Special Issue
Engineering the Future Sociologically: a Call to Delve into Environmental Education Enhanced by Technological Innovations

FUORI LUOGO

Journal of Sociology of Territory, Tourism, Technology

Guest Editors
Norberto Albano
Sandro Brignone
Carmine Urciuoli

Editor in Chief: Fabio Corbisiero
Managing Editor: Carmine Urciuoli

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Summary

9. Editorial
Smart technologies and social knowledge. Where are we now?
Fabio Corbisiero

11. Engineering the Future Sociologically: Environmental Education and Advanced Technologies in the Age of Planetary Crisis
Norberto Albano, Sandro Brignone, Carmine Urciuoli

23. Mapping Technology Usage in Environmental Education
Caterina Ambrosio, Dario Chianese

35. Learning Cities and Urban Ecosystems. Digital Technologies Fostering Informal Lifelong Environmental Education in Cities and Urban Participation
Marco Ingrassia

49. ChatGPT and the Social Appropriation of AI on Discord
Vincenzo Laezza, Arianna Petrosino, Vincenzo Luise

65. AI, Big Data, and IoT for Social and Environmental Sustainability in a Digital Transformation Course
Antonio Opromolla

81. Ecoliteracy and Artificial Intelligence: Two Opposites for a Common Goal in Education
Gianfranco Rubino

3T SECTION - 3T READINGS

101. Sissa, G. (2024), *Le emissioni segrete. L'impatto ambientale dell'universo digitale*, il Mulino
Mariella Berra reads

105. Castells, M. (2024). *Digital Society*, Edward Elgar.
Giorgio Osti reads

107. Badino, M., D'Asaro F. A., Pedrazzoli, F., (2024) *Educare all'IA. La sfida didattica dell'Intelligenza Artificiale: ChatGPT e Gemini*. Sanoma.
Emanuela Ricciardi reads

INTERVIEW

113. Beyond Dichotomies: Subjectivity, Ethics, and Ontology in David J. Gunkel's Philosophy of Artificial Intelligence
Norberto Albano, Sandro Brignone, Carmine Urciuoli

FUORI LUOGO SECTION

123. Chatbots for Customer Service: the Case Study of ANAS
Giuseppina Anatriello, Massimo Carlini, Fabio Corbisiero, Maurizio Lauro, Salvatore Monaco

137. Masculinities and Caring Professions. The Case Study of Students Enrolled in University Courses in Educational Disciplines
Marianna Coppola, Giuseppe Masullo

149. Festive Expressions in Contexts of Depopulation: Carnival in the "Sicani Area" in Sicily
Alejandro Gana-Núñez

165. Italo Calvino and the Invisible Cities: Between Literature and Urban Sociology
Marxiano Melotti

183. Pandemic, culture and well-being.
A community study on the impacts of Covid-19 with respect to individual psychological well-being
Giorgio Tavano Blessi, Enzo Grossi, Matteo Colleoni

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Redazione di Fuori Luogo
✉ redazione@fuoriluogo.info
tel. +39-081-2535883

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Fabio Corbisiero

Smart technologies and social knowledge. Where are we now?

The digital transformation of recent decades has opened up a new domain of opportunities and challenges in social systems. Technologies such as Artificial Intelligence (AI), Extended Reality (XR), and the Internet of Things (IoT) are reshaping pedagogical practices, enabling immersive simulations, real-time data analysis, and personalized educational paths (UNESCO, 2024). However, social analyses of technology remind us that every innovation is "socially constructed" (Bijker, Hughes, & Pinch, 1987) and inscribed in specific power relations. The adoption of digital tools in environmental education is not a neutral process but rather reflects—and at times exacerbates—pre-existing social inequalities (Hargittai, 2003).

The sociological debate on this topic highlights three analytical pillars: first, the risk of "AI cognitive extractivism" (Mezzadra, & Neilson, 2019), which links digital value chains to processes of exploitation of natural resources and human labor. Second, the possibility that technological efficiency may generate paradoxical outcomes, increasing overall resource consumption rather than reducing it. Third, the need to foster a form of critical "ecological literacy" (Orr, 1992) capable of integrating digital skills and awareness of planetary limits. While the existence of these concerns is partly due to the lack of relevant legal and ethical frameworks, it should be added that previous research studies have not addressed the issue comprehensively. Therefore, this special issue of Fuori Luogo focuses precisely on this topic.

Prioritizing the improvement of the quality of cultural and scientific reflections on the latest generation of digital devices can, in fact, enhance understanding of both the beneficial and problematic potential of AI and its corollary. To give another example: bias and discrimination based on gender, sexual orientation, religion, or geographical origin can be caused by unprofessional behavior during the AI training and feeding processes. Technically, inconsistencies in data labeling and unethical actions can occur when developers manually divide the possible values of a target variable into exclusive or biased categories. The algorithms used by artificial intelligence models can also be problematic, as it is difficult for developers and users to identify all errors and distortions in AI algorithms, which are usually found in the "black box."

According to the "technofeminist" approach (Borau, 2025), for example, artificial intelligence assistants, even virtual ones, can display sexual signals (bodies, faces, and voices) in addition to simple gender signals (e.g., names, pronouns, hairstyles), and this may adversely affect women by reshaping gender power dynamics, constraining self-representation, constraining their identity to misleading and limited patterns centered on body/face/voice, while facilitating covert manipulation, reinforcing harmful stereotypes, amplifying objectification, and exacerbating gender power imbalances.

The real issue is that developers often lack sufficient grounding in the social sciences and devote limited attention to issues of justice and equity. Another unresolved issue concerns the neglect of what sociologists conceptualize as 'dissimilarity'. In social sciences, dissimilarity refers to perceived or real differences between individuals or groups that influence social interactions, attitudes, and behaviors. It can be measured using indices, such as the dissimilarity index known to experts in social network analysis, to quantify the uneven distribution of groups across different geographical areas. It is a key concept for understanding social dynamics such as segregation, intergroup relations, team performance, and the formation of social networks. However, still on the subject of gender diversity, the predominance of male developers and male-oriented cognitive frameworks marginalizes female professionals. Once again.

The research and social analysis experiences documented in this special issue of Fuori Luogo show that the sociologically conscious use of technologies in training and education has the potential to foster inclusion, stimulate civic engagement, and support pro-social behavior (Kukutai, 2024). This requires the paradigm referred to in the introduction to this issue as an 'eco-human-

ist approach' (Rodotà, 2012), which balances innovation and social justice, ensuring that access to technology is not a privilege for the few, but a universal right.
In this sense, sociology can and must contribute to guiding educational policies and technological choices towards social harmonization with greater equity and protection for fragile communities. This expectation will only be effective if it can transform technology from a factor accelerating crises to a lever for their solutions, through an alliance between social sciences, educational communities, and responsible technical design.
It is therefore imperative for decision-makers to exercise caution in the selection of digital tools and AI models that could narrow their vision of learning, since general artificial intelligence does not exist. And since these models will be increasingly "aligned" with real-world experience, it is essential to adopt systemic approaches that account for human involvement, taking into account the strengths and weaknesses of the specific techno-educational system. A solution that does not mean knowing the answer to every question. Even under conditions of reflective equilibrium, we expect disagreements to persist about which actions are good or bad, both between different individuals and between different cultures. In such cases, we consider an AI to be 'aligned' if it recognises what it does not know and selects courses of action that remain robust under conditions of uncertainty.

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