HELLO

BETA

Communicator for mobile telephones and portable devices

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Pedagogical guide for use by persons with autism and/or intellectual disability

Index

Introduction

HELLO is a communicator which has been designed for use by people with Autism Spectrum Disorders and related learning difficulties, who are learning, or have learnt to communicate using image support methods.

It consists of a software application for mobile telephones and portable devices with touch controlled screens. HELLO allows the user to draw on a set of pictograms in order to communicate something. The sound for the word associated to a pictogram can also be reproduced simply by touching the image.

HELLO can be adapted to the preferences and complexity level appropriate for the child or adult who is to use the application. This allows the content (pictograms, images, categories, etc.) and the level of complexity to be chosen depending on whether the user can handle categories and compose sentences. The tool is designed to be used in any context and situation, making it possible to communicate at all times.

It is not intended for use by the deaf, or those with other hearing difficulties, as there are other more appropriate communication systems available for these cases. Although this guide mainly focuses on users with autism, the communicator may also be of use for other groups such as those with Intellectual Disabilities, in particular those with Cerebral Palsy.

In this guide we use the term "user" to refer to the person with special needs for whom the application is intended. Similarly, the term "tutor" refers to the professionals, family

members or friends who undertake the role of preparing the applications for use by the person who requires them.

Autism Spectrum Disorders

Autism Spectrum Disorders (ASD) is a relatively recent term used to describe people with a series of characteristics in common. These characteristics are known as the "triad of impairments" [1]. These people are affected in their ability to [2]:

1. Understand and use verbal and non-verbal communication
2. Interpret social behaviour, affecting their ability to relate to children and adults.
3. Think and behave in a flexible manner, for example, to adapt their behaviour to specific situations.

People with Autism Spectrum Disorders can be extremely different in terms of their abilities and their strong and weak points. Asperger's Syndrome, High-Functioning Autism, Classic Autism and Kanner's Syndrome are considered to be sub-groups of Autism Spectrum Disorders [2].

Children with a wide range of abilities may have an Autism Spectrum Disorder, and this may occur in conjunction with other disorders (for example, sensory disability, intellectual disabilities, Down's Syndrome, ADHD – Attention Deficit Hyperactivity Disorder – or language difficulties).

In this guide we use the term "autism" to refer to all Autism Spectrum Disorders as a whole.

Communication and Language in Autism Spectrum Disorders

As we have just seen, communication difficulties are the first part of the Triad of Impairments. Indeed, autism is often principally described as a communication disorder [3, 4].

It is important to examine the difference between communication and language, and the implication of this in the case of autism, both in terms of expression and reception.

Communication, understood as a mechanism for the exchange of information between people, occurs for example, in small children who have not yet developed any language skills. So, in normal development, a child of only seven months is capable of turning around when called by his or her name (reception), or can use the voice to express a like or dislike (expression). At one year old, this child can imitate facial expressions or sounds made by adults in order to attract attention.

In normal development, the development of communication starts before (and is a precursor to) the development of verbal language, which is defined as a set of structured sounds which form part of a shared code.

However, in the development of a child with autism this does not happen in the same way. Autism is the only condition in which *language development* does not necessarily go hand in hand with the *development of communication* [5].

Some people with autism who have developed their verbal language at times cannot use it in a functional way, or may not understand our language, and their communication skills therefore fluctuate. For many children, everyday situations such as having a haircut or entering

a crowded room can result in sensory overload and block their communication skills. In these situations, an autistic child who habitually uses and understands language may have serious difficulty in understanding and expressing feelings and desires. It is then that communicating what is upsetting them or simply that they "don't want any more" (expression) becomes impossible. In these situations, a tantrum may be the only outlet they can find. Furthermore, in these situations, these children may not be able to understand the simple messages we try to transmit in order to calm them down, such as "we've finished now" or "we're going now" (receptive).

In some cases, language may be used to avoid communication, as paradoxical as it may seem. In this sense, for example, some people with Asperger's syndrome may sometimes talk incessantly in order to prevent others from joining a conversation and therefore to avoid being asked questions, which would result in an uncomfortable situation for them.

- **Alternative Communication Systems**

Augmentative and Alternative Communication (AAC) includes all forms of communication (other than speaking) used to express thoughts, needs, desires and ideas. We all use this communication in the form of gestures, facial expressions, the use of symbols or images, or writing [6].

There are different alternatives and methodologies to facilitate and increase communication. In order to classify as Augmentative and Alternative Communication (AAC), systems must have at least two of the following [7, 8]:

- A structured set of non-vocal codes for communication
- A training system which allows users to learn to operate it, and make it part of their everyday life.

The pictograms offered by HELLO are not a structured set of communication codes. Nor does HELLO have a specific user training programme. HELLO is therefore not an AAC system in the strict sense of the definition. However, it is intended for use under the AAC framework, in particular "Aided AAC" which requires a physical external device for transmitting messages [9]. In this way the HELLO communicator can facilitate the work of professionals and the spreading of the use of AAC used by people with autism for communication purposes.

In the light of the above, it is advisable for HELLO to be used as part of a full communication teaching scheme rather than spontaneously and not as an independent support mechanism, as this could be counterproductive.

Pictograms

Pictograms are one of the most widely used resources in Aided ACC systems. It is also very common for pictograms to be used in the treatment of autism.

Some parents and professionals fear that if a child who still doesn't speak begins to use pictograms, then that child may never speak at all. They are afraid that the introduction of AAC may mean giving up the chance to start talking. Experience shows that exactly the opposite is true. The use of AAC not only does not prevent the child from starting to speak, but it actually makes this more likely to happen [8]. This phenomenon is not yet fully understood, but the fact

remains that the child is more likely to say his or her first words if the development of communication is strengthened. Not in vain, some image-based communication systems, such as PECS [10], start by developing very basic communication skills based on intentions, and then move on to more complex forms of communication, including the use of sounds and speech.

> *"I think in pictures. Words are like a second language to me. I translate both spoken and written words into full-colour movies, complete with sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures."* Temple Grandin (1995) [11]

In addition to the testimony of autistic people themselves, such as Temple Grandin, we now have considerable evidence that many autistic children and adults are effectively "visual thinkers". Different studies in Neuro-imaging have found that, compared with a control group, a high percentage of people with autism use areas of their brain supposedly designed for visual processing for both visual tasks and for other tasks which are in principle "non visual" [12, 13]. This partially explains the success of the therapy programmes most commonly used in autism, such as PECS [10] and TEACCH [14], which are visually based. It also justifies the used of visually supported AAC (with physical external devices) in the treatment of autism.

For those who are visual thinkers, the visual representation of information and communication can be a significant reinforcement. It can act as a support mechanism for communication in itself, and at the same time, as a support for other development areas. On one hand, the visual representation of information may help to structure thought and learning. On the other, as communication is made easier, this also facilitates the development of all kinds of skills which we learn through communication and relationships with others [15].

HELLO, A communicator for mobiles and portable devices

HELLO consists of a software application for mobile telephones and portable devices with touch controlled screens. It comes with a set of several hundred pictograms and allows new pictograms to be added from any other system, or even drawings by the child or his/her tutors, as well as photographs.

As mentioned above, HELLO is not an AAC system as such, but a simple communication device, and it is advised for use as part of a training programme for developing the child or adult's communication skills. This means that HELLO will not teach the user to communicate alone. This is achieved by experts and parents, who use their knowledge and personal qualities to teach the child or adult to communicate. This tool is simply another means of aiding this process.

Functions of HELLO

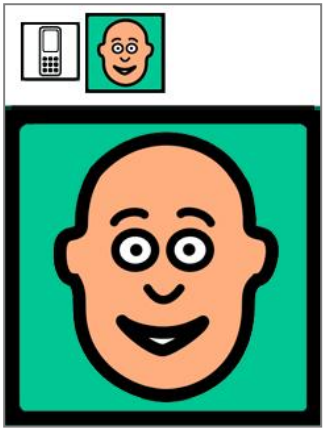
The HELLO application has different functions which can be used depending on each specific person and situation:

- Communicating using just one pictogram at a time, with or without sound.
- Communicating using a theme panel relating to a place or activity.
- Communicating by constructing a sentence or sequence of pictograms.

Not all these functions are appropriate for all children and adult users. For example, using a single pictogram to point to can be useful for a child who is just beginning to communicate, but not for a child who already knows and works with hundreds of pictograms. The theme panels, meanwhile, may be appropriate for some children and adults, but may not be for others who have learnt to make up sequences of pictograms to create a phrase with a meaning, equivalent to a written sentence.

The tutor can therefore set up the application in different ways according to the level of complexity the user can handle. More simple setups can be created, for the user to access communication items directly by touching a pictogram on the main screen, or more complex setups which require the use of categories, menus or sentence construction to transmit the desired message.

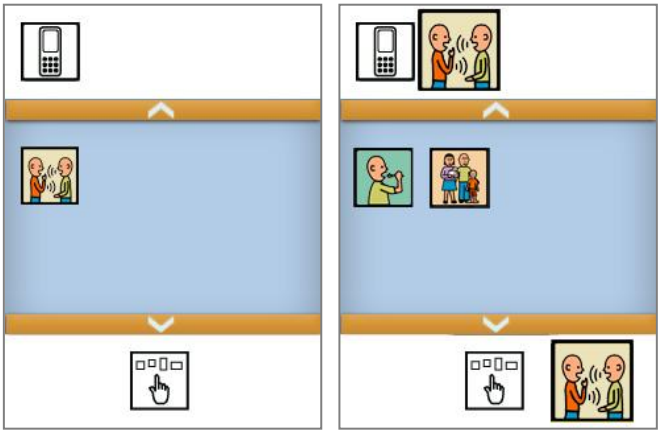
Shortcuts



It is possible to create one or more icons (pictograms) which directly represent the element to be communicated. By touching these, they expand to take up the entire screen, and the sound or pre-recorded phrase associated to them is heard.

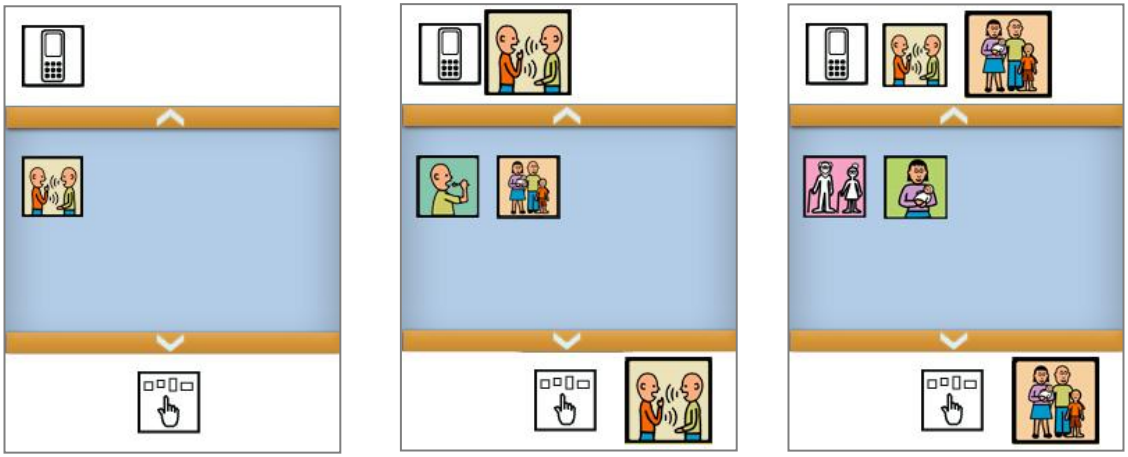
Categories

In this case, the user will have an icon for launching the HELLO application, which is used with one or more icons for launching other applications running on the AZAHAR platform (such as Tic-Tac, MP3 player, etc.). Once the application is running, there are one or more pictograms available for communication.



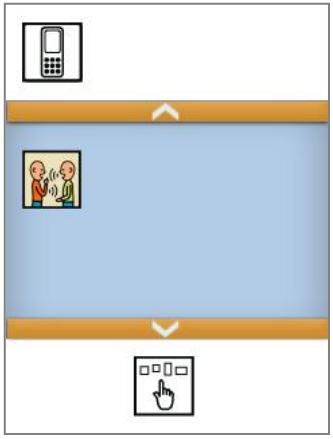
Menus and sentence construction

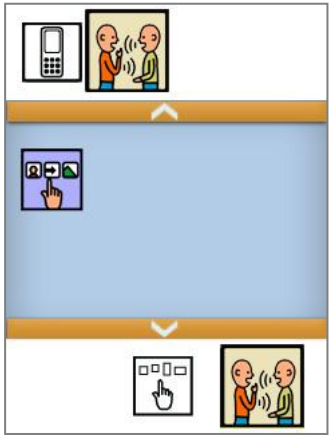
If set up by the tutor to do so, after pressing the HELLO launch icon, a screen will appear which will still not show the pictograms used for communicating, but icons representing categories. Pressing one of these icons takes you to a set of pictograms assigned to that category.



The tutor can create any category considered appropriate for each case in the form of theme panels (emotions, want, the park, school…) and then associate as many pictograms as desired to those categories.

Also, at this level, the tutor has the option of including another launch icon, the *sentence construction* icon. With this application, the child or adult can choose different pictograms, which then appear at the bottom of the screen until a sentence or phrase has been created. For example, "I + want + water". Once the sentence is complete, the application will play the sequence of pre-recorded sounds associated to the pictograms chosen.





If the tutor wishes, different forms of access can be combined for each user. For example, a basic application shortcut can be included with the pictogram which the child or adult will use in overload situations (the pictogram for "I don't want any more"), so that in order to transmit this the user will not need to enter the application and have to find it under a category or construct the sentence.

- **Other communicators for portable devices**

HELLO is not the first communicator application for portable devices. In 2001, the Autism and Learning Difficulties Group at the Robotics at the University of Valencia worked on the development of an initial application called ACIERTA [16, 17]. Since then, other tools have emerged with a similar purpose, such as the Sc@ut communicator, developed at the University

of Granada [18], and others which follow the PECS format, such as HELLO, and the application developed by the University of Claremont in California [19].

With small differences, all these offer the same functions, and are to a greater or lesser degree "multi-platform" programmes, which means they can be installed on different devices and facilitates a wider use by users. The main advantage of HELLO over other communicators is that it is 100% integrated into a set of applications developed by the AZAHAR project, supported by the ORANGE Foundation, the framework under which this and other tools have been developed. This means that, in addition to using the communicator with its classic functions, the user can also communicate in other ways, using a video call application or sending pictogram messages from his/her telephone to other mobile devices. Some of the AZAHAR applications are already available, such as TIC-TAC, intended to help understand and manage time [20, 21].

Recommendations

Objects, photographs or pictograms

HELLO can be used with photographs instead of pictograms. The disadvantage of photographs is that autistic user may use irrelevant parts of the pictures to identify them. For example, in a photograph used to communicate "Hello!" containing a mother waving, the child may notice the necklace worn by his/her mother on that occasion, rather then the gesture (with meaning) of moving her hand from left to right. Pictograms, despite possibly having a greater level of distraction, can be learnt adequately by some, although not all, autistic children.

Some people with autism and/or intellectual disability, instead of using pictograms or photographs, interpret information through objects: car keys to indicate that they are going away, a coat to tell them that they are going for a walk, or a plate to indicate it is time for a meal [22], for example. These people may have difficulty interpreting a photograph or pictogram. In these cases the use of HELLO may not be appropriate.

Within the AZAHAR applications, it makes sense to use AAC as a default tool, as the child should always have the option of communicating what he/she wants to express.

HELLO used as part of AAC training

There are a large number of Aided AAC systems (with physical device) [8]. In order to use the HELLO communicator in the advisable context, integrated in training and the use of these AAC systems, it is necessary to include the pictograms or images from that system (where they exist) or select the most appropriate ones from those provided with HELLO. The images added to HELLO do not necessarily have to be conventional pictograms, but can also be drawings showing sign language expressions, if the AAC system in use includes this type of representation.

If the user is already familiar with a communicator in a different format, such as the use of pictogram booklets and picture cards, or indeed another communication software application, if the decision is taken to use HELLO, it is advisable to introduce its functions gradually. This can start with the most basic functions, with a single button or icon for asking for just one thing, gradually including more and more alternatives as the user's level of control increases. Theme panels or categories (called "templates" in other systems) can then be included, along with options for drawing or composing sentences, thus building up from basic mode to advanced mode.

HELLO is a very open ended and flexible system, meaning that teacher or tutor creativity plays a vital role in making the very best use of the application. With some AAC systems, when the child is beginning to speak, the teacher or tutor says the first letter of the word for the child to complete it. For example, if the child wants to ask for water, the teacher says "W…" to prompt

the child to say “Water”. With HELLO it is possible, based on this example, to substitute the full word “Water” for the prompt “W…” for the child to complete the word. It is also possible to remove the sounds associated with the words, allowing the child to point to a pictogram and say the associated word on his or her own.

As all the elements available for the user to communicate must have been included in advance by the tutor, and given that some users may have a broad expressive repertoire, a concerted effort is required on the part of the tutor in order to include all the necessary pictograms, photographs or drawing in the application before the child or adult can start to use it.

Download and Installation

We have done our utmost to simplify the installation and preparation process for this tool. However, we are aware that for some professionals or family members who have less experience with modern technology, this process may seem complicated. In these cases it is highly recommended to obtain support from a friend or relative who is more familiar with the use of computers and other technological devices.

Detailed steps for installation can be found at: http://www.proyectoazahar.org

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