in the areas of developmental disabilities and evaluating its effectiveness on the group of people with autism spectrum disorder in Iran is essential (Taghi Pour& Nemati, 2018).

Totally, activities based on the evidences showed that auxiliary technology are useful tools for improving communication skills, social/emotional, and skills of daily life of people with transformational deficiencies such as autism spectrum disorder. Related research in Iran shows that multimedia teaching softwares, computer games and video modeling are used to improve autism spectrum disorder, therefore design of other auxiliary technology programs in the area of autism spectrum disorder and estimating its efficiency in this group of people is necessary (Taghi Pour& Nemati, 2018).

Technology news for autistic children

Perspective of using from technology in order to help people suffering from growth disorder, mental and physical is obvious and technology giants each of them represented their own solutions in these years. For instance, Samsung presented a program in 2014 to help autistic children to improve communication skills and developed a technology start up called (Mightier) a plat form of a game to help to autistic children and ADHD to learn adjusting their emotions. Therefore, Massachusetts Institute of Technology (MIT) is a prior sample of the program made a smart watch which analyzed

the tone of the other person's voice to determine the speaker's emotional state. (Stanford University from the New Atlas website).

Microsoft announced that it will spend 25 million dollars on its new AI program to look for solutions on this subject. In a new method and based on the technology, researchers have developed a new experimental treatment procedure with the adaptation of Google smart glasses and face recognition software which expresses people's feelings to the user, scientists of Toronto University made this application based on Google Glass, to teach children what to say in the conversations.

LuxAl start up could make a robot called QTrobot which helps to autistic children. QTrobot, is a happy robot which its face is LCD and can communicate with children with its robotic arms and especially with children who are bothered by physical contact with their therapist can make a new difference and bring a more comfortable and different treatment environment for a child with autism (Valencia et al, 2019; Koumpouros and Kafazis, 2019; Liu et al 2017).

A group of students and engineers of Kansas State University, created technology which help to the health and quality of the life of children who suffer from severe growth disabilities such as (autism).

Some of these represented projects by this group include:

- Device and smart phone which helps therapists to record and follow up cognitive, physiological and behavioral development of children.
- Shoe sensors to record progress in children's learning to walk.
- Transferable sensors such as accelerometers which can be placed in shoe and cloth to control masochism behaviors in autistic people. Engineers try to place these portables sensors in clothes.
- Musical tooth brush persuades them in brushing. These tooth brushes by playing different songs, help autistic children to know how long to brush different parts of their mouth.
- Touch computer games that teach children how to characterize items and interact with other children.
- Adjustable base design for electronic touch devices.
- Sensors of bed and mattress which tracks children's breathing rate, heart rate and their movements during sleep which potentially can aware therapists from sudden attacks and wet bed.

Most clinicians and therapists do not know what technology services can be provided for these autistic children, and engineers do not know what is needed for these children, when these two work together, there is an opportunity for encouragement and interdisciplinary collaboration and create new solutions to the real-world problems of autistic children.

Future of technology in teaching autistic children

Technologies are always designed and made for special purposes, but sometimes once it is made, other usages can be found one after the other. Technology helped to rehabilitate autistic patients, especially children. Smart house systems can be the future technology in teaching to autistic children. Making an application (Control4) include video templates which a person can enter from one activity to another and decide for the next work and can focus on the activity which is doing.

Discussion and conclusion

Knowing facts and new findings of autism spectrum disorder can help to the family of autistic child, educational system, close relatives of the person who suffers from autism, governments and societies of the person which lives there to get a clear view of the disorder and to deal with the disorder based on accurate information, to make a decision for it, and to respect the rights that are defined for his/her based on these findings.

According to what expressed in this article and according to the considerable efficient of technology in education, equipping schools with computers to use in teaching and educating mentally retarded children can be a step to transform educational atmosphere of autistic students. Using from this technology in teaching to these students who have features of late learning and early forgetfulness increase skills, content of information, knowledge and motivation and teacher changes his/her teaching to the whole of the class to smaller groups and changes from being a speaker to coaching.

Spends more time with weaker students and changing collaborating and participating with competition and by making opportunities made many capacities and moves to self-learning, self-activism, contemplation, perception and understanding of talent, self-worth, self-reliance and creativity and problem solving and creative thinking of the disable child. Technology applications is a suitable tool for text, image, music, painting, internet, creative thinking, game and reinforcing communicational skills, writing, reading, speaking and thinking of the child

Computer can be used to help in dramatic teaching, participatory learning, rehabilitation, concentration, motivation, meaningful and multisensory learning with pleasure, accuracy and enthusiasm, using images and formative evaluation, increasing self-concept and self-confidence and solving behavioral, emotional and educational problems. However, in the high use of computers for these children, there are problems such as developing bad habits, over-dependence of the child, neglect of face-to-face education and teacher model, and low parental mastery of technology.

The quality of the use of assistive technology should be considered by family involvement, individual assessment prior to the choice of assistive technology, and ongoing support in the field of autism spectrum disorder. In general, in order to achieve evidence-based activities, it is recommended to study the application of these technologies in Iran in the form of experimental projects on autism spectrum disorders. Also, future researches

should be considered on appearance of abilities and strengths of children suffering from these disorders.

Proposes for future researches

- Using from digital technology especially working with computer for educable mentally retarded students must be managed In order not to cause disruption and to provide useful and constructive feedback by creating participatory learning and evaluating learners' activities.
- Education and inhibilitation of these children must not be limited to a special time. By making familiar of parents of these children with computer educational stimulants even can be presented at home and in real life environment and society and highlight the role of the family in the education and rehabilitation of exceptional children. Parents should not be a conflicting role model for these students in technology.
- By creating variety and change in the teaching methods of these children, teachers use a variety of software that provides auditory feedback and written help, and the school, by purchasing a variety of programs, make it possible to have fun exercises for math and reading and evaluating lessons. Computer workshops should be active in exceptional schools.
- • in order to help people with disabilities, a computer set of related software and hardware such as keyboards, monitors, as well as materials and tools needed for easier access for the disabled person to the computer device should be adapted, adjusted and redesigned.
- Computer-based training is promising for inclusive, progressive and time-independent training. But teachers' concerns that these students may have difficulty learning some of the basics of computer-based instruction are justified, and therefore recognizing its various challenges is an undeniable necessity.

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