

Association Sementera ONLUS is a non-profit organisation founded in 1995 that offers programs of rehabilitation and social inclusion through innovative nonverbal approaches to people with mental ill health. The Association is constituted by volunteers and professionals in the mental health field, clients and family members. A core interest is the research for sensory integration techniques to stimulate verbal communication, which is disturbed or absent in psychotic and autistic clients. Different sensorial channels - sight, hearing, touch - are involved in an integrated way. Sementera collaborates locally with mental health services and health centres and is linked to several international networks. Research projects with many Italian and international universities are in progress. Sementera also takes the challenge of the “digital revolution” to ensure that the new multimedia and technological devices are not instruments of isolation but can be tools for self-expression and deep relationship. An interactive software system was also developed: Painteraction System.

paINTeraction

paINTeraction is an innovative intervention that uses augmented reality technology to generate a context in which fun and pleasure are at the service of emotional relationship and body expression. Sensori motor integration, creative expression and socialisation are stimulated through the movement of the body and its reproduction on the screen as on a mirror.

The main components are:

1. **interactive applications:** trails, paint, physics and vowels
2. **website (INSIDE AUT):** each user has a safe chatroom where parents, teachers, therapists and operators can constantly communicate
3. **web portal:** to collect and manage data.

Working place consists of a television screen, a personal computer and two sensors. The first one is Kinect, the motion sensing input device. The second one is a heart rate monitor bracelet.

Web portal

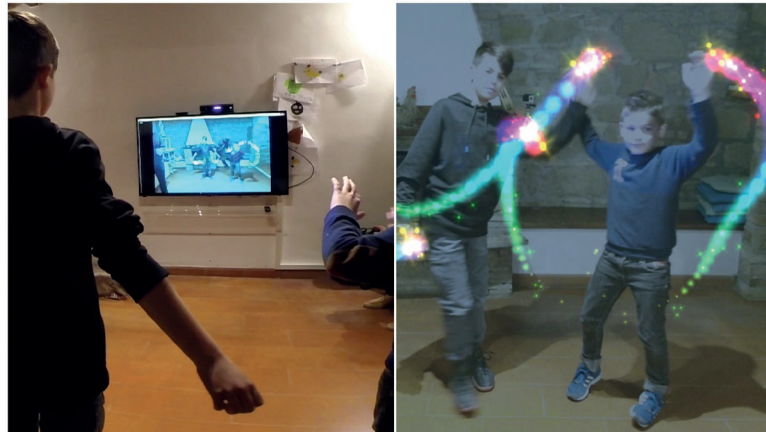
During the interactive sessions, videos and heart rate signals are saved in a cloud data storage. The system provide statistics about app use. Data is available for researchers and remote supervision.

Website

A website was designed to manage the access and privilege levels of different kinds of users. Users are therapists, trainees, researchers but also parents or teachers involved in the care of the same children with ASD. For parents and teachers, the website offers a private space where they can share images, videos and messages in order to improve their communication and help them to build a network around the children. Therapists can use this space to share selected parts of the sessions in order to inform on what happens during the therapies. Parents and therapists review selected videoclips of previously recorded sessions, and the parents are encouraged to comment on salient aspects of the interaction.

Interactive applications

1. Trails



Luminous trails are generated by hand movements. The child and therapist can see themselves on the screen and receive visual feedback from their hand movements. It is extremely intuitive, very appealing and fun, especially for younger children. Sound feedback can be added to the trails.

2. Paint



By simply using hand movements, a child can draw by picking colours from a menu. Colours can also be associated with basic emotions represented by emoticons. The colour lines are transparent and behind the drawing it is possible for the child to see themselves on the screen. A sound effect can be added to the colours.

3. Physics



The application allows an interaction with a virtual ball bouncing around in response to full body motions.

4. Vowels



Vowels emitted by a user are sensed and transformed into coloured shapes which appear on the screen close to the user's mouth. It is also possible to make drawings with one's own voice.

Study protocol hypothesis

At present the pilot testing phase is almost complete and a pilot study is due to commence in cooperation with the University of Perugia and the University of Parma, Italy, in order to investigate Painteraction outcomes for children, their families and the surrounding environment.

The primary aim of the study protocol is to evaluate the efficacy of Painteraction for children with ASD aged between 4 and 12. More specifically, the aim is to determine whether the intervention results in more sensory motor integration.

The primary hypothesis is that an intervention with Painteraction will bring about a higher rate of sensory motor integration in children with ASD after treatment and at follow up - one year after the end of the intervention. A secondary hypothesis being tested is that an intervention with Painteraction will lead to an increase in adaptive behaviour. More specifically, three domains of adaptive behaviour will be assessed: conceptual skills, social skills and practical skills. Along with adaptive behaviour, changes in behavioural and emotional problems will be measured.

Finally, the third tested hypothesis is that, using video feedback on selected video clips, parents' involvement in periodic sessions will decrease their anxiety related to parenting and increase their capacity to reflect upon their child's behaviour.