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## Autism and Computers

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## **What is Autism?**

Autism is a disability that impacts upon social and physical interaction, communication and behaviour. Many people with Autism experience Communication and language problems with over 50% of autistic people finding it hard to develop purposeful and functional language. People with autism can also demonstrate a range of behaviours which include distraction and poor organisational skills. Many find it hard to deal with abstractions and are easily obsessed with details.

Although many of the features associated with autism are similar to those found in people with learning difficulties, autistic people tend to be uneven in their abilities, with noticeable strengths and weaknesses.

Technology can help in many ways, but given the range and degree of problems that can occur with autism it is difficult to describe some computer software and resources as being "for autism". It is better to know the range of resources that are available and match and explore them for an individual's needs if possible.

## **Adapting and simplifying the Computer**

A number of changes can be made to the standard computer system that would make it easier to use.

Within modern operating systems there are a number of features that can be useful. These include utilities for changing the response rate of the keyboard or mouse, tools for speaking out text on screen and tools for reducing animations and visual distractions on screen.

Over and above these tools, additional applications can be valuable in providing a simpler, less visually confusing desktop than the standard offering.

One such example is Eldy. Eldy is a small free application that offers large simple icons that can be used with a range of access devices to open the major activities one carries out on a computer. This can include email, web browsing, chat etc.

In addition many people with Autism find the standard keyboard and mouse a barrier to using technology. There are a wide range of alternatives to these devices that can be useful including different keyboards, Mice, trackballs, touchscreens and switches. Identifying the most appropriate access technology is an important first step in aiding a person with autism.

## **Technologies that aid Interaction with the world**

Some people with Autism need to be helped to see how their actions make things happen in the world around them. At one level people can be helped by using a simple switch and cause and effect software. But sometimes even this relationship is too abstract for many people. As a result some people with Autism find it useful to operate with far more concrete activities. Such activities are enhanced when the access tool has a much clearer relationship with the outcome. These include:-

- **Touch**  
The use of touchscreens is often useful as often the area that is touched on a screen is the area that then reacts. For Instance pressing a smiley face to make it fly around the screen.
- **Gesture**  
Beyond touch, gesture can also be extremely useful, where when we point or move towards an active area make something happen in the environment. One such example is **Soundbeam** where when we move our hand through ultrasonic beam music is created.
- **Interactive environments**  
Gesture, touch and movement can be combined in highly interactive environments where as we move the environment is affected. A good example is interactive walls or floor projections where we can chase images of fish or balls around the active area and as we move the whole projection changes.

## **Technologies that Aid Communication**

People with Autism often find communication a great challenge. Especially where they find speech and the written word difficult, this is further compounded in person to person interactions. Some people with Autism find that communicating through a shared screen is less threatening.

### **AAC solutions**

AAC systems usually involve one or more communication forms such as such as objects, photographs, realistic drawings, line drawings, and written words. These forms can be combined and accessed through a very wide range of technology platforms.

### **Text Based systems**

In discussing communication systems one should bear in mind that text is a very useful system for communicating ideas and choices. Not least of all because it is very widely used. Good examples include written communication on a shared tablet such as Ipad or Galaxy Tab, or a shared screen with more than one keyboard such as the Ubuduo.

## **Photo based systems**

If the child has difficulty understanding the Picture Communication Symbol (PCS) line drawings and needs a more concrete representation, a good software program to use is Picture This (20). This program allows for the presentation of real photos, without risking ambiguous background clutter, which can be a part of personal photographs.

## **Graphic based systems**

Many people with Autism find greatest success in communication through a visual representation system of line drawings, moving later to a more concrete representation system of photographs or objects needed.

### **Symwriter (PC)**

When using line drawings, caution should also be taken in determining whether to use black/white or color picture communication symbols, as some children with autism may prefer or dislike specific colors. They may focus only on the color instead of processing the entire picture. Black and white picture communication symbols tend to remove any ambiguity which might arise.

For Instance if a child prefers the color red, and the Symbol (PCS) for "lunch" has a red apple as well as a brown sandwich and orange juice, the child may only process the apple, as it contains his preferred color. The child may not even process the image, but attend only to the color red. Therefore, the symbol becomes non-meaningful to the child.

Both symbols and photos are extremely beneficial in aiding a person with Autism through:-

- Creating Timetables;
- Personal communication systems;
- Games and Reading activities;
- Sequencing activities for reminders and routines

When any visual representation system is used, it is important to combine it with a written word, as many children with autism exhibit a high interest in letters and words, and some even become early readers. Therefore we should continually enhance literacy skills by also providing the written word with any type of visual representation system.

Technology to aid communication for people with Autism can be across a continuum of complexity:-

"Low" Technology: Visual support strategies which do not involve any type of electronic or battery operated device - typically low cost, and easy to use equipment. Example: dry erase boards, clipboards, 3-ring binders, manila file folders, photo albums, laminated PCS/photographs, highlight tape, etc.

## **Autism and Computers**

"Mid" Technology: Battery operated devices or "simple" electronic devices requiring limited advancements in technology. Example: tape recorder, Language Master, overhead projector, timers, calculators, and simple voice output devices.

"High" Technology: Complex technological support strategies - typically "high" cost equipment. Example: video cameras, computers and adaptive hardware, complex voice output devices.

## **AAC and Tablet computers**

Many people with Autism have reported that the use of tablet computers such as the iPad or Galaxy Tab. These devices have a dynamic touch screen and can be combined with an application that can support communication through symbols, graphics, text or voice.

These products range from those that are free, to those that are commercially produced. Spectronics maintain a useful database of these products which can be found at <http://www.spectronicsinoz.com/article/iphoneipad-apps-for-aac>

Two examples of products that work on such devices are proloquo2go and small talk. Proloquo2go offers smalltalk

Proloquo2go offers a full-featured augmentative and alternative communication solution for people who have difficulty speaking. It provides natural sounding text-to-speech voices (in US and British English only), high resolution up-to-date symbols, powerful automatic conjugations, a default vocabulary of over 7000 items, and word prediction.

Smalltalk is go and has a range of specialized vocabularies to meet specific needs. For instance Smalltalk daily activities offers a vocabulary of pictures that talk in a natural human voice related to the Activities of Daily Living, such as bathing, dressing, grooming, and leisure.

Taking opportunities to trial such solutions before making a purchase decision is extremely important in finding a successful communication system.

## **Technologies that Aid learning about social situations**

Games programs offer a good opportunity for the individual to excel alongside others, offering the potential to build relationships with others, in non threatening situations. The computer can therefore be a useful tool in encouraging co-operative working and dialogue through a common interest that can extend beyond games play.

The computer can offer the opportunity, through the internet and through multimedia applications and programs to experience the world around them within clear boundaries. Some software packages and websites can reinforce appropriate social behaviour patterns in a safe computer based environment.

Software can also involve simulations or real life situations where a person with autism can rehearse and practice skills and knowledge in safe settings. For example a program such as “Let's Go To Town” is designed to promote decision making and encourage discussion of the real-life activity at a basic level, alternatively a program such as “Coping with Chaos” can be used a tool for discussion about emotions and appropriate behaviour, either one-to-one or with a small group.

Sometimes, interactive environments can be very useful for learning social rules. For instance a multi-touch table such as Microsoft surface can help introduce some people with autism to working together in groups and cooperating with others.

### **Technology that aids memory, concentration and personal organization**

Some people with Autism find word processing on the computer easier than recording by hand. For some, the keyboard is easier to use than a pen. For a user who is not generally keen to converse, the computer may provide a more motivating medium in which to communicate. Word processors offer a safe environment to experiment in, as a computer does not react in the same way as another person and will always offer a “logical” reaction.

The computer will automate many tasks, helping individuals to complete certain tasks quickly and easily; the production of a graph for instance. This can be useful where individuals have poor motor skills, may be poorly organized or are obsessed by attention to detail. Words may not be enough for some people with Autism, and the additional support of symbols and images may be useful in encouraging writing. For instance. For example, mind-mapping software can help to quickly get a number of ideas down quickly without worrying about structure or order.

Visual organization tools are also extremely useful for many users. They include

- Outliners
- Flowcharts
- Graphic Thought Organizers
- Mind maps

Further information on these tools are available on a separate Mada Factsheet.

Some people with autism find that the blank page is a barrier to activity. Providing an individual with a starting point can be useful to help with this, this could be a list of words with key areas or phrases, or, for some users, a sequence of pictures or symbols alongside text can be helpful. Programs such as Clicker 5, Symwriter, Word bar, and Text Help Read and Write offer word bank support which may support the user as a planning and organizational aid.

## Motivation

For any user, including those with autism a neat printed copy can be more satisfying than poor handwriting. Mistakes can be more easily corrected and for those with difficulties with reading or spelling, speech feedback can help with motivation and the self checking of work. A number of free and commercially available text readers and talking word processors can help in this area.

## Further Information

Further information on Autism and technology can be found at

[www.mind-mapping.org](http://www.mind-mapping.org)

<http://techinspecial.com/>

<http://www.aacandautism.com/>

<http://www.spectronicsinoz.com/autism-spectrum-disorder>

**For further information** contact the MADA Qatar Assistive Technology Center, 7<sup>th</sup> Floor, Al Nasr Tower B, Al Corniche Road, West Bay, Doha, Qatar. P.O. Box 24230. Ph: +974 44594050.

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