# Enhancing the Utilization of Artificial Intelligence and Social Robots in Specialized Units for Children with Autism

**Rychalski Marie,**
Manukyan Armand, Dinet Jérôme

*Association Jean-Baptiste Thiéry,* Maxéville, France
*Lab of Psychology and Neurosciences, Lorraine University*
Nancy, France

email: marie.rychalski@univ-lorraine.fr
Armand.MANUKYAN@jbthiery.asso.fr
jerome.dinet@univ-lorraine.fr

# 1. Scientific motivation

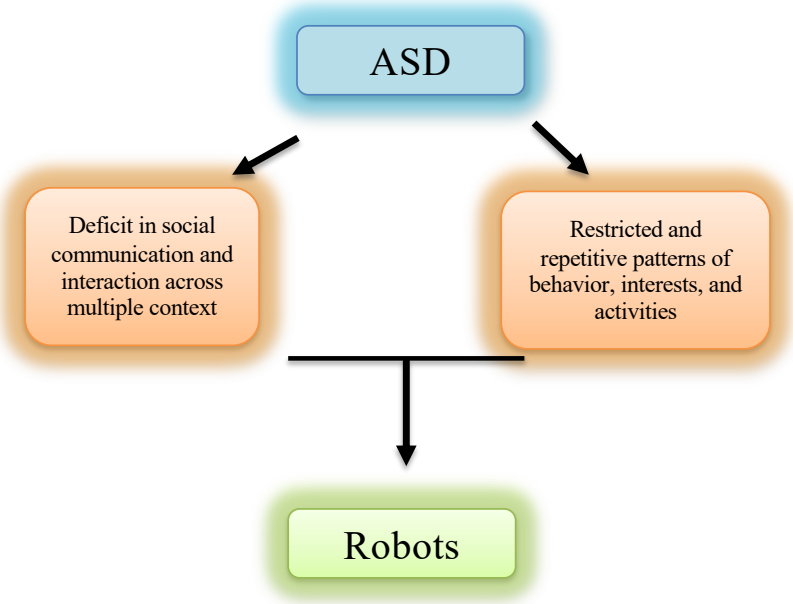



Figure 1. Theoretical schema

- **Autism Spectrum Disorder (ASD)** = 700 000 individuals - including 100 000 children
- Children with ASD challenges : adapting to their environment, including emotional, cognitive, and behavioral difficulties

➔ Can impact school learning.

- They may also struggle to respond to sensory stimuli.
- Robots to perform a variety of human-like functions, offering valuable assistance in improving the social skills of individuals with ASD

- Robots : **predictable** and **controlled** interactions, boosting **confidence** and **selfesteem**. (Mitsea & al., 2020)
- **Social Robot Facilitates :** Engagement and Attention (Azizi & al., 2023)

# 1. Scientific motivation

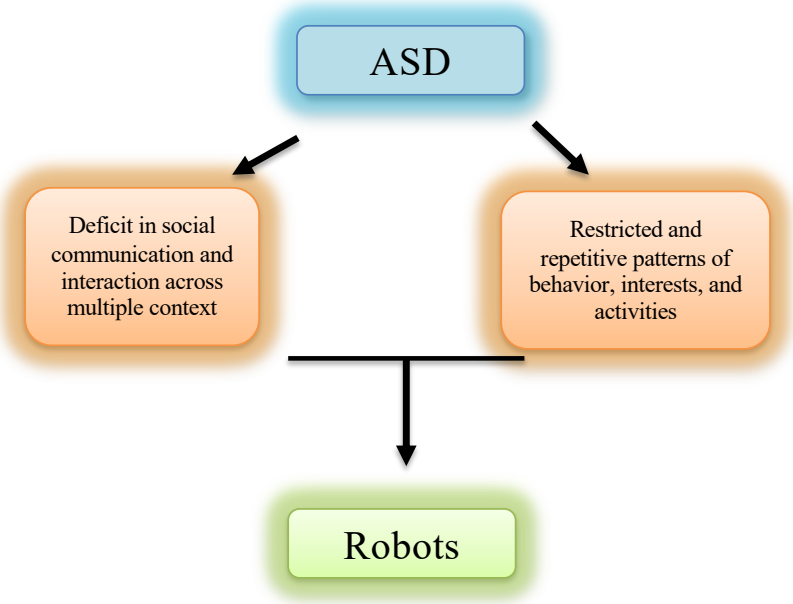



Figure 1. Theoretical schema

- Full acceptance of robots is **complex** and requires **significant investment**, especially for teachers new to robotics.
- **Acceptability** depends on **perceived usefulness** and the **ability to integrate** robots into teaching. (Duclos, 2015)
- Mental **anthropomorphism** affects robot acceptability. (David, 2020 ; David 2022).
- Spatola et al. suggest evaluating **anthropomorphism through sociability**, **agency, animacy, and disturbance** = influence robot perceptions. **Human-like** traits **enhance** acceptability by **fostering familiarity** and **reducing** perceived **threats**. (Spatola & al., 2021)

# 2. Method

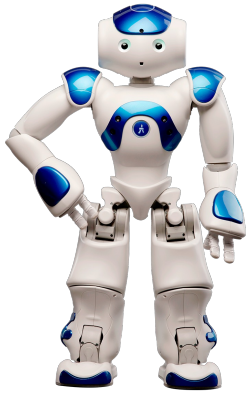
**What are the conditions required for the integration of artificial intelligence and social robots to be accepted by education and health professionals in specialized units for autistic children?**

1. Higher decision-making latitude leads to greater adoption of AI-driven social robots, despite added tasks or complexities.

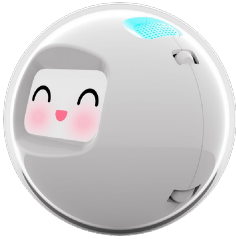
2. Strong self-efficacy results in positive attitudes toward integrating AI-equipped social robots, as professionals feel capable of managing extra workload and adapting new procedures.

3. If the benefits of AI capabilities outweigh the added workload, professionals will show higher acceptance and integration of social robots in specialized education settings.


Buddy (BlueFrog)



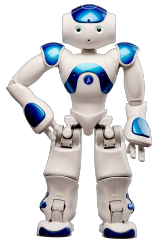
NAO (Aldebaran Robotics)



Leka (APF France)

# 2. Method

Leka (APF France)



NAO (Aldebaran Robotics)

Buddy (BlueFrog)

- **8 female** (2 teach- ers and 6 educators), all over 18 and of French nationality.
- From the **educational and teachings professionals** from two specialised teaching units (nursery and elementary)
- Association Jean-Baptiste Thiéry, located in the East of France.

- **Three robots** compared to determine the best fit for specialized classes, respecting usual working conditions of professionals and children.
- Focus groups (1 hour) : participants' self-efficacy, stress levels, and perceptions of digital technology, especially robots.
- Anonymized individual questionnaires (HRIES, Karasek test, Self-Effiacity Scale)
- The SWOT method (strengths, weaknesses, opportunities and threats) : difficulties encountered in the workplace.
- Table : expectations and fears concerning integration and utilization of robotic tools.

# 3. Results

**Robot Perceptions:**

• Leka: Sociable (3.09), moderately disturbing (2.37)

• NAO: Animated (2.41), very disturbing (3.12)

• Buddy: Very disturbing (3.03), animated (1.78)

• Highest disturbance scores: NAO (3.12), Buddy (3.03)

**Group 2 Insights:**

• Perceptions: More favorable with higher decision-making latitude and social support

• Disturbance: Higher levels, especially for Buddy (3.81)

**Focus Group Findings:**

• Vulnerabilities: Deficiencies in organization, memory, and rigor

• Constraints: Transparency, professional cohesion, communication

• Opportunities: Interaction with diverse teachers, varied learning methods, training, supervision

• Threats: Lack of time, limited human resources, institutional constraints, bureaucracy

**Expectations and Fears:**

• Positive: Better understanding of students, increased motivation, adoption of innovative tools

• Negative: Loss of time, dependence on technology, reduced social relations

Table I: *Descriptive Statistics of Anthropomorphism Factors for the Robots NAO, Leka and Buddy using the HRIES Scale [16].*

| Robots | Factors | Mean | Median | S-D | Minimum | Maximum |
|---|---|---|---|---|---|---|
| NAO | Sociability | 2.46 | 2.46 | 1.817 | 1.180 | 3.75 |
| | Animacy | 2.41 | 2.41 | 1.549 | 1.310 | 3.50 |
| | Agency | 2.00 | 2.00 | 1.506 | 0.930 | 3.06 |
| | Disturbance | 3.12 | 3.12 | 0.707 | 2.620 | 3.62 |
| Leka | Sociability | 3.09 | 3.09 | 2.701 | 1.180 | 5.00 |
| | Animacy | 1.78 | 1.78 | 1.103 | 1.000 | 2.56 |
| | Agency | 2.00 | 2.00 | 1.414 | 1.000 | 3.00 |
| | Disturbance | 2.37 | 2.37 | 1.061 | 1.620 | 3.12 |
| Buddy | Sociability | 2.34 | 2.34 | 1.541 | 1.250 | 3.43 |
| | Animacy | 1.78 | 1.78 | 1.018 | 1.060 | 2.50 |
| | Agency | 1.81 | 1.81 | 1.237 | 0.930 | 2.68 |
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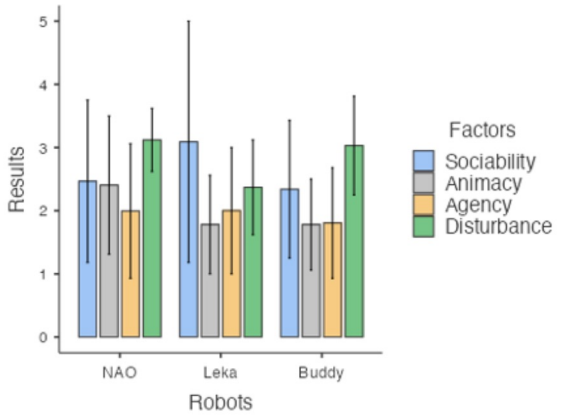


Figure 2: The anthropomorphism scores based on the HRIES scale for each robot, NAO, Leka and Buddy

# 4. Discussion

**1) Psychosocial Dimension:**

• Decision Latitude: Group 2 has higher autonomy (mean: 80.5) than Group 1 (63.5), leading to better job satisfaction and perception of abilities. Stress from high demands may increase disturbance perception, especially for NAO (3.125) and Buddy (3.031).

• Social Support: Moderate to good (mean: 22.5). Positive correlation with robot acceptance.

**2) Robot Perceptions:**

• Leka: High sociability (3.094), moderate disturbance (2.375), most popular.

• NAO: Most animated (2.406), most disruptive (3.125).

• Buddy: Neutral perception, balanced scores.

• Intergroup Comparison: Higher decision latitude and social support lead to more favorable perceptions but higher disturbance, especially for Buddy (3.813).

**3) Focus Group Analysis:**

• Vulnerabilities: Issues with organization, memory, rigor.

• Constraints: Transparency, cohesion, communication.

• Opportunities: Diverse teacher interaction, varied methods, training, supervision.

• Threats: Time constraints, limited resources, institutional issues, bureaucracy.

• Expectations and Fears: Better student understanding, increased motivation, innovative tools vs. time loss, tech dependence, reduced social relations.

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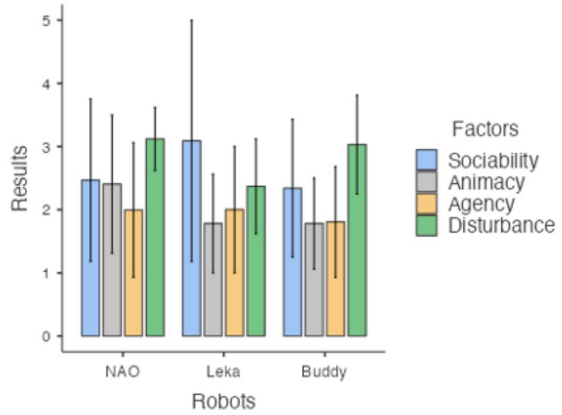


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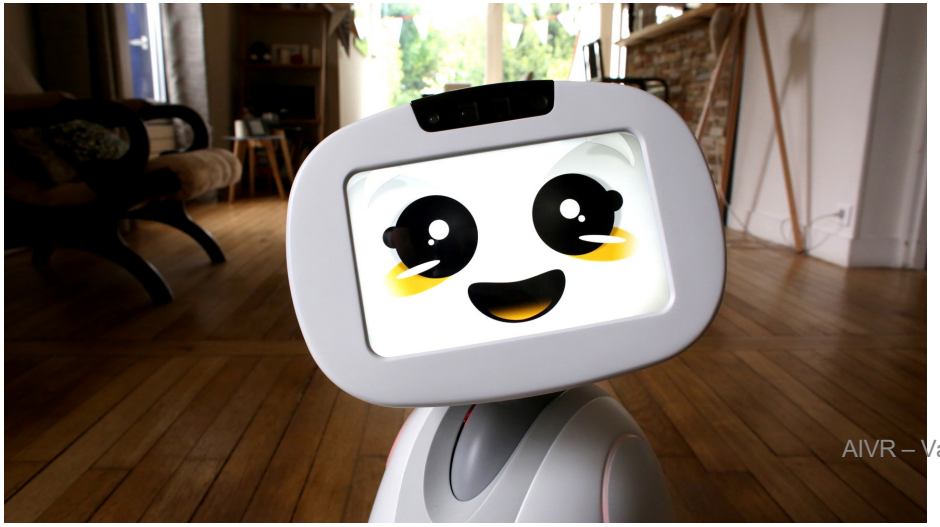
# 5. Conclusion

- This study examines **the acceptance of AI-equipped social robots** in specialized classrooms for **children with autism**, focusing on **decision latitude, self-efficacy**, and the balance between **benefits and workload**.
- **Greater decision latitude** and **high self-efficacy** promote **positive** responses to **robot integration**. Successful adoption depends on whether **educational benefits outweigh time and resource investments.**
- **Careful planning** is needed to minimize disruption and foster **a supportive environment**, enhancing interactions in autism therapy.
- **Adoption** is influenced by **affective** and **social factors**, **robot design**, and **anthropomorphism.**
- Future research should **refine** these **aspects** to better **align robots with teachers' needs** and **expectations**, minimizing resistance.

# Thank you for listening !



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