

# Perspective Ethical Issues about Experiences with Social Robots to help Children with Autism Spectrum Disorders

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## ABSTRACT

During the last 15 years, a lot of scientific studies have focused their attention in the field of robot technologies for enhanced therapy of people with cognitive disabilities. In particular, human-robot interaction (HRI) is a fascinating field of research in robotics, which is closely related to many of the ethical concerns raised with regards to interactive robots. Philosophers gradually began to focus specifically on the nature of technology and its implications for society. People with Autistic Spectrum Disorders (ASD) often have difficulty communicating, fail to respond to social cues, tend to repeat particular actions (walking in a specific pattern for example) and sometimes become preoccupied with certain objects. It has been noticed that children who suffer from ASD respond well to the use of animals or robots in therapy. They feel comfortable with robots whose behavior and social signals tend to be relatively simple and predictable [1].

For this reason, SARACEN (Socially Assistive Robots for Autistic Children Education) Project promoted an integrated approach in the diagnosis and therapy of children with autism. The main idea is to integrate the use of humanoid social robots (Aldebaran NAO) in clinical practices in order to improve the expected outcomes in terms of socially, communicative and educative behaviors of autistic children.

However, we had to face up all the implications related to the adoption of this approach in such a population. In this sense, we want to highlight the attention on two topics: i) the flow of protocol we adopted for current and future studies involving the utilization of robots in aid of children with autism, and ii) how we would manage the downsides to our works [2]. In particular: how do robots play their part in helping these children? How will robot be integrated in a home scenario? Should the robots for HRI be part of clinical practices in hospital?

We designed a linear research protocol that can be easily adapted to guide all the robotic intervention (see Figure 1).

We progressed through three principal different stages:

- **Exploration.** The research team first interviewed therapists and clinicians to collect the details of children with autism in terms of social, communicative and educative behaviors.

- **Deployment.** The collected information was then elaborated to design the specific application taking in consideration also the technical constraints of the robot. We then deploy our scenario to test users for reviewing its capabilities and verifying its usability with children with autism. We involved non-technical-expert person in order to adapt the system in a home scenario.
- **Improvement.** We lastly refined our system from feedback received from the previous deployment stage. In collaboration with therapists and clinicians, we assessed the effectiveness of our improved system.

In Table 1 we summarized the pilot studies we are carrying on in collaboration with both the Association “Amici di Nico” ONLUS and the KISS-Health Project. We highlight the stage in the protocol flow and the expected outcomes.

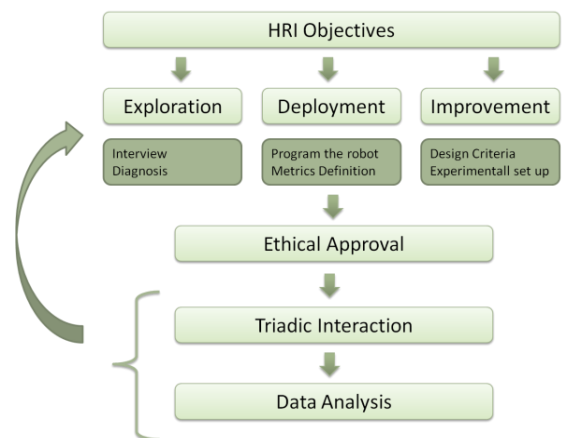


Fig. 1. Each stage in the protocol flow plays utmost importance in the overall intervention program.

Developments in technologies have determined hundreds of economic and cultural changes in our society and we can expect that the process of cultural integration of humanoid robots into human society will be a gradual and difficult process [4, 7]. Therefore, it is quite important to address the risks and benefits for the human subjects associated with the interaction with robots in order to fully understand further problems, especially when dealing with autistic children.

The benefits are clear: increased social interaction, empathy, ability to recognize emotions and share. Recent research literature has revealed that the application of robotics technology in the therapeutic context for children with autism holds innovative possibilities. However, they did not provide sufficient scientific evidences that could be adopted for all children with these disabilities, so we had to investigate more in detail the expected outcomes [5].

As with any robotics-led initiative, oversight and design is crucial. Who will design and maintain the robot, the programming? Who will determine the controls, and how will those controls be determined? Regardless of the field in which robotics are being deployed, it takes a monumental cooperation between the engineers and the scientists of that particular field, in order to properly implement the needs of the design [6].

TABLE 1. OVERVIEW OF THE PROTOCOLS OF SARACEN

Protocol	Stage	Expected Outcomes
Digital PECS System	Improvement	Improve Communication Skills
Postural Education [3]	Deployment	Improve Body Awareness Improve Social Engagement

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