

Guest editorial: Knowing and learning in the age of intelligent machines

Over the last few years, advances in artificial intelligence (AI) and machine learning have fostered the spread of machines capable of learning and acting autonomously in the workplace, giving rise to polarized debates both in popular discourse and academia. On the one hand, intelligent machines are often associated with dystopian scenarios characterized by widespread unemployment, human subjugation, deskilling and, more generally, a deterioration in the quality of working life. On the other hand, these technologies are surrounded by enthusiastic expectations that portray them as prodigious tools capable of relieving humans of the most demanding and repetitive tasks, enhancing their agency, and creating advanced working environments. The main danger of this polarization, as in other debates on organizational and technological innovation, lies in overlooking “the more intricate, and often ambiguous, dynamics that happen between total domination and total emancipation” (Meyer, 2019, p. 2)

The special issue “Knowing and Learning in the Age of Intelligent Machines: Navigating Innovation, Automation, and Human Agency in the Workplace” engages directly with the ongoing debate on organizational knowing and learning by examining whether, and in what ways, workers transform their practices in organizational contexts increasingly characterized by machines capable of developing, synthesizing, and acting upon knowledge about the world. In line with an emerging body of organizational scholarship (Faulconbridge *et al.*, 2024), the volume seeks to illuminate the organizational and professional transformations triggered by these technologies which, often opaque and inscrutable (Kellogg *et al.*, 2020), simultaneously inspire both hopes and concerns among organizational actors. To address these topics, the special issue brings together seven articles that guide readers through a variety of heterogeneous work settings, highlighting the multiple effects that intelligent machines exert on organizational processes. The empirical contexts considered are broad and diverse, ranging from Human Resource Management and industrial production to digital platforms and healthcare organizations. Likewise, the technologies examined encompass different forms of intelligent systems, including AI diagnostics, automatic speech recognition, homestay platforms, e-learning management systems, and robotics. Despite this diversity, all contributions share a common theoretical orientation grounded in a processual understanding of knowing and learning, conceived as distributed, ongoing, and continuously evolving practices (Chia, 2009; Gherardi, 2016). Consistently with this perspective, all the articles adopt qualitative methodologies, primarily ethnographic observations and interviews, to explore in depth how organizational processes are reshaped and reconfigured through technological innovation.

Before describing the specific contents of this special issue, it is crucial to briefly address a fundamental question underpinning all the selected contributions: what happens to organizations when they embed intelligent machines into their everyday work processes? To answer this seemingly simple, yet deeply challenging question, the articles explore the intermeshing of discursive and material elements within the daily practices that emerge around these innovative technologies. Grounded in empirical research, the contributions investigate both the discourses surrounding the future (see Olivieri *et al.* and Ecclesia) and present implications of intelligent systems and the concrete practices through which people interact with and use these technologies.



Particularly in the articles focusing on the current use of new technologies, the emerging picture is far removed from the disruptive imaginaries often promoted by both techno-enthusiastic and techno-pessimistic literature. Organizational and professional communities do not disappear in the face of technological innovation. Rather, they continue to exert significant influence over workers by monitoring, correcting, and guiding their activities, thereby transmitting knowledge about “how work should be done”. This occurs both in organizations that have emerged around intelligent technologies (see O’Dowd) and in those that predate technological innovation (see Schönian). Although intelligent technologies collect data on workers’ performance and generate recommendations based on such data, these mechanisms do not replace traditional forms of top-down control, nor do they diminish the role of peers in negotiating and defining appropriate ways of working in practice. Learning and knowing remain participatory processes in which workers acquire competences through interaction with others and, above all, through the reproduction of practices alongside more experienced actors. These traditional forms of control and surveillance are therefore added to the automated monitoring exercised by intelligent technologies, with foreseeable consequences for workers’ stress levels and emotional well-being.

The contributions also discourage absolutist or polarized interpretations regarding what people know and learn through their interactions with intelligent machines. Work processes do not appear to be characterized either by widespread deskilling and unemployment or by a straightforward enhancement of individual capabilities. Rather, what emerges is a reshaping of work practices and, consequently, of the forms of knowledge mobilized by workers. As highlighted by Callari and Lohse in the context of Industry 4.0, workers engaged in specialized tasks acquire new competences to manage technological change while simultaneously developing a broader understanding of the overall production process. At the same time, Stroud, as well as Vase and Pedersen, show how workers interacting with intelligent machines also develop so-called transversal skills, enabling them to facilitate and support the integration of these technologies into organizational processes.

Against this backdrop, in the following pages the single contributions included in this special issue will be introduced. Each article addresses a specific aspect of the relationship between intelligent technologies, work practices, and organizational processes, offering empirically grounded insights into how intelligent machines are integrated into everyday professional contexts. Taken together, these contributions highlight the complexity and heterogeneity of the transformations associated with the diffusion of intelligent systems, while also revealing the continuities that persist in organizational forms of coordination, learning, and control.

In their article, Olivieri and colleagues propose an innovative methodology, named “hypothetical enrollment”, aimed at exploring the organizational and epistemological consequences of adopting AI diagnostics into clinical settings. The proposal of the authors seems particularly suitable for understanding how the medical knowledge produced by new and automatized intelligent machines transform organizational practices and reshape professional identities involved in the management of a certain disease. The attempt of the author is to promote a comprehensive approach that takes in consideration both expectations about AI, that arise when an innovative object is introduced in an organizational setting, and the everyday practices that gradually emerge around it. The paper tests this methodology on the empirical case of a startup which applies machine learning models for the early detection of autism spectrum disorder. What emerges is that the proposed methodological approach helps to compare the expectations and the implementation strategies fostered by different professionals, paying a particular attention to the imagined challenges associated with the introduction of AI (e.g. disruption of previous clinical practices, additional bureaucratic work).

In Ecclesia's empirical work, the focus is on the imaginaries that emerge around the implementation of artificial intelligence in Human Resource Management. The study, based on interviews and observations conducted within companies using AI in recruitment processes, examines the discursive practices through which a future shaped by AI is imagined, interpreted, and negotiated. AI is not represented as an immediate threat to recruiters' autonomy or job security; rather, practitioners tend to describe it as a technology that, at present, falls short of its promises. Consequently, AI is primarily framed as useful for handling repetitive tasks, thereby enabling workers to focus on "meaningful activities" that are perceived as more closely aligned with their professional and personal self-actualization. Within this framing, learning and developing specialized professional expertise is not only seen as a rewarding process in itself, but also as a form of defence against the potential future advancement of intelligent machines.

The contribution of O'Dowd explores the learning processes that emerge around digital platforms, considering the case of a property management company operating on Airbnb. The study, based on solid ethnographic research, focuses on how the formal organization contribute at shaping the learning dynamics in which workers are daily involved. Organizational rules, as well as direct management control and formal training course, concur at ensuring that workers operate in a way consistent with organizational goals (e.g. obtaining high rates by customers and reaching the platform-derived "superhost status"). In this frame, also informal support among employees that take place in instant messaging platforms are supervised by manager, that monitor the discursive practices through which operators exchange the "tricks of the trade." In this way, workers are placed under the double surveillance of human management and algorithmic control practised by the platform, that evaluates the work of the staff distributing sanctions and rewards.

Schönian, drawing on a qualitative study carried out through interviews, investigates how in a corporate context workers use a e-learning management system, designed to support self-directed learning and knowledge integration across the organization. The considered technology has been designed to integrate AI-driven recommendation, learning modules and activity-tracking features. The creation of a digital environment, explicitly addressed to learning and subjected to managerial supervision, create multiple tensions. Workers become, at the same time, responsible for their own training and dependent by peer recommendations and managerial guidance, crucial for contextualizing algorithmic recommendations. Moreover, visibility into time spent on the platform introduces a degree of ambivalence: low engagement may be perceived as a lack of initiative, whereas high engagement can suggest time diverted from core tasks. Therefore, the platform reshapes how employees work and learn at the workplace, influencing how they perceive and manage their learning and job performance, as well as their relationships with colleagues and supervisors.

Callari and Lohse conducted an extensive qualitative study, based on interviews, for exploring the learning process that involve workers at the times of the so-called Industry 5.0. The aim of the authors is moving away from a technocentric perspective in which machines are the principal drivers of change, instead they show how workers, being involved in complex learning and knowing processes, have an active role in reshaping their tasks. The paper underlines the active role of the workers in front of the challenges connected with the technological innovation, with reference to robotics, that take place in small and medium enterprises. The results identify three connected ways in which the work in the manufacturing sector changes: reskilling happens at the level of individual tasks and refers to adjusting and learning new skills to handle specific changes in work activities; upskilling operates at the process level and involves actively engaging with and managing production systems in real time; craftsmanship works at the product and workflow level and refers to

hands-on, embodied knowledge, attention to detail, and a focus on quality and care in the overall production process.

Drawing on a broader project focused on integrating a semi-automated AI system into European metallurgy production, Stroud examines how digital technologies can optimize industrial processes in line with environmental, economic, and quality objectives. His analysis is grounded in a comparative case study involving four production plants located in different European nations, across two industrial companies. The author places particular emphasis on the implications of AI adoption for workforce development, with a specific focus on transversal skills rather than purely technical competencies. Combining desk-based research with on-site observations, interviews, and direct discussions with employees, he captures diverse workplace perspectives. From this evidence, the paper identifies a range of emerging training and skill needs associated with digital transformation, subdivided in system-specific operational skills, context-dependent transversal skills, and broader organizational capabilities required for large-scale digital integration.

Finally, Vase and Pedersen research examines how automated clinical documentation reshapes everyday work practices and learning processes within hospital environments. Focusing on automatic speech recognition, framed as a form of artificial intelligence, the authors investigate how clinicians actively adapt and make such systems workable in real clinical practice. Rather than treating the technology as fully stable or mature, the paper emphasizes its ongoing evolution through long-term use in an orthopedic department of a public hospital. The proposed study is based on ethnographic fieldwork conducted between 2020 and 2022, combining participant interviews with direct observations of automatic speech recognition in use. Through this approach, the paper shows how the introduction of automatic speech recognition redistributed coordination work, shifting responsibilities that were previously handled by administrative staff onto clinicians. The authors highlight the often invisible corrective labor performed by clinicians, including error checking, managing system breakdowns, and ensuring the accuracy of medical records. This continuous interpretive and maintenance work seems to be essential for keeping the system functional in practice.

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