Organizational Psychology and the Introduction of Social Robots in Higher Education: Implications for the Social and Solidarity Economy in Bulgaria

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DOI: https://doi.org/10.56293/IJMSSSR.2025.5712

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

Abstract: This paper explores how principles of organizational psychology can support the integration of social robots into academic institutions, with a specific focus on the emerging framework of the Social and Solidarity Economy (SSE) in Bulgaria. By applying institutional, psychological, and cultural models, the study examines how attitudes, leadership styles, and organizational climates mediate the acceptance, resistance, and co-creation of value when robots are introduced into learning environments. Three key models are employed: the Institutional Technology Acceptance Model (TAM), the Resistance to Automation Model, and the Co-Creation of Value Framework. These are analyzed within the Bulgarian cultural and institutional context. The paper outlines the conditions under which social robots can serve as emotionally intelligent and pedagogically effective actors that align with SSE values such as participation, inclusion, and sustainability.

Keywords: Social robots, organizational psychology, higher education, technology acceptance, solidarity economy

Introduction

The integration of social robots into higher education is no longer a futuristic vision but a present challenge with organizational, psychological, and ethical dimensions. Within the framework of the Social and Solidarity Economy (SSE)—which prioritizes inclusive participation, trust-based governance, and social innovation—social robots must be introduced not merely as technical tools but as relational actors embedded within a value-driven institutional culture. This paper investigates the conditions for successful deployment of social robots in Bulgarian academic settings through the lens of organizational psychology, taking into account local cultural norms, academic identity, and institutional dynamics. It draws from interdisciplinary insights to propose a roadmap that ensures robots are not just accepted, but meaningfully integrated in ways that enhance engagement, reduce resistance, and support educational equity.

Research Objectives

- To explore the organizational-psychological factors that influence the acceptance and integration of social robots in Bulgarian higher education institutions.
- To examine how these factors align with the principles and goals of the Social and Solidarity Economy.
- To propose context-sensitive strategies for sustainable adoption and co-creation of value through robot-assisted education.

Research Tasks

1. Analyze theoretical models of technology acceptance and resistance within organizational settings.
2. Examine empirical cases of robot deployment in international academic contexts (e.g., Waterloo University, SIRRL Lab).
3. Identify cultural and institutional barriers to robot integration in Bulgarian universities.

4. Assess the relationship between perceived organizational culture and openness to innovation among Bulgarian faculty and students.
5. Develop strategic recommendations for policy, leadership, and co-design involving social robots.

Object of Study

The process of organizational adaptation and psychological acceptance related to the implementation of social robots in academic environments, viewed through the prism of SSE values.

Research Hypotheses

1. H1: Perceived organizational support and clarity of institutional goals positively influence the intention to adopt social robots.
2. H2: Resistance to robot implementation is more strongly driven by psychological identity threats than by technical concerns.
3. H3: Participation in co-design and implementation processes reduces emotional and cognitive resistance.
4. H4: Institutional cultures that promote inclusion, innovation, and adaptability are more likely to align with SSE values and adopt robot-assisted models.
5. H5: In the Bulgarian context, cultural dimensions such as power distance and uncertainty avoidance moderate the pace and success of robot integration.

Possible Methods

- Quantitative: Survey research using validated TAM scales, Hofstede's cultural dimensions, and organizational climate instruments.
- Qualitative: Semi-structured interviews with academic staff, students, and administrators involved in pilot projects.
- Comparative case studies: Analysis of successful implementations from institutions like University of Waterloo and Softbank Robotics partnerships.
- Organizational diagnostics: Use of models by Cameron & Quinn and Hofstede to map perceived cultural barriers and facilitators.

Expected Results

- Identification of key organizational and psychological conditions that support or hinder robot adoption.
- Empirical confirmation that co-creative and participatory processes reduce resistance and increase acceptance.
- Development of a framework that links organizational culture, robot integration, and the values of the Social and Solidarity Economy.
- Policy and design recommendations for Bulgarian universities to implement robots in an inclusive, ethical, and sustainable way.

The topic of introducing social robots into academic environments through the lens of organizational psychology is new, interdisciplinary, and rapidly evolving. In recent years, applied models have emerged that attempt to explain:

- what facilitates or hinders the integration of robots in academic institutions;
- how organizational culture, the attitudes of faculty and students, and leadership influence the acceptance and sustainable use of robots.
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1. Institutional Technology Acceptance Model (Institutional TAM)

(Venkatesh et al., 2003; Ifenthaler & Yau, 2020)
An extended version of the classic Technology Acceptance Model (TAM), applied to university settings. The model includes:

- Perceived usefulness – to what extent the robot enhances teaching/learning;
- Perceived ease of use – whether using the robot requires significant effort;
- Organizational support – leadership, resources, training;
- Social influence – how colleagues and students perceive the use of robots;
- Expected compatibility with the academic role – whether the robot fits into the institutional culture.

"Perceived organizational support significantly predicts the academic staff's intention to use educational robots." (Ifenthaler & Yau, 2020)

Application: Universities should provide clear policy, leadership support, and faculty training to encourage the adoption of robots in teaching.

2. Model of Resistance to Automation in Educational Institutions

(Cameron et al., 2021)

This model focuses on psychological and organizational barriers to robot implementation. Key elements include:

- Cognitive resistance – fear of losing control, feelings of being replaced;
- Emotional resistance – uncertainty, tech-related stress, professional anxiety;
- Identity threat – perception that the robot undermines the authority/role of the teacher;
- Lack of clarity on benefits – vague objectives, lack of evidence for effectiveness.

"Resistance often arises not from the technology itself, but from perceived threats to academic identity and pedagogical values."

(Cameron et al., 2021)

Application: Appropriate communication strategies and involving faculty in the design and role selection process can reduce resistance.

3. Value Co-Creation Model in Academic Settings

(Woolley & Feller, 2022)

This model views the introduction of robots as a cooperative change process, where participants (faculty, students, IT teams) jointly define and build the value of the new technology. Core principles:

- Co-design and partnership – involving faculty and students in pilot projects;
- Adaptive leadership – flexible governance open to change and experimentation;
- Communication transparency – sharing results, expectations, risks;
- Institutional learning – organizations evolve alongside technology.

"Adoption of social robots in education is a relational process, driven by shared goals and negotiated meanings within the institution."

(Woolley & Feller, 2022)

Application: A successful model is not imposed "top-down" but is built through joint adaptation—via feedback, local pilots, and ongoing dialogue.

Table 1. Summary: How Organizational Psychology Informs Practice

Model	Focus	Practical Conclusion
Institutional TAM	Technology acceptance	Ensure organizational support and training
Resistance to robotization	Emotional and cognitive barriers	Mitigate through communication and involvement
Value co-creation	Co-design and institutional adaptation	Sustain innovation through participation and transparency

Organizational psychology with an applied focus studies how individuals' function within institutions and how factors such as motivation, leadership, team dynamics, and organizational culture affect workplace effectiveness. In an academic context, this involves:

- How faculty, students, and administration perceive technological innovations;
- How they adapt to new roles and expectations in the presence of robots;
- How organizational structure and culture support or hinder innovation.

Social Robots in Academic Environments – Applications

Social robots have been used in universities for:

- Supporting teaching in language, computer science, and robotics courses;
- Facilitating role-play and simulations (e.g., in psychology, education, medicine);
- Motivating and engaging students through interactive learning.

At the University of Waterloo, the Furhat robot is used for language learning and bullying prevention via role-play scenarios

(Sanoubari et al., 2023).

Context and Goals:

At the University of Waterloo (Canada), the Social and Intelligent Robotics Research Laboratory (SIRRL), led by Prof. Kerstin Dautenhahn, conducts innovative projects using the Furhat social robot. A flagship project is REMind, aimed at supporting students' social and emotional development through robot-led role-playing.

Language Learning:

Furhat is used in online French lessons for students aged 10–14. The robot:

- Provides personalized instructions;
- Adapts communication based on the learner's pace and level;
- Encourages through positive reinforcement.

Psychological Effect:

Students who feel anxious speaking in front of others show higher engagement and reduced anxiety when working with Furhat. This supports organizational psychology theories about "soft" technologies mediating a sense of safety and control.

Bullying Prevention:

In the same project, Furhat takes part in simulated role-play scenarios where students practice:

- Recognizing verbal and non-verbal bullying;
- Coping strategies;
- Empathy for victims.

Furhat plays the role of victim, witness, or aggressor, creating a safe but impactful learning environment. (Sanoubari, E., Muñoz, J. E., Yamini, A., Randall, N., & Dautenhahn, K., 2023)

NAO and Pepper Robots

These robots are used in training programs for children with autism spectrum disorders (Cabibihan et al., 2013). Context:

NAO and Pepper (by Softbank Robotics) have been involved in numerous research and practical interventions for children with ASD. Their expressiveness, predictability, and personalization make them ideal for working with children with communication difficulties.

Educational Applications:

- NAO is used to train:
  - Eye contact;
  - Emotion recognition and expression;
  - Movement and gesture imitation;
  - Social scenarios (e.g., greeting, waiting, turn-taking).
- Pepper, with more advanced interaction, is used for:
  - Small group training;
  - Controlled play sessions;
  - Speech-recognition-based dialogues.

Psychological Relevance:

Children with ASD often struggle with human interaction but engage more easily with robots that offer structured, predictable, and "non-judgmental" interaction. Organizational psychology emphasizes the environment's role in mediating effective learning and personal development.

Both examples illustrate how social robots serve as facilitators of learning, emotional development, and socialization. From an organizational psychology perspective, their success depends not only on the technology but also on:

- A supportive culture;
- Staff training;
- Integration into the institution's strategic management.

Table 2. Strategic Recommendations for Introducing Social Robots in Higher Education

Focus Area	Challenge	Recommended Strategy	Expected Effect
Organizational acceptance	Lack of institutional support or vision	Develop a clear policy outlining goals, benefits, and impact metrics	Increased trust, structure, and sustainability of implementation
Faculty technological adaptation	Resistance, lack of confidence, anxiety	Conduct training seminars, mentoring programs, and share best practices	Improved competence, reduced technological anxiety
Psychological	Perceiving robots as	Promote robots as assistants,	Protect professional identity, reduce

Focus Area	Challenge	Recommended Strategy	Expected Effect
barriers (identity and control)	competitors or threats	not replacements; highlight hybrid roles	resistance
Co-design and inclusion	Top-down technology implementation	Involve faculty, students, and technical teams in design and testing	Increased ownership, contextual suitability
Cross-cultural/social sensitivity	Diverse academic community with mixed attitudes	Adapt robot behavior to cultural expectations; use universal norms	Better reception and acceptance among international/marginalized groups
Public and academic legitimacy	Skepticism or lack of understanding	Run communication campaigns highlighting outcomes and pilot successes	Greater public and institutional trust in the initiative

Key Success Principles:

- Institutional transparency: openness about goals, limitations, and opportunities;
- Continuous feedback: regular consultation with academic staff and students;
- Ethical sensitivity: consideration of autonomy, control, and digital ethics;
- Flexible change management: adaptive strategies based on outcomes and cultural context.

The table summarizes key organizational, psychological, and cultural factors and offers concrete actions based on the research discussed in the previous section.

Traditional and Contemporary Understandings of the Role of Technologies and Social Robots in Academic Environments: A Comparative Analysis

The evolution of educational technologies in recent decades has transformed the way technology is perceived in academic environments—both from an organizational and psychological perspective. Within this context, social robots represent a critical transitional element: they do not merely automate tasks but participate in social interaction, prompting a redefinition of traditional concepts of learning, teaching, and organizational culture.

Table 3. Comparative Analysis of Paradigms

Aspect	Traditional Understanding	Contemporary Understanding (Focus on Social Robots)
Function of Technology	Instrumental (supporting teaching)	Cognitive and social partner in learning
Role of the Educator	Central source of knowledge and control	Facilitator coordinating interaction between students and technologies
Perception of Innovation	Technology introduced "top-down"	Innovation is co-created with participants (co-design)
Organizational Approach	Rigid structure, vertical management	Adaptability, interdisciplinarity, inclusive leadership
Interaction Focus	Information and content delivery	Meaningful, emotional, and social engagement (Mutlu et al., 2009)
Technology Acceptance	Dependent on infrastructure and support	Influenced by cultural, personal, and psychological factors (Li, 2015; Schaefer et al., 2016)

Theoretical Interpretation Through the Lens of Organizational Psychology

Traditional models view technology as a resource to be managed, often embedded within frameworks of technical

rationalism, where innovations are implemented through administrative logic.
Contemporary approaches, by contrast, see technologies—especially social robots—as active agents in the organizational ecosystem. These robots communicate, express "intentions," adapt, and maintain long-term interactions. This shift demands an understanding of:

- Organizational culture and identity;
- Emotional readiness and resilience of academic staff;
- Individual and cultural differences in attitudes toward autonomous systems.

Hence, the success of an innovation depends not solely on its technical functionality but on how well it resonates with the institution's values and social dynamics (Woolley & Feller, 2022).

Shift Toward an Applied Focus: The Importance of Context

The comparative analysis reveals that introducing social robots is not a technical act, but an organizational-psychological process. This necessitates:

- Contextualized implementation strategies;
- Culturally and role-sensitive scenarios;
- Involvement of all stakeholders (faculty, administrators, and students).

Furthermore, drawing on the principles of the solidarity economy, this process should emphasize collective benefit, inclusivity, democratic participation, and ethical use of technology. A socially just academic environment values not only efficiency but also shared ownership, equity, and the well-being of all participants.

Thus, the next section will present practical scenarios for implementing social robots across diverse academic contexts, focusing on role definition, communication, cultural adaptation, and expected added value.

Empirical Evidence: Cultural and Demographic Correlates

A study by Mitevska et al. demonstrated significant correlations between demographic variables (age, gender, professional experience) and perceived organizational cultures, using the Cameron & Quinn framework and Hofstede's dimensions.

Key Findings:

1. Gender: Men showed a stronger preference for goal- and rule-oriented cultures, whereas women were less identified with innovation-driven culture. This may indicate the persistence of traditional roles, particularly in highly structured academic settings.
2. Age: The youngest (under 25) and oldest (45+) were more aligned with goal-oriented cultures, suggesting intergenerational value transmission. The middle age group (26–45) demonstrated stronger adherence to innovative and collectivist practices.
3. Experience: Longer tenure correlated with a preference for rule-based cultures, particularly under conditions of high uncertainty avoidance, a trait characteristic of the Bulgarian sociocultural context.
4. Hofstede's Cultural Dimensions:
    - A positive correlation was found between perceived environmental security and collectivism, and a negative correlation with individualism.
    - A strong association was observed between power distance and isolation/normativity in academic culture.

These results align with Li's (2015) cultural mediation model, which highlights that cultural preferences—such as collectivism vs. individualism—shape one's readiness to adopt new technologies like social robots.

Implications for the Solidarity Economy

In the Bulgarian context, dominant cultural models suggest a higher sensitivity to stability, rules, and social cohesion. This calls for a gradual, socially adaptive approach to technological innovation in education.

The solidarity economy perspective complements this by advocating for:

- Inclusive governance models in educational innovation;
- Participatory design that respects local cultural and social values;
- Equity in access to technological benefits;
- The use of technology (including social robots) not as ends in themselves, but as tools to enhance community well-being and academic cooperation.

Conclusion: Social Robots in Academia – Psychological, Organizational, and Solidarity-Oriented Insights
The introduction of social robots into higher education signals a paradigmatic shift in how we conceptualize teaching, learning, and academic culture. No longer seen solely as technological tools, social robots now occupy the role of cognitive, emotional, and social partners—reshaping educational dynamics at multiple levels.
From the perspective of organizational psychology, this transformation can only be successfully achieved when it takes into account:

- Institutional culture and identity;
- Psychological readiness and resistance among educators;
- Interpersonal dynamics and leadership;
- Broader sociocultural factors shaping attitudes toward technology.

In this context, the following research hypotheses can be articulated:

H1: Perceived organizational support significantly increases faculty's intention to adopt and use social robots in academic contexts.
(Based on Ifenthaler & Yau, 2020)
H2: Emotional and identity-based resistance to automation (e.g., fear of role displacement) is a stronger predictor of rejection of educational robots than concerns about their technical utility.
(Based on Cameron et al., 2021)
H3: Co-design and participatory implementation strategies lead to higher levels of acceptance, trust, and sustained use of social robots in educational institutions.
(Supported by Woolley & Feller, 2022)
H4: Cultural values—such as collectivism, uncertainty avoidance, and power distance—moderate the relationship between robot introduction and user acceptance.
(Following Li, 2015; Hofstede's cultural dimensions)
The Role of the Solidarity Economy
Incorporating the principles of the solidarity economy provides an ethical and community-driven lens for technological change in academia. This perspective argues that innovation must serve not only institutional goals but also the collective benefit of all participants—faculty, students, administration, and society.
From this standpoint, we can formulate additional hypotheses:
H5: Academic communities that adopt solidarity-based governance (e.g., participatory decision-making, shared ownership) will demonstrate higher perceived value and social legitimacy of robot-assisted education.
H6: When framed within solidarity economy values (equity, mutual support, democratic inclusion), the use of social robots enhances not only educational outcomes but also community cohesion and psychological safety.
In educational contexts characterized by hierarchical culture, low trust, or technocratic decision-making, resistance to social robots is more likely—not because of the technology itself, but due to a disconnect between innovation and lived values. The solidarity economy helps bridge this gap by emphasizing:

- Inclusivity over elitism;
- Empowerment over control;
- Human-centered design over efficiency at any cost.

Final Reflections

In summary, the future of social robots in academia depends not merely on engineering breakthroughs, but on how institutions understand, feel, and manage the integration process. This demands a multidisciplinary framework—combining organizational psychology, cultural analysis, and solidarity-based ethics.
To ensure that social robots are not just accepted but truly embraced, educational institutions must:

- Foster transparent, participatory cultures;
- Address emotional and identity-related barriers;
- Align innovation with shared values and the common good.

This is not just a matter of implementation—it is a matter of redefining academic progress in ways that honor both technological potential and human dignity.

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