



Investigating Educators 'Appropriation of Robots for Autistic Children in Special Education Settings in France: Work in Progress

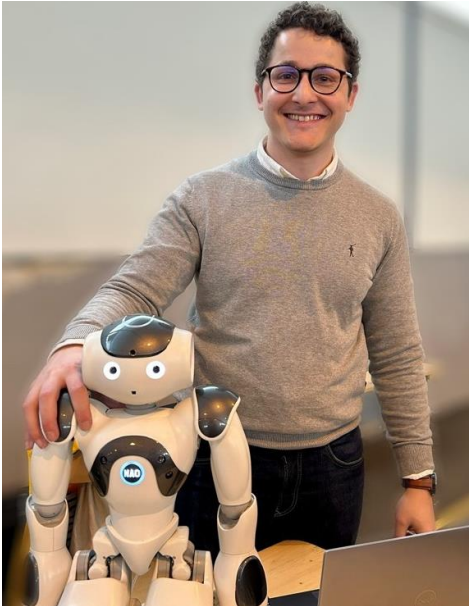
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Présenter



Armand Manukyan is a psychologist with a doctorate in psychology and an associate member of the Lorraine Laboratory of Psychology and Neuroscience (2LPN, Université de Lorraine). After 8 years working with autistic and multi-handicapped children and adults at the Association J.B Thiéry (Maxéville, France), he is now in charge of research at the Association.

He sets up and coordinates digital tool experimentation projects (robots, virtual and augmented reality, digital applications). He works with university laboratories to ensure that the methodologies employed are appropriate and to promote the studies carried out.

Topics of interest and current work

The Association J.B Thiéry is a medical-social association based in Maxéville (Lorraine, France), which supports children, teenagers and adults with autism and multiple disabilities. For several years, it has been involved in experimentation and research into innovative digital tools. It collaborates with university laboratories, notably the Laboratory of Psychology and Neuroscience (2LPN, Université de Lorraine).

The 2LPN works on a wide range of subjects, from human-machine interaction to the study of neurological aging. Together, the two organizations are working on a wide range of subjects, from the benefits of robots for autistic children to the use of augmented reality in the field of disability.

Challenges of autism for teachers

- The most common characteristics of autism are:
 - (i) inappropriate social interactions, impaired capacity to understand other's feelings or mental states;
 - (ii) impairment of social communication skills (e.g. understanding gestures, facial expressions, tone of voice);
 - (iii) significantly reduced repertory of activities and interests (stereotypical behavior, fixation to stable environments)
- This represents a major challenge for professionals: adapting activities and teaching and educational materials.

Autism and benefits of robots

- **Autistic children prefer robots because of their simple, predictable and repetitive features.**

Huijnen, C. A., AS Lexis, M., & de Witte, L. P. (2017). Robots as new tools in therapy and education for children with autism. *International Journal of Neurorehabilitation*, 04(04).

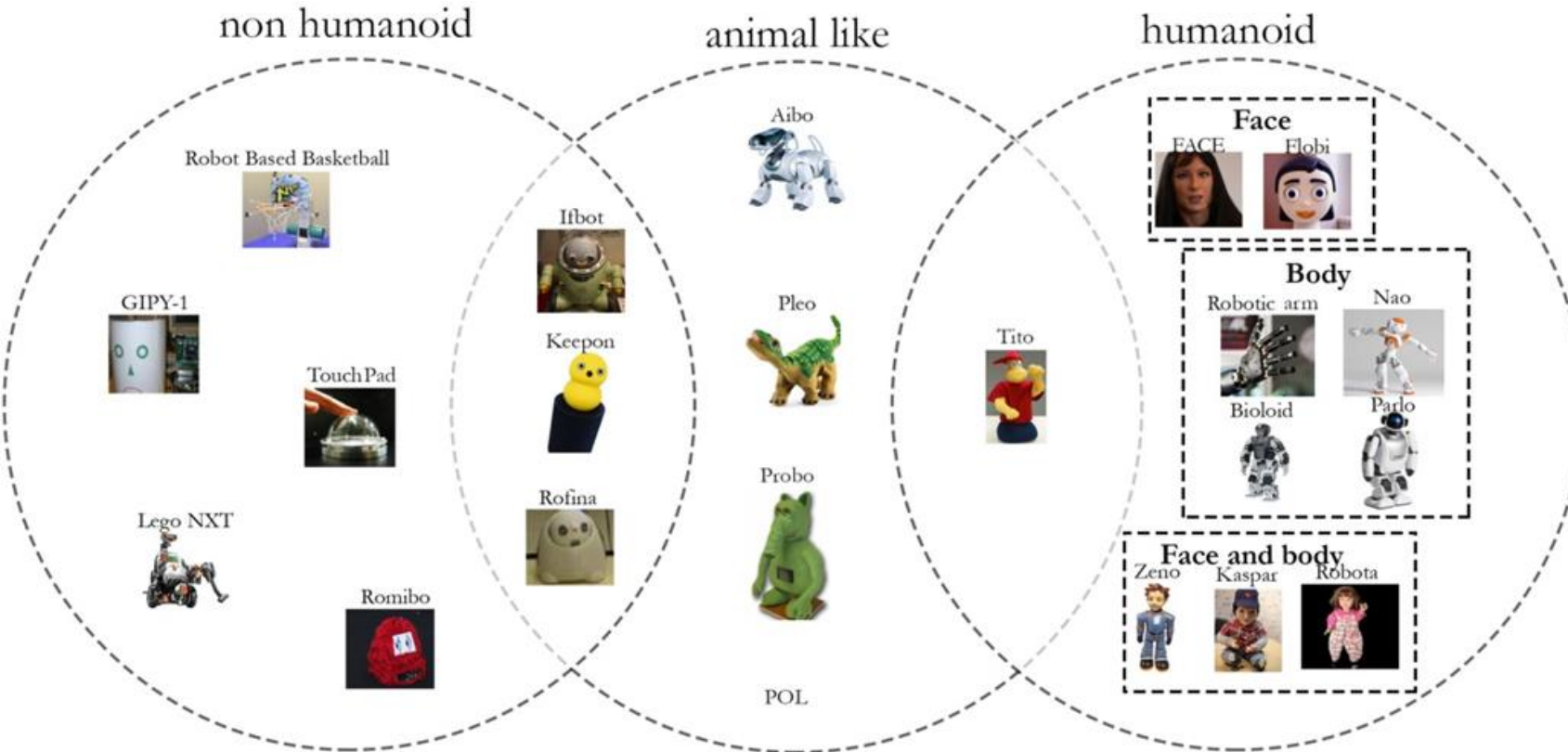
- **Better performance with a robotic rather than a human partner.**

Pennisi, P., Tonacci, A., Tartarisco, G., Billeci, L., Ruta, L., Gangemi, S., & Pioggia, G. (2015). Autism and social robotics : A systematic review. *Autism Research*, 9(2), 165- 183.

- **ASD children initiate more interactions with robots.**

Sartorato, F., Przybylowski, L., & Sarko, D. K. (2017). Improving therapeutic outcomes in autism spectrum disorders : Enhancing social communication and sensory processing through the use of interactive robots. *Journal of Psychiatric Research*, 90, 1-11.

Which robot for autistic children?



Pennisi et al. (2015)

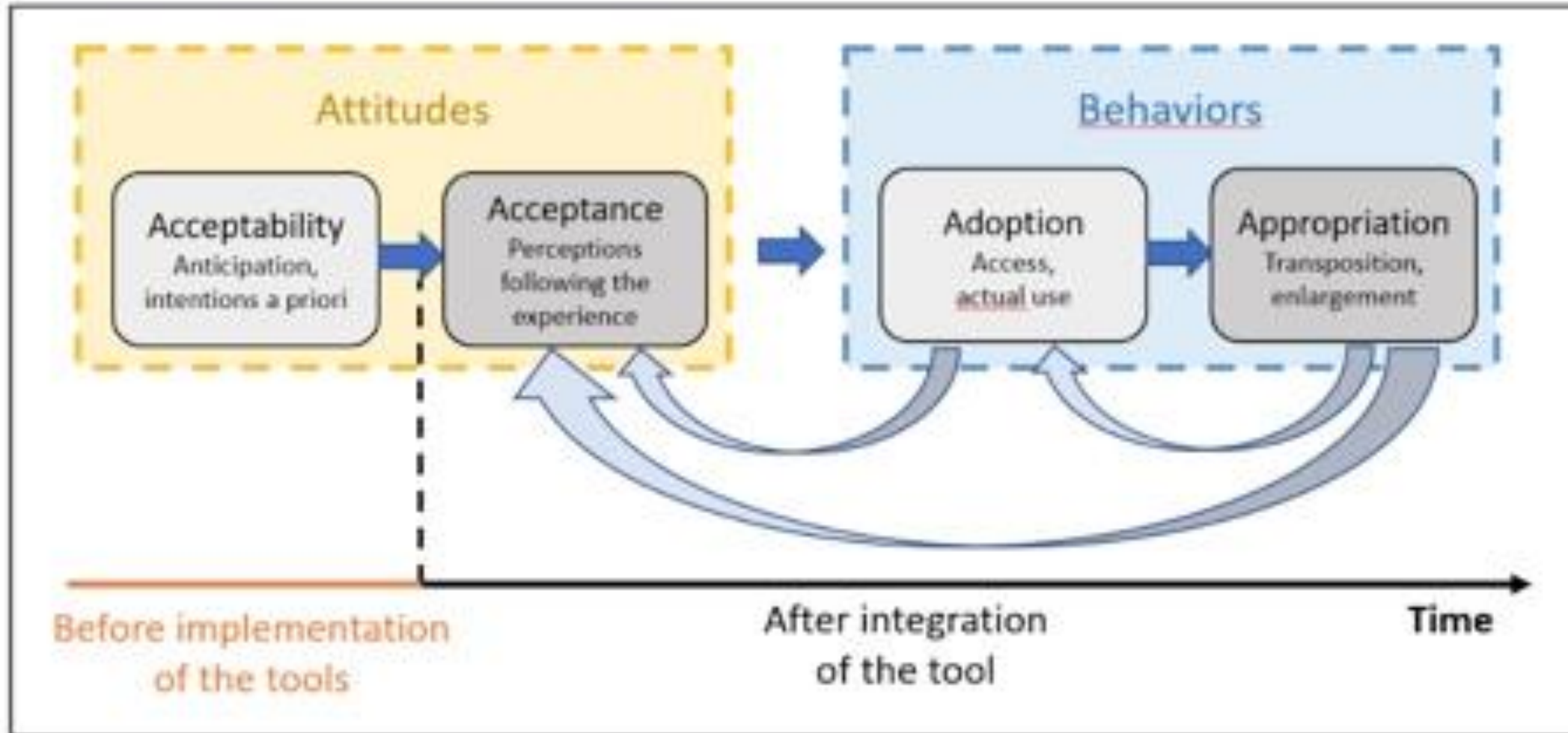
There are many different-looking robots. Kumazaki et al. (2020) emphasize that characteristics (size, shape, ease of use) are important when choosing a robot.

Criteria can vary according to the child's profile and the professionals who use them.

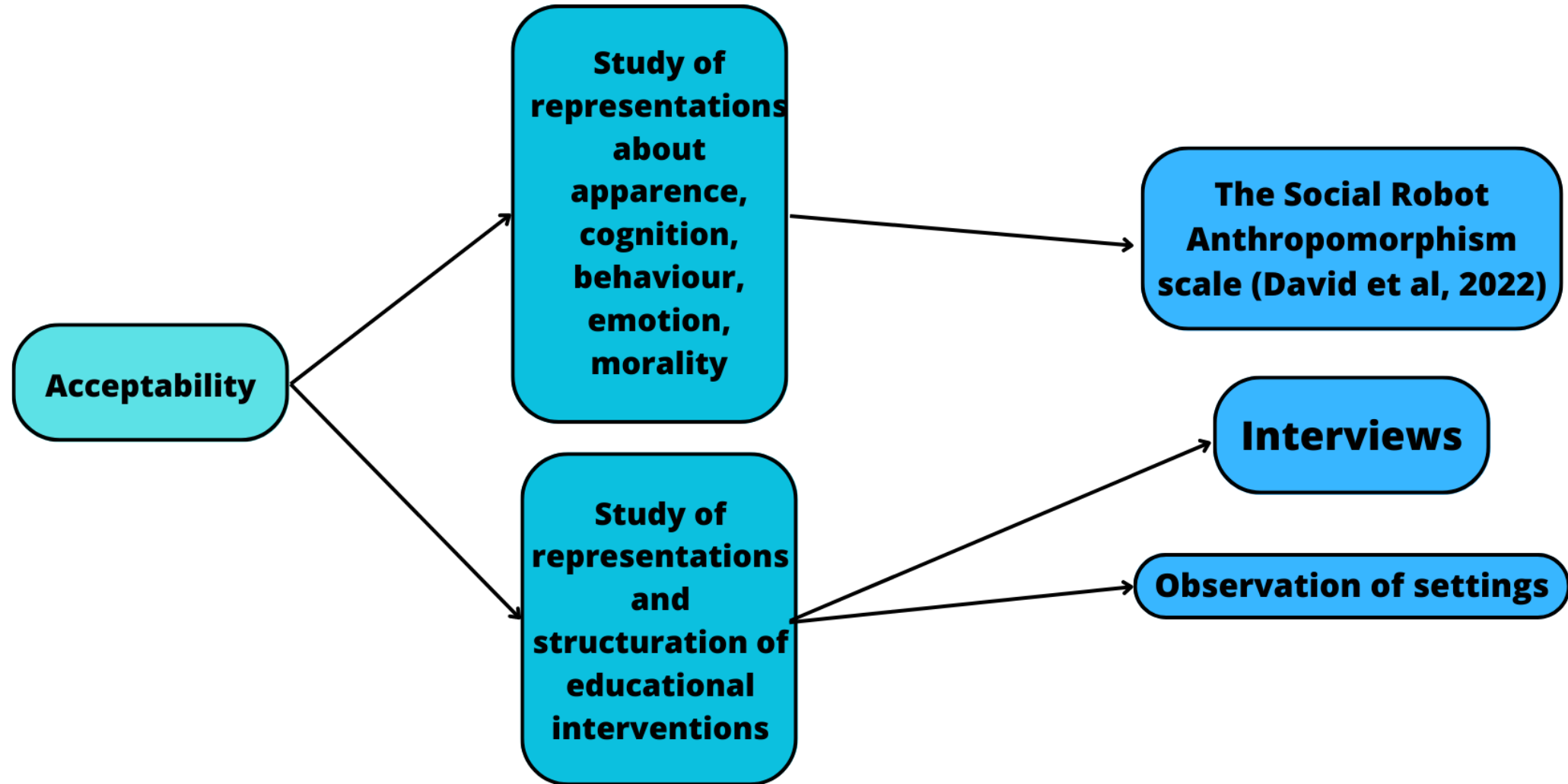
Biais of experimenting robots in a lab-based settings

- The bias of the experimenter using the robot does not take into account the professional's subjectivity.
- The integration and optimal use of the robot are factors in its effectiveness, and it is therefore necessary to take this into account.
- To generalize robots in an educational system, we need to identify the factors that determine the choice of robot for the educator.

The 4A model to explain robots integration



Preliminary work : study of acceptability



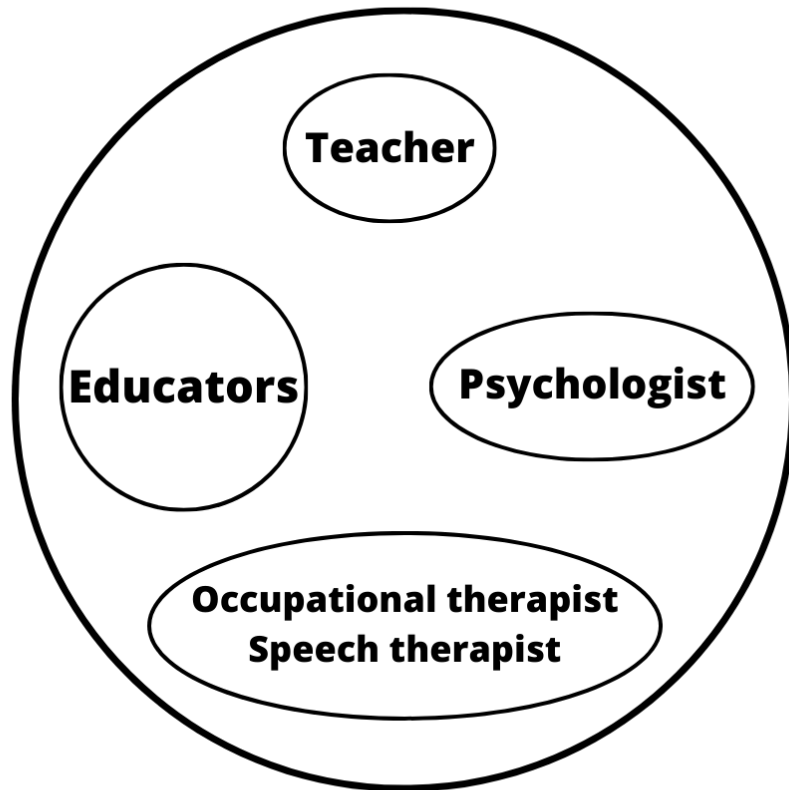
Preliminary work : preschool autism teaching unit

The preschool autism teaching units (UEMA) are inclusion devices created in France thanks to the 3rd autism plan (2016)

- ➔ characterised by an innovative team approach and multidisciplinary missions.
- ➔ Children in class is accompanied by parental guidance by professionals.
- ➔ support for 7 children (3 to 6 years old) by 7 different professionals (educators, teacher, speech therapist, psychologist and occupational therapist).

Study of representations of robot in UEMA

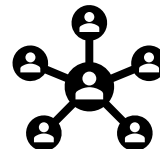
Preschool Autism Teaching Unit



Intensive multidisciplinary interventions characterized by one-on-one sessions structured around behavioral and developmental strategies.

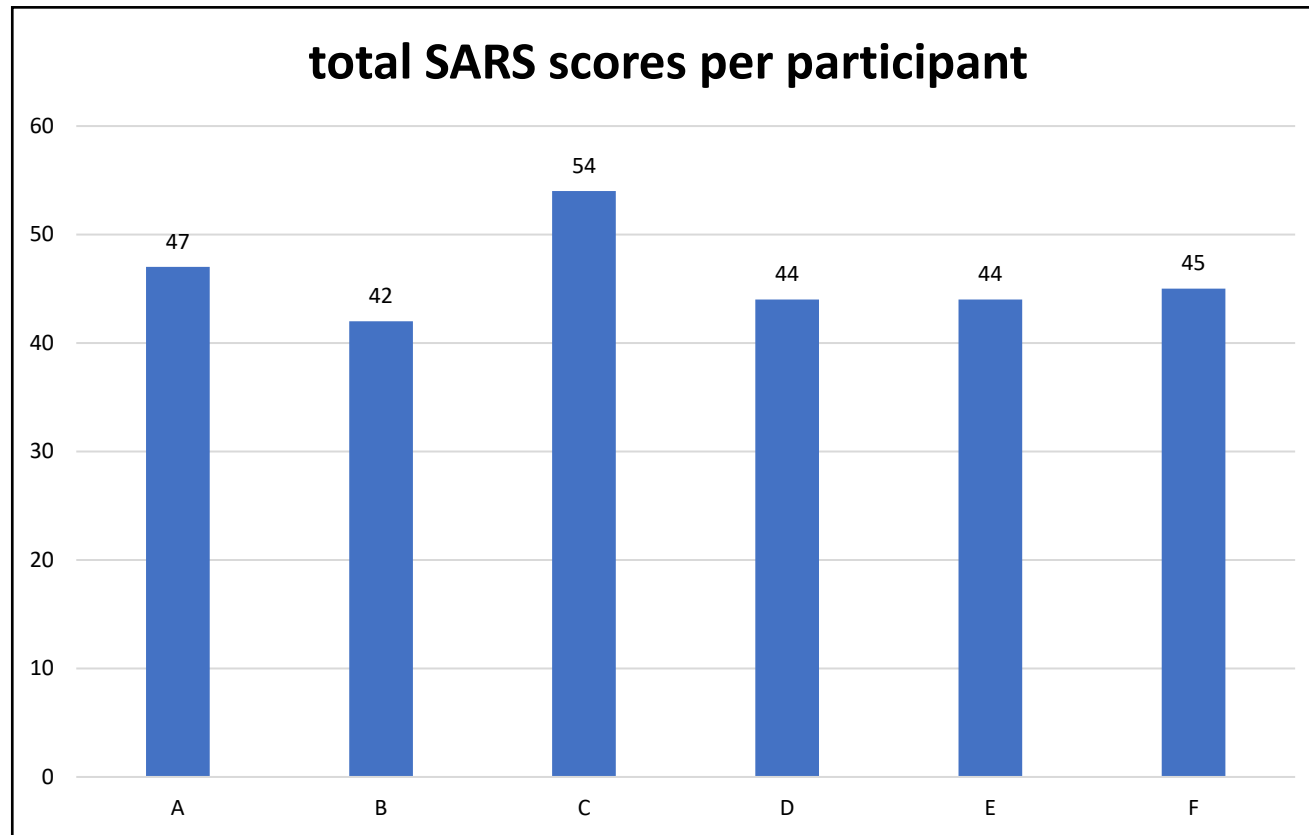


Each child benefits from a regularly updated, individualized program of goals.



Integration of robots might be difficult related to the organization

Results (1)



Maximum score at 140

Rather low homogeneous scores

Professionals have a low representation of anthropomorphism of the robots

Highest scores in subcategory « cognition »

Lowest scores in subcategory « morality » and « emotion »

Results (2)



- **The interviews reveal a recurrence of terms related to anxiety and discomfort.**
- **Professionals emphasize the fear that the robot Nao will replace them in their work.**
- **Professionals have the impression that the robot will block their relationship with students.**
- **The evidence we have gathered points to a link between the robot's low anthropomorphization score and its rejection by professionals.**

Discussions

- Even if the robot is not seen as a partner similar to a human being, its presence as a tool can worry and disrupt the way professionals organize and represent their own work.
- Preliminary study leading to research into the conditions for implementing a robot in a multidisciplinary intervention system.

Aim: to generalize the benefits of robots observed in lab-setting.