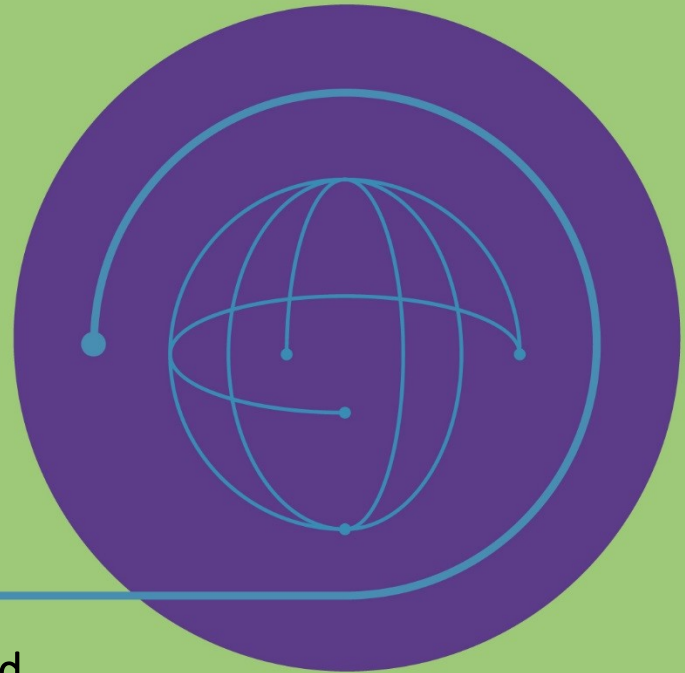


How Could Robots Improve Social Skills in Children with Autism?



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Overview

- Statistical Data
- What is Autism Spectrum Disorder (ASD)?
- Specialized Services/Resources for Children
- Using Social Robots
- Conclusion and perspectives

Statistical Data

- More than 3000 children with autism in Qatar (including: Down Syndrome, Speech and Language disability, Learning Disability ...).
- Autism occurs in all racial, ethnic and social groups.
- ASD can be reliably diagnosed by age 2, but many children can be diagnosed at even younger ages.

Autism

A pervasive, neurologically based developmental disability of extended duration which causes severe learning, communication, and behavior disorders with age of onset during infancy or childhood.

Individuals with autism exhibit impairment in reciprocal social interaction, impairment in verbal and nonverbal communication and imaginative ability, and a markedly restricted repertoire of activities and interests.

Source: IDEA

Autism: Signs and Symptoms

- Met the full criteria under DSM-IV
- Signs and Symptoms include
 - Social Challenges
 - Communication issues
 - Repetitive Behaviors
 - Associated Medical Conditions may include
 - Genetic Disorder
 - Gastrointestinal Distress
 - Seizure Disorder
 - Sleep Dysfunction
 - Sensory Processing Problems

Definition ASD

Autism Spectrum Disorders:

- Disorders are characterized by varying degrees of impairment in:
 1. Communication skills
 2. Social interactions
 3. Repetitive and stereotyped patterns of behavior.

What Are Important Skills to Teach Young Children with Autism?

- **Communication skills**: allow the child to get their needs met and replace maladaptive behaviors and engage in social interactions.
- **Non-verbal communication**: Teaches the child that people's faces/bodies carry important information.
- **Interactive Play Skills**: teaches flexibility, improves relationships, replaces self-stimulatory behaviors
- **Imitation Skills**: Allows the child to learn from the environment.

Age Ranges for Therapies

- Birth to 36 months
 - Early Steps provides therapies at home or in daycares
 - Individual/Family Service Plan (IFSP)
- Ages 3 to 5
- School age
 - Therapies can be through school and Medicaid

Most Common Approaches Used

- Behavioral Approaches- ABA- Applied Behavior Analysis and Applied Verbal Behavior, TEACCH
- Developmental Approaches- SCERTS, Floortime/DIR, RDI

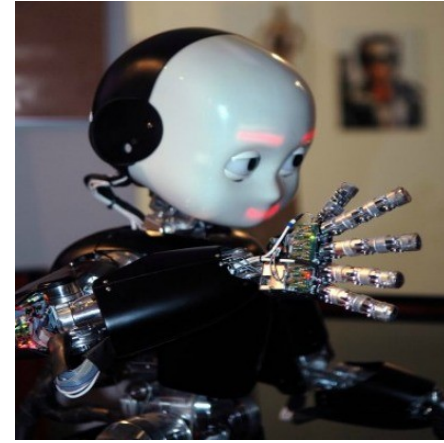
Autism and Special Needs

How can a robot help children with autism or other special needs?

- Robots can provide a safe and comforting way to interact socially by acting as a social mediator
 - Robots allow children to interact how they want
 - Robots facilitate learning
 - Robots remove the human element
 - Robots need help to interact in the world
 - Robots can be customized
 - Robots are fun!
- Research shows that robots are helping to reveal a potential shift in kids' social and learning psychologies—moving from acts of knowledge transmission toward acts of exploration, collaboration, and creation.

Robotics and Autism

- There are lots of new robot products coming out now to help children with Autism.
- Nearly all robots designed or advertised as being for children with Autism can be used for many other applications such as research, personal use or general education.
- Nearly all robots designed for children with Autism are extremely cost prohibitive! (Most robots cost upwards of \$12,000.00)



NAO Robot Test phase Mursi Experience's.

- MADA starts in the second semester of 2017 a new project that aims to use NAO Robots to improve skills in children with Autism.
- The idea was to design a prototype applications that uses robot sensor like microphone, speech recognition module. The process of the application is that the robot ask questions to the children with Autism and wait for the answer. If the answer is correct, the robot play sound and pass to the next question. At the end, if all questions are correct the robot starts dancing and playing music.
- The prototype had been tested locally and as a perspective, we will plan to test the application in schools and record interactions with children with autism.



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Conclusions

- The use of robots for autism **therapy and diagnosis** is just beginning.
- There is **anecdotal evidence** that robot therapy can help children with autism
- Can we do something with Social Robot?
- Localization...



Thank you.

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