



EQUATING TECHNOLOGY & AUTISM

AUTISM

Neurodevelopmental disorder marked by persistent deficits in social communication and social interaction across multiple contexts and restricted, repetitive patterns of behaviour, interests, or activities (DSM-5)



FEATURES

- Failure to initiate or respond to social interactions
- Deficits and verbal and non-verbal communication
- Inability to maintain eye contact
- Absence of interest in peers
- Stereotyped or repetitive motor movements, use of objects, or speech
- Insistence on sameness, inflexible adherence to routines
- Hyper- or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment
- Frequently co-exists with Intellectual disability



TECHNOLOGY TODAY

- In the twenty-first century, technology commonly denotes a variety of popular electromechanical devices such as cell phones, tablets, video recording equipment, and hand-held, desktop, and laptop personal computers
- Most children, right from a very young age are extremely fascinated by technology and quick to learn its use in the form of playing games or watching videos



EQUATING AUTISM AND TECHNOLOGY

- Parents and clinicians regularly report that children with autism are drawn to technological devices and researchers have noted the importance of devising treatments that take advantage of this fascination (Colby, 1973)
- Use of technology is socially valid and often economically feasible, hence it becomes an ideal intervention tool
- It greatly increases the child's independent functioning skills by decreasing the amount of direct support needed from another person



AUTISM AND COMMUNICATION

- Children with Autism frequently have difficulty with spoken and written language expression
- They have difficulty comprehending spoken language as well as gestures, body language and tone of voice
- Difficulty in motor planning further complicates speaking, writing and using sign-language
- An array of Alternative and Augmentative Communication (AAC) approaches are used to enhance, expand and develop communication skills in children with Autism



ASSISTIVE TECHNOLOGY

- An assistive technology means any item, piece of equipment, or product system, whether acquired commercially, off-the-shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities
- Since children with Autism process visual information much better than auditory information, the use of assistive technology allows inputs through their **strongest processing area**

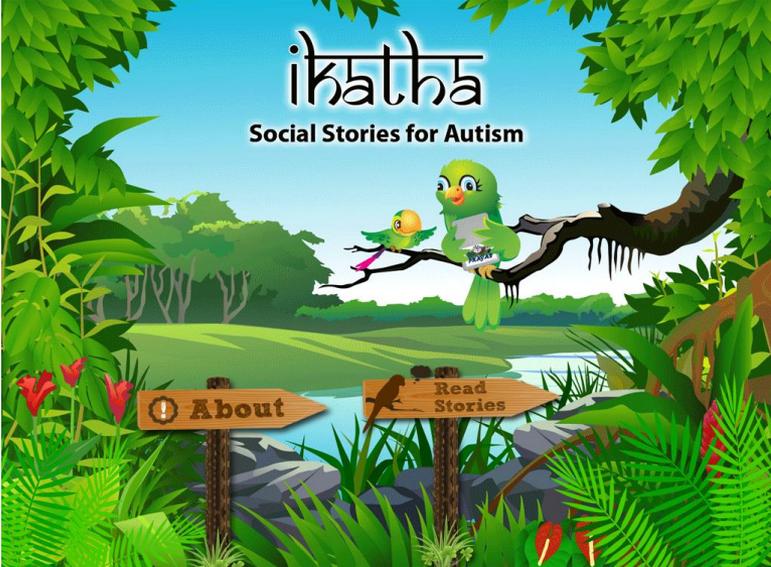


TECHNOLOGY-BASED INTERVENTIONS IN AUTISM

- As a temporary instructional aid to be removed once the goal of behaviour change has been met.
- For indefinite use as an assistive tool e.g. voice output augmentative communicative devices
- Most often, in Autism assistive technology is used as an instructional aid to enhance the functional skills and abilities of children



TECHNOLOGY AS AN INSTRUCTIONAL AID



MECHANICAL PROMPTS

- Individuals with Autism often need external stimulus prompts to initiate, maintain, or terminate a behaviour
- Technological advancements in the last decade have created cost-effective automated prompting devices with the ability to deliver the same level of prompting with less human interaction and obtrusiveness and often less human effort in managing prompt delivery (Taber, Seltzer, Heflin, & Alberto, 1999)



MECHANICAL PROMPTS

CONTD..

- Auditory prompts in the form of timers, auditory pagers, mp3 players and other music players are helpful in minimizing off-task behavior
- Tactile prompts, often in the form of vibratory devices have helped social initiations in play settings or as a means to solicit help. It can also be used to for various other skills like increasing eye contact or remembering to take medicine



VIDEO

- Due to the ease with which it can be accessed, video technology is often used by clinicians and educators
- It has been used as an effective way of modeling appropriate behavior in the form of acquisition of language comprehension skills, social skills, expressive language skills, self-help skills, emotions & academics
- It can be used as an engaging medium for giving feedback and providing basic instruction to children with Autism



VIDEO

.... CONTD..

- Video modeling has been found to useful for the following reasons (Charlop-Christy, Le & Freeman, 2000)
 - a) It uses a relatively simple format to present concepts in a systematic way
 - b) The predictability of videos is often appealing to children with Autism
 - c) It effectively gains and maintains children's attention
 - d) It is a less 'emotionally laden' way to learn
 - e) It allows easy repetition of the model without the risk of inconsistency

- Video models should allow for teaching of multiple exemplars of the same behavior

- The models should be such, that there is focus on the salient features with minimum distraction



COMPUTER- BASED INTERVENTIONS

- They are the most widely studied technology-based interventions
- Because of how versatile computer technology is, they have been used to teach a variety of skills, including how to recognize and predict emotions, enhance problem solving, improve vocabulary, increase play related statements and improve reading and communication skills
- All other modes of technology like videos and prompting can be incorporated in a computer along with the use of specially developed software and applications to present information



COMPUTER-BASED INTERVENTIONS CONTD..

- Computer based instruction typically results in benefits such as increased motivation, decreased inappropriate behaviour and increased attention, increased fine motor skills
- Various other modes of intervention, like social stories, which did not originally use technology are now being presented in the multimedia format



COMPUTER-BASED INTERVENTIONS CONTD..

The usefulness of computer-based interventions is due to the following reasons-

- They act as conditioned re-inforcers for many children with Autism resulting in task presentation that has inherently reinforcing characteristics
- They are predictable and consistent, compared to the unpredictable nature of human responses
- Computer programming allows unlimited control of stimulus presentation thus facilitating repetition of learning trials
- Computers have the ability to permit concurrent, or 'cooperative', use (e.g. two children with two joysticks), thus facilitating the development of interpersonal skills



VIRTUAL REALITY

- A step beyond computers, virtual reality provides the opportunity to experience a three-dimensional, computer-generated world in which people can behave and encounter responses to their behaviour
- Though not explored in great detail due to hitches like cost and lack of availability, virtual reality can benefit since it accomplishes incomparable control over the environment, allowing researchers and clinicians to arrange environments to best promote learning and generalization
- It may offer a highly realistic but safe environment to teach skills that are associated with some level of danger (**e.g., pedestrian safety, stranger safety, etc.**) when taught in the natural environment

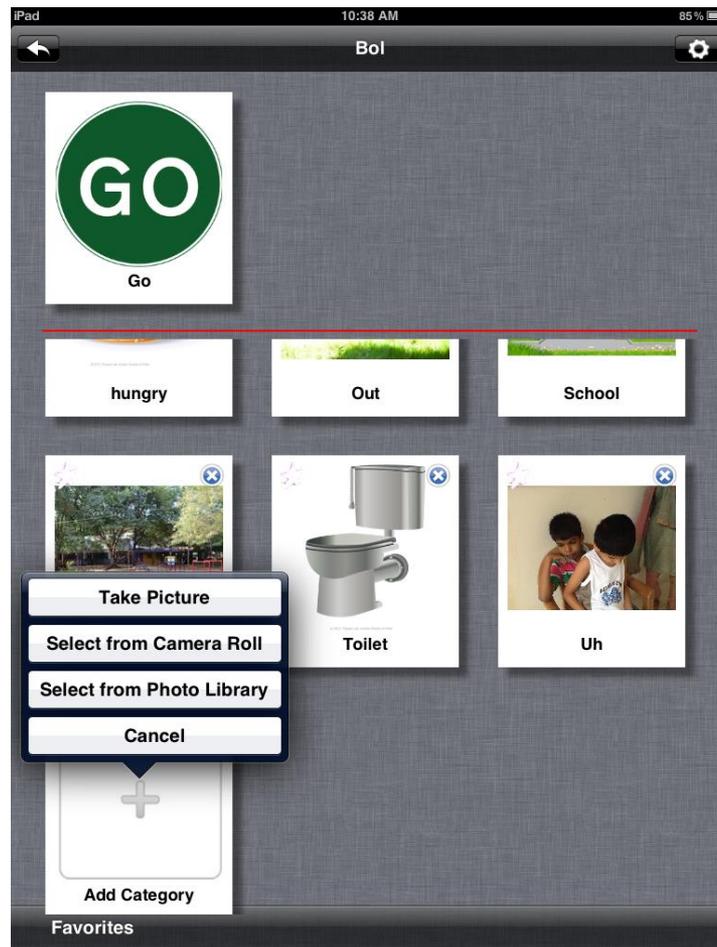


ROBOTICS

- The applicability of Robotics to Autism has been explored by the Aurora Project (Dautenhahn, 2003)
- The study established robots as being safe and interesting partners for social interaction in children with Autism
- Children preferred a 'reactive robot' to a 'rigid toy'
- The social interaction learnt using a robot were reflected in social interactions outside the research setting



TECHNOLOGY AS AN ASSISTIVE TOOL USED INDEFINITELY



SPEECH GENERATING DEVICES

- Voice Output Communication Aids(VOCA), also known as Speech Generating Devices (SDGs) are used in cases where speech development does not occur
- It is used in cases where natural speech of Autistic Individuals is not functional to them. It also facilitates development of effective speech
- SGDs range from simple, single message devices with less than a minute of speech output to highly complex, computer-based systems capable of storing or generating virtually unlimited numbers of messages.



SPEECH GENERATING DEVICES CONTD..

- Graphic symbols, most commonly in the form of line drawings, are used to represent messages, which are activated by finger or other methods, touching an area on the device that corresponds with the desired message.
- Thus, SGD's use a visual interface and require simple motor movements to operate, making them effective for children with ASD

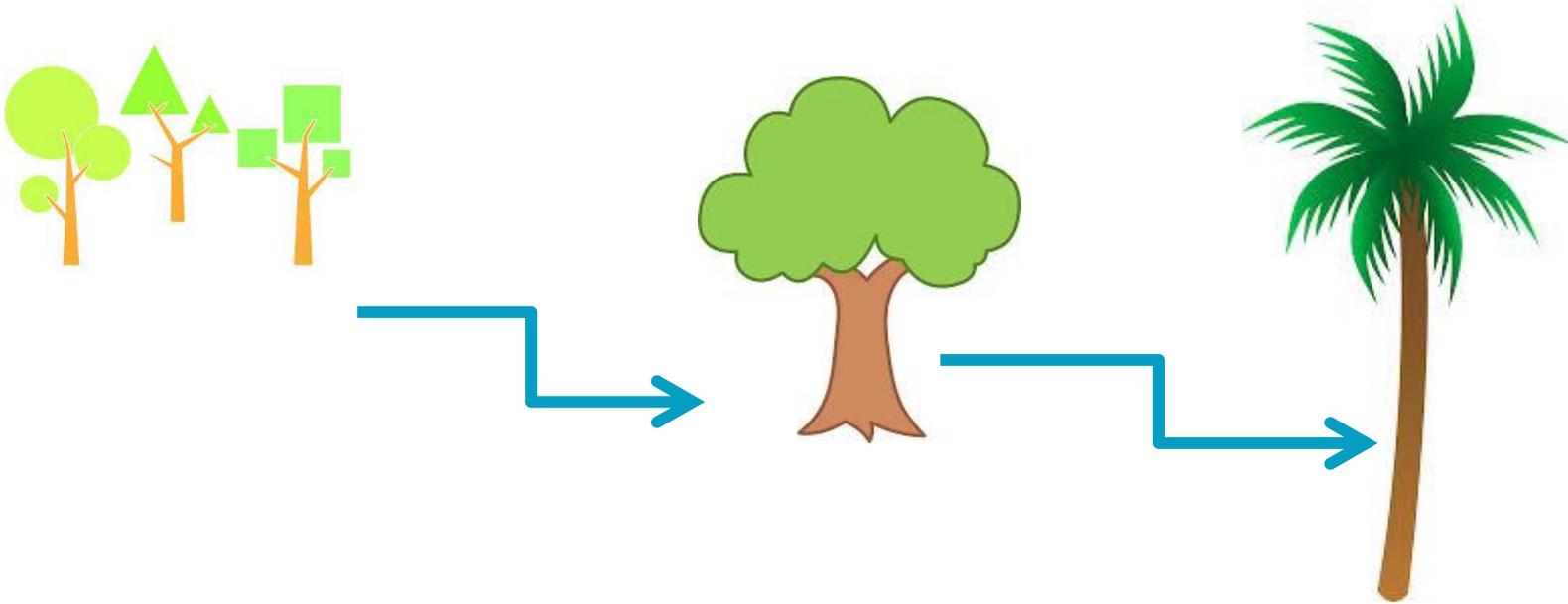


INDIGENOUS SOLUTIONS DEVELOPED AT PRAYAS LAB- AUTISM SOCIETY OF INDIA

- Prayas-Daksh- www.learn4autism.com
- App for Communication- Bol-
<https://itunes.apple.com/in/app/bol/id579955668?mt=8>
- App on Social Story- iKatha-
<https://itunes.apple.com/in/app/ikatha/id789851768?mt=8>



Introduction To Multi Media assisted learning



CONCLUSION

Technology has been found to have a variety of benefits when it comes to working with individuals with Autism. This is essentially because of its ability to intervene through the strongest area for them, i.e. the visual area. The predictability of technology, ability to allow multiple repetitions and variations of the stimulus make it an essential tool for teaching new skills and assisting children with Autism.



REFERENCES

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- <http://at.mo.gov/information-resources-publications/documents/Autism.pdf>
- <https://scholar.google.com/citations?user=IsxbdcAAAAJ&hl=en>
- <http://www.specialed.us/autism/assist/asst10.htm>

