

# Therapist-technologist collaboration in robotics- assisted learning

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**Innovative methodology for integration of  
assistive technologies in speech therapy for  
children and adolescents  
(ATLog)**

- Innovative technologies: Socially-Assistive Robots to create therapeutic human-robot interactions.
- Collaborates with the Logopedic Centre at the South-West University in Blagoevgrad for therapy sessions with children with communication disorders, Autism, ADHD and developmental language disorders

## ATLog Platform

- Integrates advanced assistive technologies—Socially Assistive Robots (SARs), Virtual Reality (VR), and Conversational AI—into speech and language therapy (SLT)
- Target learners – 20 children from kindergarten to primary school
- Duration of experiments – 6 months; 1 experiment in a month;
- Duration of sessions – around 30 minutes
- Technology used - Blockly-based programming environment, Socially Assistive Robots including Nao, Furhat, Emo (a custom-built expressive robot) and Double3 telepresence robot; Conversational AI powered by ChatGPT and BgGPT, combined with speech recognition and text-to-speech from Microsoft Azure and Google.

# ATLog - GUI



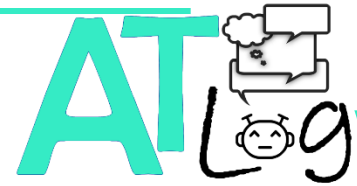
ATLog block-based graphical interface for visual programming, with the Nao robot category currently open on the canvas.



## Results

- Therapist feedback indicated strong usability and acceptance, with high SUS scores (74%) and TAM measures of usefulness and ease of use rated also highly (63%).
- Children's learning outcomes included **improved vocabulary, turn-taking, comprehension and reduced communication anxiety**. Engagement increased due to playful and interactive scenarios delivered through the robots. Observations also highlighted more confident participation in therapy, with early evidence of transferable gains in social communication.

## How can ATLog and SARs support inclusive education



- New predefined graphical blocks can be tailored to different learning styles (e.g., auditory, visual and embodied learning).
- QR code and speech synthesis features can support both verbal and nonverbal learners.
- Teachers could use the ATLog to design interactive lessons across subjects like languages: storytelling with SARs and AI-generated narratives; math: robot-led problem-solving games with real-time feedback; music: robot-led games for guessing the musical instrument

# Publications

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- 1. Lekova, A., Tsvetkova, P., Andreeva, A., Dimitrov, G., Tanev, T., Simonska, M., Stefanov, T., Stancheva-Popkostadinova, V., Padareva, G., Rasheva, K., Kremenska, A., & Vitanova, D. (2025). A Design-Based Research Approach to Streamline the Integration of High-Tech Assistive Technologies in Speech and Language Therapy. *Technologies*, eISSN 2227-7080, Volume 13 (Issue 7), 306. <https://doi.org/10.3390/technologies13070306>
- 2. Galya Georgieva-Tsaneva, Andreeva, A., Tsvetkova, P., Lekova, A., Miglena Simonska, Vaska Stancheva-Popkostadinova, Dimitrov, G., Rasheva-Yordanova, K., & Kostadinova, I. (2023). Exploring the Potential of Social Robots for Speech and Language Therapy: A Review and Analysis of Interactive Scenarios. Volume 11(Issue 7), ISSN 2075-1702, 693–693. <https://doi.org/10.3390/machines11070693>
- 3. Lekova, A., Tsvetkova, P., Andreeva, A., Miglena Simonska, & Kremenska, A. (2024). System software architecture for advancing human robot interaction by cloud services and multi-robot cooperation. *International Journal on Information Technologies and Security*, ISSN 1313-8251, Volume 16 (Issue 1), pp. 65–76. <https://doi.org/10.59035/fmfz4017>
- 4. Andreeva, A., Lekova, A., Tsvetkova, P., & Miglena Simonska. (2024). Expanding the Capabilities of Robot NAO to Enable Human-Like Communication with Children with Speech and Language Disorders. 2; <https://doi.org/10.1145/3674912.3674919>
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# THANK YOU FOR YOUR ATTENTION!



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- Dr. Gergana Padareva
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