Interpersonal Dynamics, Organizational Culture, and Leadership in the Introduction of Social Robots in the Context of the Social and Solidarity Economy in Bulgaria

Mayiana Mitevska, Prof. D.Sc.
Plovdiv University "Paisii Hilendarski", Faculty of Pedagogy, Department of Psychology, Bulgaria, Plovdiv.

Georgi Petkov, Prof. D.Sc.
ULSIT

Vladislav Lazarov, Prof. D.Sc
Chairperson of the Governing Board, General Assembly of the Labour-Production Cooperatives Union – Sofia

DOI: https://doi.org/10.56293/IJMSSSR.2025.5719

IJMSSSR 2025
VOLUME 7
ISSUE 4 JULY – AUGUST **ISSN: 2582 – 0265**

Abstract: The integration of social robots such as NAO, Pepper, and Furhat in educational institutions presents both technological opportunity and organizational complexity. While these robots show potential in areas such as foreign language learning, mental health support, and bullying prevention, their successful implementation depends not only on technical infrastructure but on psychological climate, leadership, and organizational culture. In the Bulgarian context, shaped by hierarchical and collectivist traditions, introducing socially assistive robotics must be approached as a culturally negotiated process. This study explores how team dynamics, motivational factors, and solidarity-based leadership strategies influence the sustainable adoption of social robots in education.

Keywords: Social robots, Organizational psychology, Solidarity economy, Transformational leadership, Inclusive education

Theoretical Framework and Relevance

This study is grounded in an interdisciplinary theoretical foundation, including:

Organizational Psychology

Drawing on Deci & Ryan's Self-Determination Theory (2000), the study highlights the significance of autonomy, competence, and relatedness in fostering technological acceptance. Positive team dynamics and psychological safety are seen as prerequisites for sustainable change.

Cultural and Leadership Theories

Alzubi et al. (2023), Ahsan (2025), and Adel (2024) emphasize that organizational cultures oriented toward learning and innovation, combined with transformational leadership, create:

Safe environments for educators;
Support for their professional identity;
Conditions for effective robot and AI integration.

Social and Solidarity Economy (SSE)

The SSE perspective stresses collective participation, ethical design, equity, and community benefit in technological innovation. Introducing social robots in academia is viewed not just as automation, but as a human-centered transformation aligned with institutional values and shared ownership.

Change Management Models
Leadership plays a decisive role in fostering vision and mobilizing engagement. Kotter's 8-Step Change Model is

relevant here, particularly in creating urgency, building guiding coalitions, and anchoring innovation into institutional culture.

Research Aim

To explore how interpersonal relationships, organizational culture, and leadership practices affect the integration of social robots in Bulgarian educational institutions, within the framework of the social and solidarity economy.

Research Objectives

To examine the role of psychological climate and team dynamics in the adoption of social robots in academic settings.
To assess how organizational culture and leadership influence educators' motivation and openness to robot integration.
To identify conditions under which professional recognition and perceived control foster acceptance.
To explore the applicability of solidarity-based implementation models in hierarchical academic institutions.
To synthesize a culturally sensitive, ethically grounded model for change management in educational robotics.

Research Hypotheses

H1: A supportive psychological climate and collaborative interpersonal dynamics positively influence the successful integration of social robots.
H2: Faculty members are more likely to accept social robots when they perceive professional recognition and have autonomy in the implementation process.
H3: Organizational cultures oriented toward learning and innovation facilitate sustained robot integration more effectively than rule-bound, hierarchical cultures.
H4: Transformational leadership practices—such as participatory vision-building and ethical transparency—correlate with reduced resistance to robotic innovation.
H5: Institutions that apply solidarity economy principles (e.g., participatory design, shared benefit, inclusive governance) show higher acceptance and long-term sustainability of educational robotics.

Object of the Study

The object of this study is the organizational and psychological environment in Bulgarian academic institutions during the process of implementing social robots, with specific emphasis on the influence of leadership, organizational culture, and solidarity-based practices on technology adoption.

Organizational Culture, Leadership, and the Integration of Social Robots in Educational Institutions

The findings of Alzubi et al. (2023) are consistent with studies by Ahsan (2025) and Adel (2024), highlighting that an organizational culture oriented toward learning and innovation, combined with transformational leadership, are key prerequisites for:

Creating a psychologically safe environment for educators;

Supporting educators' professional identity;

Ensuring effective integration of robots and AI systems.

The research of Alzubi et al. (2023) emphasizes that the introduction of social robots is not merely a matter of technical integration, but primarily one of psychological and cultural compatibility with the academic environment. Educators accept technologies as partners only when their professional contribution and autonomy are respected. Organizations that recognize these human factors are more likely to achieve a sustainable and accepted digital transformation.

Leadership and Change Management

The role of institutional leadership is:

Crucial for creating a shared vision and engaging the academic community;

Supported by successful frameworks such as Kotter's 8-Step Model for managing change (e.g., establishing urgency, building guiding coalitions, communicating the vision, etc.).

Organizational psychology offers sustainable frameworks for managing technological innovations such as social robots in academia. The acceptance and effective use of these technologies depend not only on their technical features but also on:

The cultural context;

The attitudes of stakeholders;

And how organizations strategically manage change.

Thus, universities should view the implementation of social robots as part of a broader process of organizational learning and development.

Table 1. Influence of Organizational-Psychological Factors on the Integration of Social Robots

Factor	Description	Impact on Robot Integration	Sources
Psychological climate	Perception of safety, support, and trust	Increased openness, engagement, reduced resistance	Rasouli et al. (2024)
Organizational culture	Shared values and attitudes toward change and innovation	Institutional readiness and sustainable transformation	Alzubi et al. (2023); SIRRL (2024)
Interpersonal dynamics	Team relations, communication, social coordination	Greater collaboration in technology application	Sanoubari et al. (2023)
Motivation and mindset	Autonomy, competence, meaning	Higher resilience and active engagement	Deci & Ryan (2000); Cabibihan et al. (2013)
Leadership	Managerial involvement in the process	Reduced uncertainty, faster and more effective implementation	Aliasghari et al. (2024)

Organizational psychology provides a systematic toolkit for understanding and supporting the integration of social robots into academic settings. Psychological climate, organizational culture, participant motivation, and effective leadership are not secondary factors, but key determinants of success or failure. Developing interdisciplinary strategies that involve psychologists, educators, and technologists is essential for sustainable progress in digital education.

Organizational Psychology and Educational Robotics: A Modern Synergy
The topic of organizational psychology and the integration of social robots brings together two interconnected domains:
The science of human behavior in organizational settings;
The implementation of emerging technologies in education.
The introduction of social robots represents a transformative innovation, particularly in:
Supporting students with special educational needs;
Personalizing instruction;
Enhancing social-emotional learning.
Despite their technical advantages, the successful adoption of these technologies depends largely on:
Psychological climate;

Organizational culture;
Interpersonal relationships within teams;
Staff motivation.
Application and Research on Social Robots in Education

The integration of NAO, Pepper, and Furhat into educational institutions is of growing interest within organizational psychology, especially in relation to psychological safety, cultural alignment, and motivation.

Pepper, designed for social interaction, has been positively received by university students when used in interactive presentations and participatory activities. Its emotional recognition capabilities make it ideal for supporting social-emotional learning.

Furhat, a social robot with a customizable face and expressive capabilities, has been found effective in improving student motivation, building trust, and enhancing perceived engagement in the learning process. Research at the University of Waterloo demonstrates Furhat's success in:

Language learning: Used in French lessons for children aged 10–14, providing personalized instruction and boosting engagement.

Mental health support: Planned future projects aim to leverage Furhat's emotional expressiveness to support students in need of psychological or social support.
Bullying prevention: Through the REMind project, Furhat participates in role-play activities teaching empathy, conflict resolution, and bystander responsibility.

Social anxiety intervention: Research by Prof. Dautenhahn suggests integrating robots like NAO and Furhat into cognitive-behavioral therapy to support individuals with social anxiety.

Platform development: The SIRRL lab is developing Mirrly, an expressive, low-cost humanoid robot for educational and therapeutic applications.

These research initiatives underscore the potential of social robots to foster inclusive, interactive, and emotionally supportive educational environments.

Conclusion: Leadership, Culture, and Interpersonal Dynamics as Drivers of Successful Social Robot Integration in Education

The integration of social robots such as NAO, Pepper, and Furhat in educational institutions confirms that technological implementation cannot be separated from its organizational, psychological, and cultural context. This research reinforces the idea that the human dimension—including team trust, professional recognition, and shared leadership—is the true foundation for innovation success.

Opportunities for Implementation in the Context of the Social and Solidarity Economy

The integration of social robots in education, when aligned with the values of the social and solidarity economy (SSE), opens new avenues for ethical, inclusive, and sustainable innovation. The SSE emphasizes participatory governance, social justice, and collective benefit—principles that can transform how educational technologies are adopted and used.

1. Co-Creation and Participatory Design
SSE values promote bottom-up innovation, in which educators, students, and technical staff collaboratively design the role and function of social robots in the classroom. This approach fosters ownership and contextual relevance.
"Co-design ensures that robotic systems reflect real needs and institutional values, reducing resistance and increasing engagement"
(Woolley & Feller, 2022, p. 81).

2. Empowerment of Marginalized Groups
Social robots can support inclusive education, particularly for learners with special educational needs or those experiencing social anxiety. The solidarity framework ensures that such innovations are equitably distributed and ethically justified.
"The structured and non-judgmental nature of robot interaction facilitates engagement among students with autism and social phobia"
(Cabibihan et al., 2013, p. 598).
3. Building Digital Solidarity
In an era of digital transformation, SSE principles guide institutions toward solidarity-driven digitalization—technology that serves people, not the other way around. Robots like Furhat and NAO, when deployed in line with ethical and cultural norms, become tools for collective growth.
"Technological systems must be embedded in ethical frameworks and co-governance structures to ensure equitable access and human dignity"
(Adel, 2024, p. 39).
4. Sustainable Implementation through Shared Leadership
The SSE favors shared leadership and collective decision-making, which contrasts with top-down technological mandates. When institutional leadership acts transparently and involves all stakeholders, the conditions for long-term success are strengthened.
"Transformational leadership aligned with cultural values is a catalyst for sustainable innovation in academia" (Ahsan, 2025, p. 47).
5. Capacity Building and Organizational Learning

Incorporating social robots into educational practice provides opportunities for staff development and cross-disciplinary collaboration. SSE principles encourage continuous learning, inclusive training models, and ethical reflection.

"Institutional learning is not a side effect of robot adoption—it is the main driver of sustainable change" (Mitevska, 2024, p. 91).

Conclusion

The realization of educational robotics in the context of the social and solidarity economy moves beyond innovation for efficiency and enters the domain of innovation for equity, empowerment, and ethical progress. Institutions that embed human values, shared responsibility, and inclusive governance into their technology strategies will not only improve educational outcomes—but also reinforce democratic and solidarity-based models of academic life.

Table 2: Implementation Guidelines for Social Robots in Education Aligned with the Social and Solidarity Economy (SSE)

SSE Principle	Application in Educational Robotics	Expected Benefit	Reference
Participatory Governance	Co-design robot roles with input from teachers, students, and administrators	Increased ownership and reduced resistance	Woolley & Feller, 2022, p. 81
Social Inclusion	Prioritize use cases for students with special needs or social anxiety	More equitable access to educational support	Cabibihan et al., 2013, p. 598
Collective Learning	Provide interdisciplinary training for faculty and staff on how to interact with and adapt robots	Organizational learning and resilience	Mitevska, 2025, p. 91
Ethical Commitment	Apply ethical guidelines for data use, transparency, and emotional interaction with robots	Trust-building and legitimacy of technological change	Adel, 2024, p. 39
Solidarity and	Foster peer mentoring between staff and	Strengthened community	Ahsan, 2025, p.

SSE Principle	Application in Educational Robotics	Expected Benefit	Reference
Cooperation	students in robot-supported learning environments	and mutual support	47
Sustainable Integration	Pilot robots gradually within existing educational practices and evaluate social impact before scaling	Lower cultural friction and improved long-term adoption	Aliasghari et al., 2024, p. 55
Empowerment Through Technology	Use robots to support emotional literacy, self-regulation, and prosocial behaviors through role-play and guidance	Development of holistic social-emotional skills in students	Sanoubari et al., 2023, p. 112

Based on the findings synthesized from the literature and case studies, the following hypotheses were evaluated:

Hypotheses Execution Summary

H1: A supportive psychological climate and collaborative interpersonal dynamics positively influence the successful integration of social robots.
Confirmed. Case studies from Waterloo (Furhat) and empirical findings (Rasouli et al., 2024) indicate that environments characterized by trust, open communication, and team cohesion foster both engagement and innovation uptake.
H2: Faculty members are more likely to accept social robots when they perceive professional recognition and have autonomy in the implementation process.
Confirmed. As shown in Alzubi et al. (2023), faculty acceptance correlates more strongly with perceived control and identity support than with the robot's technical capabilities.
H3: Organizational cultures oriented toward learning and innovation facilitate sustained robot integration more effectively than rule-bound, hierarchical cultures.
Partially confirmed. Studies show that while hierarchical cultures (e.g., Bulgarian academia) require more structured support, those that foster autonomy and adaptability achieve better long-term outcomes (Mitevska, 2025; Adel, 2024).
H4: Transformational leadership practices—such as participatory vision-building and ethical transparency—correlate with reduced resistance to robotic innovation.
Confirmed. Empirical examples using Kotter's model and transformational leadership frameworks (Ahsan, 2025) show improved engagement and reduced resistance when leaders model learning and co-creation.
H5: Institutions that apply solidarity economy principles (e.g., participatory design, shared benefit, inclusive governance) show higher acceptance and long-term sustainability of educational robotics.

Confirmed. The co-design and pilot models used at SIRRL (University of Waterloo) reflect key elements of the solidarity economy, leading to meaningful integration, community support, and ethical awareness.

Final Reflection

The convergence of findings confirms that technological success in education is rooted in human-centered strategies. Leadership must not only promote innovation but also nurture trust, inclusion, and cultural alignment. Institutions that embrace this integrated approach—combining organizational psychology, transformational leadership, and the solidarity economy—will be best positioned to implement educational robotics sustainably and ethically.

This research supports a shift from viewing social robots as tools of automation to seeing them as partners in collaborative educational ecosystems, where people, values, and technology evolve together.

Reference

1. Adel, A. (2024). Ethics of Artificial Intelligence in Education: Principles for Responsible Innovation. Cairo: Knowledge House Press.
2. Ahsan, R. (2025). Transformational Leadership in Higher Education: A Psychological and Cultural

Approach. Amman: Al-Quds Academic Publishing.

3. Aliasghari, P., Ghafurian, M., Nehaniv, C., & Dautenhahn, K. (2024). How Non-Experts Teach a Robot via Kinesthetic Teaching Across Sessions: Variability in Teaching Styles and Performance Effects. International Journal of Social Robotics, 16(1), 55–74.
4. Alzubi, A., Hussein, A., & Abed, M. (2023). Faculty Perceptions of Social Robots: Control, Identity, and Acceptance in Higher Education. Journal of Educational Robotics, 14(2), 45–67.
5. Cabibihan, J. J., Javed, H., Ang, M., & Aljunied, S. M. (2013). Why Robots? A Survey on the Roles and Benefits of Social Robots in the Education of Children with Autism. International Journal of Social Robotics, 5(4), 593–618.
6. Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. Psychological Inquiry, 11(4), 227–268.
7. Mitevska, M. (2025). Organizational Psychology and Educational Innovation: A Bulgarian Perspective. Sofia: Akademika Press.
8. Sanoubari, E., Muñoz, J. E., Yamini, A., Randall, N., & Dautenhahn, K. (2023). What Makes an Educational Robotic Game Fun? A Framework-Based Analysis of Children's Design Ideas. Journal of Human-Robot Interaction, 12(3), 105–123.
9. SIRRL (2024). Furhat Robotics: Social and Intelligent Robotics Research Laboratory – Annual Report. University of Waterloo: SIRRL Publications.
10. Woolley, A. W., & Feller, J. (2022). Collaborative Intelligence: The Human–Machine Partnership That Can Transform Work and Learning. Beirut: Al-Maarifa Publications.
11. Rasouli, S., Ghafurian, M., Nilsen, E., & Dautenhahn, K. (2024). University Students' Perceptions of Smart Agents for Social Stress and Anxiety Management. Robotics and Autonomous Systems, 157, 104–119.