Sorting Out Agencies in AI-supported Radiological Work Practices[1]

Astrid Galsgaard, MSc. Psych., PhD scholar
Radiological AI Test Center, Capital Region of Denmark. Department of Work and Organizational Psychology, University of Copenhagen, Denmark

Anders Buch, PhD
Docent at Centre for Profession Studies, VIA University College, Denmark

ABSTRACT

The article examines how narrow-task artificial intelligence (NT-AI) implementation reconfigures professional practice and agency in radiology departments. Drawing on practice theory and qualitative data from two Danish hospitals, we analyze how radiographers and radiologists interact with NT-AI systems in their daily work. The findings reveal that professional expertise is not simply diluted by AI but transformed through complex negotiation processes involving trust and responsibility. Professionals develop new interstitial expertise by learning when to trust, question, or override AI suggestions. Rather than creating a zero-sum game where AI gains agency at humans' expense, implementation produces new forms of relational expertise while preserving distinct forms of human and non-human agency. We propose that successful AI integration requires practice-centered design approaches that recognize how agency materializes through relationships between people and technologies, rather than viewing implementation as merely a technical challenge.

KEYWORDS

AI implementation / Agency / Expertise / Practice theory / Radiology / Relationality

Introduction

Radiology is a domain of expert practices, where precise imaging and interpretive skill are central to screening and diagnosis. Radiographers produce high-quality scans, and radiologists interpret them to make clinical decisions (Dolan & Tillack 2010). The advent of narrow-task artificial intelligence (NT-AI)—algorithms designed for specific tasks in medical imaging—introduces a new sociomaterial dimension to radiological work by performing tasks traditionally reserved for human experts (Eyal 2019). NT-AI systems in radiology can analyze images and suggest findings with speed and consistency, potentially shifting aspects of decision-making from humans to algorithms.

Recent research emphasizes that successful human-AI relations hinge on factors like trust, transparency, and mutual acceptance among stakeholders (Bergquist et al. 2023; Ulfert et al. 2023; Wesche et al. 2024). Drawing from a comprehensive qualitative investigation into how radiologists in Sweden integrated AI into diagnostic decision-making, Magnus Bergquist and Bertil Rolandsson (2022) concluded that AI-driven decision-making necessitates creativity and development of innovative approaches to the profession. However, this creativity operates within the framework of institutional logics

[1] You can find this text and its DOI at https://tidsskrift.dk/njwls/index.
Astrid Galsgaard, LinkedIn: 'Astrid Galsgaard'

and is shaped by 'contingencies and strains' (p. 141) tied to the radiological professional identity, such as issues of accountability. Science and technology studies likewise underscore that technologies like AI can profoundly shape work practices and professional identities by reconfiguring tasks and roles in context (Armour & Sako 2020; Barley & Beane 2020; Leonardi & Barley 2008). In the realm of professional identity and organizational change, a sociomaterial perspective has been advocated: Charlotta Kronblad and Søren H. Jensen (2023) argue that digital transformation in organizations must be understood by examining the intertwined evolution of material tools and professional practices (Kronblad & Jensen 2023). Similarly, Masashi Goto (2021) observes that implementing AI in professional domains often entails constructing new collective roles and relationships, as professionals reinterpret their expertise and adjust to hybrid human-AI logics (Goto 2021). In short, beyond the question of technical performance, the integration of AI into expert work raises fundamental sociomaterial questions about how professional work is *practiced*, how responsibilities are shared, and how professionalism is enacted.

Understanding how radiologists *practice* their professional agency and how the use of NT-AI reconfigure professional practices requires zooming in on these interdependent processes (Goto 2021; Smets et al. 2017). In radiosurgery, NT-AI might thus both enable and diminish professional agency, affecting boundaries of authority and expertise (Dahlin 2024). This dual nature of AI challenges traditional conceptions of expertise and necessitates a re-evaluation of its integration into professional work (Lombi & Rossero 2024). It raises concerns that the growing *agentic* role of technology could diminish the agency of human professionals in the workplace (Schatzki 2025). While professionalism is characterized by expertise, authority, and having autonomy of judgment (Abbott 1991), professionals may also experience that these qualities can be challenged and disrupted by AI's capacity to standardize, quantify, and redistribute cognitive tasks previously rooted within professional discretion and experience (Hoeyer & Wadmann 2020; Redaelli 2023). The implementation of AI technologies thus raises questions of replacement or augmentation (Susskind & Susskind 2015), imperative for social scientists' study of working life.

This article addresses these issues by adopting a practice theoretical lens (Rouse 2023; Schatzki 2002) to examine agency in the integration of NT-AI in radiology. We provide an empirical account of how radiographers and radiologists in two Danish hospital settings interact with NT-AI systems in their daily work, and we consider how their agency is being reconfigured in the process. By examining *how* professionals incorporate, negotiate, or resist the AI in situ, we offer new insights into the evolving relationship between human expertise and algorithmic assistance. In doing so, we aim to advance previous relational and sociomaterial accounts (e.g., Dahlin 2024) by exemplifying how distinct, coexisting forms of agency from different entities (human and non-human) constitute and reconfigure sociomaterial nexuses, while still preserving their distinctiveness.

While we adopt a sociomaterial perspective that recognizes the entanglement of human and non-human actors in practice, we argue that such entanglement does not imply indistinguishability. Rather, this article seeks to analytically disentangle the specific forms and effects of agency exercised by humans and technologies within professional practices. We contend that it is both possible and necessary to identify how human actors, drawing on professional judgment, tacit knowledge, and institutionalized responsibilities, interact with technological systems that operate according to algorithmic logics, training data, and encoded parameters. By systematically tracing how actions

unfold and decisions are made in concrete work situations, we demonstrate that human and non-human agencies, while relationally co-constituted, remain ontologically and operationally distinct. This analytic distinction enables a more precise understanding of how professional agency is not simply diffused into a sociotechnical assemblage but is actively negotiated in relation to the capabilities, constraints, and interpretive gaps of AI systems. Through this approach, we aim to sharpen the conceptual tools available for examining expertise and accountability in digitally mediated professional settings.

To guide our inquiry, we pose the following main research question:

> *How is radiological professional expertise and agency practiced and reconfigured through the integration of narrow-task AI in everyday work practices?*

We investigate this through three sub-questions:

1. *How do radiology professionals enact and negotiate expertise in practices involving NT-AI?*
2. *How are material arrangements (in case NT-AI systems) and human actors interrelated in shaping what is done and said in radiological practice?*
3. *How is professional agency—understood as the capacity to effect action within a practice—preserved, contested, or transformed through these sociomaterial interactions?*

Theoretical background

The notion of *expertise* has been thoroughly discussed in the literature and many conceptions prevail (Heimstädt 2024). Traditionally, expertise is considered as an individual cognitive capacity and property developed through the individual's extensive education and practice-based experience (Mylopoulos & Regehr 2007). Likewise, with *agency*, that is defined within the cognitive-neuro science as a *sense of agency* encompassing the sense of control, autonomy, overview (Le Besnerais et al. 2024). This approach focuses on measuring the subjective experience of the sense of agency often within experimental settings through quantitative biometrical measurements and self-reporting scales (e.g., Caspar et al. 2016; Grynszpan et al. 2019). In this view, professionals' expertise resides in their individual minds, in the form of specialized knowledge and pattern-recognition skills (Dreyfus & Dreyfus 1986). However, recent perspectives challenge this individualistic view, suggesting that expertise is better understood as a relational and practiced phenomenon (Eyal 2019). In relational sociology and relational understandings of expertise, what counts as expertise emerges from networks of contributors and the interactions between them (Dépelteau 2018). Gil Eyal (2019) argues that we should shift focus from the lone expert to the system of professionalism: the ensemble of people, tools, and organizational structures that collectively produce knowledgeable action. Within sociocultural psychology, the exercise of *relational expertise* is 'a capacity to work relationally with others on complex problems' (Hopwood et al. 2016). In a hospital setting, this means recognizing that not only doctors and radiographers, but also patients, protocols, software systems, and even the AI algorithms contribute to diagnostic work. Expertise, from this angle, is not a static possession of an individual but

a property of sociomaterial practices—an outcome of humans and non-humans (things) doing something together in context.

This practice-centered view aligns with Theodore Schatzki's (2002) and Joseph Rouse's (2023) practice theories, which posits that social phenomena (like professionalism or expertise) are manifest in organized activities or practice (Rouse 2007, 2023; Schatzki 2002, 2025). Social practices manifest through the concrete doings and sayings of actors. Social practices, Schatzki argues, are 'temporally evolving, open-ended set[s] of doings and sayings linked by practical understandings, rules, teleoaffactive structure[s], and general understandings' (Schatzki 2002, p. 87). In radiology, for example, the practice of carefully reading an image, consulting colleagues for a second opinion, and communicating results to patients enacts what it means to be a *professional* (at least presently). The actors use their practical understandings to determine what are appropriate and skillful (professional) ways to proceed in going about their activities; they attend to the formal rules, procedures, and regulations in the domain; they are affectively attuned to objectives that structure professional conduct; and they have a general sense of worth and purpose in enacting their professionalism. Such practices are situated in time and space, evolving with new circumstances. When an NT-AI system enters the scene, it becomes part of a practice arrangement, that is, an ordering of activities (Schatzki 2002, p. 19), potentially reconfiguring how tasks are carried out and by whom. Schatzki's recent work on agency (2025) further clarifies that agency should be seen as the capacity to *effect* something within the flow of activity (Schatzki 2025). Concurring with relational psychological perspectives on expertise (e.g., Hopwood et al. 2016)—rather than treating agency as a mystical trait or solely a human possession—Schatzki asserts that agency is a kind of *causality* that can be exercised by various entities (people, organisms, things, or technologies) as they interact (Schatzki 2025, 4ff.). Importantly, however, different kinds of entities have different forms of agency, and when we talk about *distributed agency,* we refer to how the agentic contributions of multiple entities combine in action. For example, a radiologist's agency might lie in her interpretive judgment and decision-making, whereas an AI's agency lies in its algorithmic processing and output generation. These are not the same, but in practice, they can become interdependent. Schatzki's practice theory thus urges us not to accept a 'blackmail' of posthumanism, 'that one is either a head-in-the-sand humanist or an up-to-date posthumanist' (Schatzki 2002, p. 194), but instead examine how human and non-human agencies intertwine in accomplishing a task—recognizing their differences. By looking at professional agency as something that emerges through the enactment of practices, we focus on how radiologists and radiographers make things happen in their work *with* the AI, rather than treating agency as a fixed attribute they either retain or lose.

Adopting this stance means that professional agency is not measured simply by who makes the final decision, but by the ensemble of actions and influences through which outcomes are realized. Mustafa Emirbayer's relational sociology (1997) and subsequent work by Emirbayer and Mische (1998) reinforce this idea by portraying agency as a *temporally* embedded process of social engagement (Emirbayer 1997; Emirbayer & Mische 1998). Human agency involves the interplay of past experience, future orientation, and present engagement with others. Crucially, it is relational: individuals achieve agency by interacting and aligning with those around them (including non-human others) to interpret the world and act upon it (Emirbayer & Mische

1998). The challenge that NT-AI poses to radiologists' agency can be seen as a challenge of *relating*: how to meaningfully relate one's own expertise to the algorithm's suggestions and role in the workflow. If agency and expertise are understood as relational achievements, then introducing AI means these achievements are now distributed across a human-AI network. Recent work (Dahlin 2024; Pakarinen & Huising 2023) echoes this view, suggesting that expertise in such contexts emerges from the dynamic interplay of various human and non-human elements, rather than residing in any single actor.

To better understand the dynamics of social practices, we include Joseph Rouse's (2007) elucidation of *normativity* in social practices. Joseph Rouse (Rouse 2007, 2023) argues that normativity is an essential and irreducible feature of social practices, not because practices are governed by fixed rules or display regular patterns, but because they are constituted through mutual accountability among participants. On Rouse's view, a practice is not defined by external norms or internal mental states but by the way actions within it are held accountable to what is 'at issue and at stake' (Rouse 2007, p. 5). This accountability unfolds within ongoing interactions among actors and is directed toward a shared, though often contested, future. Within this framework, *care* becomes a central notion—not as an affective sentiment, but as a form of responsiveness and attentiveness to others and to the evolving stakes of the practice. To care in this sense is to take responsibility for how one's actions matter in relation to others and to the practice itself. It is through such caring responsiveness that normativity is enacted and sustained in lived, embodied, and situated ways.

In sum, a relational, sociomaterial perspective on expertise and agency directs our analytical attention to situated activities: *Who is doing what together with whom or what, and with what effects?* We expect to see professional expertise being enacted through new constellations of actions involving both professionals and AI tools. Likewise, we expect professional agency to be something continuously accomplished (or sometimes undermined) by how people engage with these tools in practice. Crucially, while we acknowledge the entanglement of human and technology, we also heed Schatzki's (2025) point that we must recognize the distinct agencies involved. A strong interpretation of sociomaterial (cf. Jones 2014) as advocated by, for example, Karen Barad (2007) and Bruno Latour (2005), argues that it is impossible to disentangle human from machine agency in use (they become a *hybrid* actor). Schatzki (2025), however, offers a weak interpretation of sociomateriality: even when humans and AI act together, the form of agency each brings is not identical and typically remains distinguishable in the overall nexus (Schatzki 2025). In other words, rather than collapsing the radiologist and the AI into a single abstract *actor*, we consider how the radiologist's judgment and the AI's computations *aggregate* to produce outcomes. This perspective maintains the integrity of the concept of agency—preserving our understanding that, for instance, an algorithm does not (yet) care or hold responsibility in the way a human does, even if its output is pivotal in the decision. It also means that when things get accomplished (or go awry) in practice, we can analyze the contributions and interactions of both types of agents. For example, a missed diagnosis in an AI-assisted case might be due to a flaw in the algorithm *or* an oversight by the human, or a breakdown in their interaction (such as misinterpretation of the AI's suggestion). By sorting out these threads of agencies, we gain insight into how to better align the sociomaterial configuration for reliable and responsible outcomes.

Methods

We adopted a pragmatist abductive approach (Timmermans & Tavory 2022) for our study of NT-AI in radiologists' work. Abductive analysis is a research method that combines empirical observations with theoretical reflection to generate nuanced insights. Abductive methods suggest an iterative exploration involving both deductive and inductive reasoning. The abductive study commenced with a thematic literature review (Galsgaard et al. 2022). The review was guided by an interest in exploring the consequences for radiological professionals' agency in the interaction with AI, together with clearance of how the AI implementation might challenge the professionals' enactment of expertise. The literature review provided background knowledge that informed the development of our initial hypotheses regarding professional agency and enactment of expertise. We tested the hypotheses using empirical material gathered through shadowing observations and semi-structured interviews. Based on the hypotheses, a deductive analysis of the transcribed dataset was conducted. We considered how the hypotheses were useful in making sense of the dataset, and whether they should be modified or nuanced to accommodate our empirical observations. The inductive phase enabled the identification of alternative themes in the dataset, refining and reframing the theoretical assumptions underlying the initial hypotheses. We reviewed literature thematically (Galsgaard et al. 2022) through the search bases PsychInfo, PubMed, EMBASE, and Google Scholar with search words: *AI or Technology and Radiology or Medicine and Resistance or Scepticism*, and *Sense of Agency or Agency or Autonomy and Technology or AI or Human Computer Interaction*. From the thematic literature review, we realized that NT-AI might be perceived by professionals in AI implementation processes as possessing expertise akin to professionals, potentially augmenting, or even substituting their roles.

The sites and the respondents

The empirical part of our study is conducted as a *critical case* study (Flyvbjerg 2006). Two radiological departments at two different hospitals in Denmark were the sites to generate empirical data for testing our hypotheses. These sites, given the names: *Hospital 1* and *Hospital 2*, were the *most likely* cases (Flyvbjerg 2006, 230f.) to obtain insights about professionals' constitution of agency during NT-AI implementation—due to the typicality of these sites' mundane radiological practices of work [screening and grading X-rays and magnetic resonance imaging (MRIs) in both low severe cases and high], and their strategic importance representing unique advanced stages of NT-AI implementation. As with critical cases, these two sites gave us a unique possibility to produce analytical insights valid for other similar (future) cases (Flyvbjerg 2006). At the time of the study (2022-2023), only two NT-AI algorithms were fully implemented in radiological diagnostics in Denmark. The inclusion criteria were that respondents had to be radiographers or radiologists actively implementing these NT-AIs in their work practices. The respondents (n = 14) were all site-specific decision-makers within different domains of radiology. They varied by professional position at the departments (head of department, NT-AI process manager, and NT-AI professional), types of education (radiographers and radiologists), seniority (8-32 years), age (33-68), gender (eight women and six men), and

AI proficiency (ranging from *none* to *advanced*). Awareness of these differences allowed us to consider how their *positionality* (Timmermans & Tavory 2022) influenced interpretations of relation with NT-AI.

The cases and the AIs

At Hospital 1, AI was implemented in the procedure of knee osteoarthritis grading. Here, we observed five X-ray-specialized radiographers (two females) over six months, as they conducted X-ray examinations for knee osteoarthritis in ambulatory patients. The radiographers transmitted the images to an NT-AI (CE marked and FDA cleared), which performed immediate diagnostic analysis. Within 25 seconds, the NT-AI provided its analysis, marked the electronic image with arrows, and offered diagnostic interpretations of severity grade and in structured text. If knee osteoarthritis was not found, the patient was booked for a MRI examination within 2 hours. This procedure replaced a previous method where patients often faced prolonged waits for image readings, potentially causing distress and delays in further assessment like MRI. Management positioned the NT-AI as a *decision-support tool* to streamline patient assessment, aiming to reduce patient distress and alleviate professional workloads.

At Hospital 2, AI was implemented in the breast cancer screening procedure. Here, we followed five breast cancer radiologists (three females) screening women aged 50-69 years for breast cancer. Normally, two radiologists read (interpret) the images to detect potential malignant tissue—in a double-blinded procedure. For both low and middle- to high-risk cases NT-AI marked the screen with descriptors like 'condensation and 'calcium' and provided risk scores for potential malignant tissue. In non-critical cases with a low risk of malignancy, the implementation of NT-AI (CE marked and FDA cleared) replaced one radiologist as the first reader in the assessment. In case of disagreement between the radiologist and NT-AI in these low-risk cases, a second radiologist was consulted to reach consensus among at least two readers (the radiologists and NT-AI). In contrast to the non-critical cases, the critical cases involving medium to high malignancy risks were still handled by radiologists as the first reader. The NT-AI's role was in such middle- to high-risk cases was optional and functioning as a supplementary decision-support tool. For these critical cases, a third radiologist was called in as a tie-breaker. Management aimed to optimize screening efficiency by reducing the need for one radiologist per screening, thereby speeding up the overall process while conserving human resources.

Data generation

During 12 months, we generated data through the ethnographic methods of *shadowing observation* (Kristensen 2016) and *semi-structured interviews* (Kvale & Brinkmann 2015) through an iterative process of observations, initial data analysis, semi-structured interviews, and final data analysis. We initiated our empirical data generation by shadowing the professionals. Each participatory shadowing observation (n = 20) ran through two to three hours. This method allowed us to closely observe professional practices and question professionals in real-time, facilitating immediate

clarification and enhancing our understanding. By using the abductive tool of *defocusing*, we were already at this stage of our investigation able to 'interrupt our pre-existing categories and expectations' (Timmermans & Tavory 2022, p. 57) to test our initial hypotheses. Field notes were both descriptive and analytical, identifying challenges and dilemmas in the AI relation. We conducted one to three audio-recorded semi-structured interviews with all 14 respondents (n = 24) of approximately 60 minutes each, looking for surprising aspects that we did not include in our literature-based hypotheses-development. Prior to interviews, we tested questions on a pilot group representative to our respondent-group to improve the clarity and relevance of the questions. This iterative process, informed by literature, pilot testing, and observational insights, ensured that our interview guide was robust and responsive. Besides our systematic data generation, we participated in department meetings, multi-disciplinary team conferences, and informal conversations with the strategic management of the respective AI implementations.

All respondents were handed information on the study's purpose and procedure, and all signed a declaration of consent to use data for scientific purposes in an anonymized form. The respondents were informed about the possibility to withdraw their consent.

We carefully listened through the recordings to identify additional initial themes to those we had already noted prior to previous interviews and observations. All interviews were transcribed verbatim.

Data analysis

We familiarized ourselves with the data through *focused coding* (Timmermans & Tavory 2022, p. 91) to identify themes supporting or challenging our initial hypotheses about radiological expertise with NT-AI. Next, we revisited the data to identify unexpected insights, using *open coding* (Timmermans & Tavory 2022., 95ff.) to uncover gaps between our literature review-based hypotheses and empirical findings. We formulated all codes as explorative WH-questions (ibid., 133ff.): *In which situations do the professionals experience NT-AI as interfering with their expertise in practice? How is the interaction with NT-AI (the sociomaterial interaction) shaping how radiological practices are enacted? With which strategies do the professionals respond to these changes?*

In the following sections, we present our analyzed findings.

Enactment and negotiation of expertise in practices: Findings

Using the ethnographic tool of *thick description* (Geertz 2021), we offer an in-depth account of our data analysis, resulting in two poignant cases that illustrate how the radiological interactions with NT-AI were enacted in practice at the two sites. Through these thick descriptions, we aim to uncover the complexity in themes crucial in the organizations' implementation of NT-AI technologies in professionals' enactment of radiological work practices. The respondents have been anonymized regarding gender and age by names from the Greek alphabet since this information are not pivotal in our analysis of data.

Case 1: AI implementation at knee osteoarthritis grading—Trusting AI?

On the second floor of a large hospital in Denmark's capital region, the X-ray department is bustling. Radiographer Alfa with eight years of experience is about to start the first day in the AI implementation process. Excited, Alfa prepares to work with the NT-AI which Alfa has learned about through months of introductory sessions. Alfa is hopeful that the NT-AI will streamline the resource-intensive MR visitation process, which usually begins with an X-ray image.

Alongside Alfa is radiographer Beta with 15 years of experience and among the managers of the AI process. Beta played a key role in selecting the NT-AI, and with Beta seniority in the field, Beta was a crucial advisor during these early implementation days. Beta job is to supervise Alfa, ensuring the protocol is followed. However, an unexpected twist arises when Beta, observing from the adjacent radiographer room, steps in.

As Alfa prepares to inform the patient of their diagnosis, Beta, having reviewed the images self, disagrees with the NT-AI conclusion. This deviation from protocol unsettles Alfa, who was trained to rely on the NT-AI's readings. Beta, feeling a professional and ethical obligation, instructs Alfa to delay speaking to the patient while Beta seeks a second opinion from a senior radiologist in musculoskeletal imaging. The radiologist confirms Beta's assessment, suggesting no osteoarthritis is present. Beta faces a dilemma: trust own professional judgment or follow the AI procedure protocol? Opting for the former, Beta decides to send the patient for further MRI, bypassing the NT-AI's diagnosis. This incident leaves Beta questioning the reliability of the NT-AI and prompts an urgent meeting with the AI process manager team and the head of radiology department to reassess the implementation process.

Radiographer Alfa, meanwhile, feels confused and uncertain. Alfa had been led to believe that the NT-AI could read images at the level of a senior radiologist. The protocol Alfa was trained to follow now seems flawed. Alfa wonders if own role is changing—is management expecting Alfa to double-check NT-AI readings? This isn't part of Alfa expertise; Alfa's job is to ensure high-quality images, not diagnose diseases. Additionally, Alfa and the colleagues are now tasked with communicating NT-AI diagnoses to patients, a new responsibility that feels daunting. Alfa isn't sure how to explain the source of a diagnosis: should Alfa claim the results come from 'we' the radiographers, from 'the radiologists', or explicitly mention the NT-AI? This uncertainty adds to Alfa growing discomfort. The situation prompts significant questions: how reliable is the NT-AI, and what protocols should be in place when its assessments conflict with human expertise? As the AI process team deliberates on the next steps, Alfa waits for further instructions, sensing a shift in own professional responsibilities.

In the following days, Beta meets with the AI process team: radiologist, radiographer Delta, and the head of X-ray department Epsilon, to discuss the NT-AI's unexpected failure and plan their next steps. Radiographer Beta contacts the software developer, who explains the error as likely technical. However, the team remains unconvinced, repeatedly questioning whether they can trust the NT-AI to avoid future critical errors. This incident shakes their confidence in both the NT-AI and their decision-making regarding its implementation.

During their meeting, the team considers additional annotation of the NT-AI but soon realizes this is futile; they have already extensively annotated it. Radiographer Delta

suggests adding an extra decision-making layer involving a radiographer or radiologist to validate the NT-AI's readings. Initially, this idea seems to address their concerns, but Beta points out it undermines the NT-AI's purpose of saving human resources and providing gold-standard readings. Radiologist Gamma then proposes training radiographers to verify the NT-AI's assessments. Gamma quickly retracts, questioning the logic of asking radiographers to trust a system they must constantly double-check. This leads Beta to pose a crucial question: 'Do we no longer trust this NT-AI?' The room falls silent. Gamma emphasizes the core issue: 'If we doubt it, how can we convince radiographers to trust and integrate it into their daily practice?' The team faces a critical dilemma: balancing the potential benefits of NT-AI while ensuring reliable and safe patient care. Their next steps will determine the future of AI integration in their department. The AI process team wrestles with the responsibility of checking the NT-AI's accuracy. They debate where their role ends and the radiographers begin, ultimately deciding to limit radiographer's involvement in decision-making. They agree to keep the error low-profile and inform the team that they are working on a solution, sticking to the original plan. Reflecting on the responsibility for potential NT-AI errors, Gamma half-jokingly suggests it should fall on department management. Head of X-ray department, Epsilon, asserts that radiologist reviews of the current images within 2-3 weeks will provide the necessary validation, maintaining the original AI process procedure.

Subsequently interviewed over three sessions, Beta reveals regret over own handling of the NT-AI failure. Initially, Beta felt stopping the procedure was *the* ethical choice. Now, Beta sees it as a mistake, risking the AI process' vision of transforming diagnostic imaging and saving resources. Beta identifies a contrast between the healthcare system's aim to improve workflow saving money, and the professionals' goal to save lives. Beta believes health professionals should prioritize resource efficiency, fearing over-diagnosing more than missing a diagnosis. Reflecting on the incident, Beta wishes that Beta had stayed calm and said, 'Let's see how it performs next time', adhering to own broader vision of resource-oriented healthcare.

Interviewing and shadowing radiographer Alfa several times post-NT-AI implementation, we learn Alfa now 'takes an extra look at the X-rays' to ensure 'nothing obviously is wrong'. Alfa also carefully reads the NT-AI's free text justifications, comparing them with own observations. Though this extra step isn't part of Alfa official duties, Alfa finds it engaging: 'Yes, it is an extra task, but I find it interesting to be smarter on that matter – to actually be able to see if something is wrong in the knee'. Alfa, like the colleagues, views the NT-AI as *the* expert. If Alfa agrees with the NT-AI's assessment, Alfa follows the protocol. If Alfa strongly disagrees, Alfa consults a senior radiographer or radiologist to avoid forwarding NT-AI errors and misdirecting patients. This process has increased the time, Alfa and the colleagues spend on each task, involving more checking and consultation. When we discuss this with process manager Beta, Beta acknowledges that while radiographers 'definitely make the decision (on what to do), they do not make the assessment (of the images)' referring to the protocol. This suggests radiographers are administrators of the NT-AI, executing its prescribed steps and communicating with patients.

Radiographer Alfa expresses concern about handling insights beyond own mandate, time, or expertise. This concern is echoed by radiographer Zeta with over 20 years of experience. Zeta notes the process team's unclear instructions on responding to NT-AI's sometimes vague marks on X-rays. Zeta finds the new decision-making layer introduced

by NT-AI to be insecure. Process manager Beta relates to the radiographers' concerns. Beta has encountered NT-AI marking symptoms on X-rays unrelated to arthritis, admitting, 'I honestly don't know what to do with this information'. Beta explains that professional roles and responsibilities in the health system are rigidly defined for security and accountability, whereas AI tends to blur these lines by 'spitting dumb and clumsy information in all directions'. Currently, Beta reports such instances of misplaced or excessive information from NT-AI to the process team and the managers. Beta places the responsibility on managers to decide the appropriate actions, stating, 'The managers must decide if and how we must act upon this'.

Case 2: AI implementation in breast cancer screening—AI and responsibility

A dark room heated by computers, all connected to buzzing external hard disks, is the workplace of the breast cancer radiologists at this large hospital just north of Copenhagen in Denmark. Radiologist Eta with 8 years of screening experience had only limited experience with AI before the current NT-AI implementation process. Today, approximately half a year into the implementation of the NT-AI in the breast cancer screening, Eta refers to the NT-AI as a kind of colleague: 'Receiving the score from the AI gives me a sense of being three, and not just two, reading the images'. Radiologist Kappa, who has more than 30 years of screening experience, adds: 'Sure it's a collaboration. None of us (referring to the radiologist and NT-AI) can come up with a perfect result on our own'. Despite this management-authorized procedure, the radiologists have noticed a change in how they read the images and how they reach a conclusive decision. Radiologist Theta with 9 years of screening experience, experiences being more likely to recall a patient for further assessment if the NT-AI's risk score is in the *middle range*, even if Theta cannot detect any red flags (markings on the images supported by a middle- or high-risk score) that would justify a recall. Theta has become more sensitive in own reading, leading to more recalls and more time spent on each screening. Conversely, Theta finds it easy to overrule the NT-AIs low-risk interpretation and conclude a middle- or high-risk for malignant tissue, leading to a recall decision. Theta reflects on this difference and concludes that the new screening procedure is no longer 'blind' in the sense that Theta, as a second reader, does not have access to the first reader's interpretation. Now, with NT-AI, Theta cannot avoid noticing which name is listed on the computer screen as being the first reader: If it is one of the radiologist colleagues, Theta automatically knows it is a middle- or high-risk case and that Theta should read the images more carefully to detect what's wrong. However, if it says 'NT-AI' on the screen, Theta knows it is a low-risk case. But what is the problem here? Isn't that just a part of the procedure? We ask during the observation. 'Yes', Theta replies, 'but I am not supposed to have this information at this early stage of my reading. The first reader's interpretation must be "blind"; otherwise, we could just all sit together discussing it back and forth, influencing each other's interpretation'. Theta explains, 'the point is that two experts interpret the images *independently*, and if they agree, we have a reliable conclusion'. Theta has noticed reading the 'NT-AI cases' differently: 'I'm zooming in on NT-AI's markings, checking for errors there, instead of reading the images objectively'. Peer radiologist Eta, who views the NT-AI as an extra colleague, agrees on this issue:

the NT-AI influences their otherwise intended independent 'blind' reading simply by its presence in the procedure.

As long as Eta is *the* responsible for the image interpretation, Eta reads each examination in detail. Acknowledging that the NT-AI now is a part of the reading procedure, Eta cannot rely solely on its interpretation when it comes to the responsibility for the decision made. That responsibility is Eta's. This distribution of responsibility aligns with management's guidelines, though the radiologists now working with the NT-AI are all unclear about what happens if they, together with the NT-AI, make a mistake, such as failing to detect malignant tissue that could be a precursor to cancer. As Eta reviewed a patient's journal, Eta realized that a critical mistake had almost been made. Two of Eta peer radiologists had missed detecting malignant tissue in a woman's right breast, even though the NT-AI had red flagged 'high density tissue' in that very area. Meanwhile, the two radiologists had detected something *else* elsewhere in the same breast and therefore, fortunately, decided to send the woman for another clinical examination, which Eta happened to conduct. It then became clear that there was a large cancerous nodule in the area red flagged by NT-AI. Realizing that they could have missed a severe cancer, Eta now takes extra care to and recheck the NT-AI's red flagging, making Eta spend much more time on each image than Eta used to do.

Who bears the responsibility here? The radiologist, of course, but what happens when the second reader, a radiologist, disagrees with NT-AI's interpretation, and the case is sent to a consensus reader, another radiologist, who then agrees with the NT-AI? Do they just keep sending the case on until more radiologists agree than disagree? That would be quite resource consuming. How will the responsibility for a potential mistake in this scenario be distributed among the radiologists and the NT-AI? '"I honestly don't know', Eta replies, 'but I assume that, in time, we – the radiologist and the NT-AI – will somehow share the responsibility of the decision made like two separate systems'. Eta cannot imagine how this would work in practice.

This issue of responsibility is also raised by radiologist Tau with over 30 years of screening experience. Tau often ignores the NT-AI because of believing it only slows down the work of Tau. Tau fears that one day the NT-AI will be positioned as a second reader, capable of validating the first-reading radiologist's interpretation. Tau worries that the professional authority will be handed to the NT-AI, leaving only the responsibility for the NT-AI's decisions to the radiologist, reducing the radiologist to a 'machinist serving the NT-AI'. Peer-radiologist Sigma with 10 years of screening experience agrees with Tau that NT-AI should not be given such professional authority. However, Sigma welcomes the NT-AI as a first reader because Sigma finds it 'much safer than the junior radiologist readers'. When Sigma sees that NT-AI is the first reader on the computer screen, Sigma feels reassured, concluding that the task of detecting low-risk cases suits the NT-AI at its current intellectual level. Different it will be that day NT-AI is allowed to access information beyond the current images, information about the patient's medical history and maybe about social condition, genetic dispositions, etc. Radiologist Theta and Tau envision a future where NT-AI might handle the entire screening process, potentially replacing human radiologists, though this prospect is met with both awe and concern.

The head of department and radiologist Omega with 28 years of experience is among the front runner of AI implementation processes in Denmark. Omega leads a cautious implementation of NT-AI, restricting its role as first reader to low-risk cases,

ensuring it always acts under human supervision. At our first meeting with Omega, half a year into the implementation process, Omega expects that in time, the NT-AI will advance to also positioning the middle- and high-risk cases, still as the first reader. Omega sees no opening toward that any NT-AI will access information beyond the current images, nor does Omega expect that it will ever stand alone in the screening procedure. The rigid procedure for the NT-AI provides in Omega's opinion a clear direction of responsibility; 'It is always the doctor's and the doctor's alone'. Meeting with Omega a year later talking about lessons learned, Omega identifies an unintended consequence: junior radiologists are losing essential training opportunities as NT-AI handles most cases. To address this, Omega adjusts the NT-AI's role, limiting it to low-risk cases to ensure that trainees can develop their skills on more complex cases.

Discussion

Informed by Schatzki's (2002) and Rouse's (2023) practice theoretical approaches—and taking departure in our three research sub-questions—we proceed to discuss the significance of our findings.

1. Enactment and negotiation of expertise

Our findings show that radiological professionals' enactment and negotiation of expertise unfolds through a complex process of engagement with NT-AI. At both sites, professionals needed to develop new ways of understanding and negotiating their expertise within NT-AI-mediated practices. The challenges emerged differently at each site but shared similar patterns of renegotiation of trust, responsibility, and accountability.

At Hospital 1 (knee osteoarthritis grading), we observed radiographers like Alfa and Beta—the latter also AI process manager—experienced a temporary conflict of different normativities of the radiological practice (Rouse 2007). They felt obliged to integrate the NT-AI readings into their workflows, altering the traditional dynamics of radiological work practices. This included ensuring the accuracy of NT-AI outputs and determining when human expertise should override NT-AI suggestions. Their trust in both their own expertise and NT-AI's capabilities was challenged when they found themselves in conflict between management-authorized procedures and their professional, practical understandings in meaning-making of situations—a matter crucial in whether AI is adapted in practice or not, according to Hoeyer and Wadmann (2020). The introduction of NT-AI technology thus disrupted work practices and challenged the professionals to find a new modus operandi for enacting radiology as trustworthy healthcare. Moreover, radiographers like Alfa developed a dual form of expertise. While continuing to apply traditional expertise in producing high-quality images, the radiographers simultaneously developed new capabilities in relation to the NT-AI outputs. Alfa began taking an extra look at X-rays to verify the AI's assessments. This extends beyond merely operating within narrow specialized domains to recognize and work with the knowledge resources that others (including non-human agents) bring.

At Hospital 2 (breast cancer screening), considerations about responsibility shaped how the professionals enacted their expert practices with NT-AI. Here, NT-AI was

integrated as a co-reader in breast cancer screening, altering the traditional dual-expert reading process. The involvement of NT-AI changed how radiologists approach their work, particularly by influencing their focus and potentially affecting their decision-making processes. NT-AI as a first reader had the potential to streamline workflows in low-risk cases but also inadvertently shaping radiologists' interpretations. Professionals like Eta and Theta experienced their reading practices being influenced by NT-AI's supposedly objective and blinded input, which nonetheless contrasted with the profession's normativity regarding expertise validity, by affecting their analyses. Moreover, radiologists like Eta developed a new understanding of diagnostic expertise as being in collaborative dialogue with the NT-AI. Eta's characterization of the NT-AI as a 'kind of colleague' suggests the emergence of a transformation of the 'existing knowledge to create common ground' (Dionne & Carlile 2024, p. 188)—a ground that is built at the boundaries between professional practices.

The critical question of responsibility emerged prominently at both sites. At Hospital 2, radiologist Eta wondered about how responsibility would be distributed *in time* between radiologists and NT-AI. This uncertainty reflects what Rouse (2007) describes as the normative accountability of practice, where what is at stake is not just technical performance but also ethical responsibility (Rouse 2007). Rouse's understanding of *accountability* as a uniquely human form of normativity becomes particularly relevant here. The radiological professionals are accountable not just in their technical assessments but in their concern for patients' wellbeing and their sense of professional responsibility. Normative accountability cannot only be pinned down and controlled by *how* tools, such as bureaucratic procedures, but also requires engagement with *why* and *where to* considerations (Rouse 2007). Similarly, ethnographer Sarah Pink (2022) concludes from her empirical research that normativity, as ethical responsiveness and attentiveness, is pivotal to the constitution of trust in technology: 'trust (is) dependent on the morality of the stakeholders involved with a technology, rather than in the technology itself' (Pink 2022, p. 47). The radiologists and radiographers in our study were continuously grappling with these deeper ethical normative questions as they integrated NT-AI in their practices.

In both cases, professional expertise was not simply diluted by NT-AI but reconfigured in ways that require professionals to create an understanding of the technology's capacities and limitations. This aligns with Schatzki's (2025) perspective that different types of entities have different forms of agency (Schatzki 2025). The professionals were not simply abandoning their expertise to the AI but were developing new interstitial expertise that involved knowing when to trust, when to question, and how to integrate the AI's capabilities into their professional judgment.

2. The relationship of material arrangements and human actors

Our findings revealed the complex relationship between NT-AI systems and radiological professionals in shaping radiological practice. Following Schatzki's (2002) practice theory, we can understand this relationship as involving a continuous negotiation between human activities and material arrangements. The NT-AI systems at both sites functioned as what Schatzki (2002) describes as material arrangements that are 'involved in and around, support and facilitate, or are used in or are otherwise tied to' (Schatzki 2002,

p. 77) human activities. However, these arrangements did not simply determine what radiographers and radiologists were doing. Rather, we observed that the changes in material arrangements reconfigured and channeled established social practices.

At Hospital 1, the NT-AI system reorganized the workflow by providing immediate diagnostic analysis of knee X-rays. This material arrangement altered the *rules* that not only structured the practices (protocol for patient handling, extra-checkups of images, etc.) but also provoked new teleoaffective structures as demonstrated by Beta's ethical dilemma when doubting the NT-AI's assessment. The incident revealed how the general understandings of radiographic practices—focusing on scanning accuracy and patient care—came into tension with the new material arrangement.

At Hospital 2, the NT-AI's role as first reader for low-risk cases fundamentally changed how radiologists, exemplified by Theta, enacted their work practices. The material arrangement altered how to go about blind reading procedures, creating a situation where the radiologist's work was pre-structured by knowing which cases the AI had already assessed (from double-blinded reading to human+AI not-blinded reading). As Theta noted, 'I'm zooming in on NT-AI's markings, checking for errors there, instead of reading the images objectively'.

This integration exemplifies what Schatzki (2019) describes as a *practice-arrangement bundle* where material entities and human activities become intertwined in producing social phenomena (Schatzki 2019). The NT-AI systems did not simply replace human judgment but connected with human expertise in ways that transformed what was done and said in radiological practice. The normative aspects of these practices—what counts as correct or appropriate (Rouse 2007)—were particularly evident in how the professionals grappled with the question of when to trust or override the AI's assessments.

3. Transformation of professional agency through sociomaterial interactions

Our findings suggest that radiologists' agency underwent significant transformation—neither simply preserved nor contested, but reconfigured—through interaction with NT-AI. This transformation can be understood through Schatzki's (2025) conceptualization of agency as the capacity to effect action within practice.

At Hospital 1, radiographers, exemplified by Alfa in our case, experienced both an expansion and limitation of their agency. While the protocol positioned them primarily as administrators of the NT-AI's assessments, they developed a form of discretionary agency in deciding when to question the AI's readings and consult colleagues. As Beta commented, radiographers 'definitely make the decision (on what to do)' even if 'they do not make the assessment (of the images)'. This illustrates Schatzki's (2025) point that human agency and technological agency remain distinct while being intertwined in practice (Schatzki 2025). Moreover, our findings illustrate how human accountability (Rouse 2007) is decisive for the constitution and enactment of practices: when the professionals in their relation to NT-AI face discrepancy regarding this normativity (of trust and responsibility), they respond by acting in different ways—with several strategies. Their extra-checkups of images, frequently conferring with peer, and considerations of putting in an extra control layer of human oversight in the AI process, are all

strategies-in-practice to overcome these discrepancies. Sometimes these strategies work and the professional manages to build a new mundane work procedure through which they constitute new forms of agency; sometimes the strategies only work temporarily, and the professionals end up in despair, missing the capacity of agency, as Beta experienced.

At Hospital 2, radiologists experienced a complex transformation of the distribution of agency. When working with low-risk cases assessed by the NT-AI, they found themselves more likely to recall patients when the AI's risk score was in the middle range, even when they couldn't detect obvious red flags. This strategy of spending more time on each image to validate the NT-AI assessment, as acted out by radiologist like Theta, demonstrates how the implementation of this NT-AI didn't simply diminish professional agency but redirected it. Going from being enacted by the practice of reading images, to a practice of validating (+ images reading) the NT-AI's assessment. However, the professionals were frustrated engaging with NT-AI because of lacking clear managerial instructions.

Limitations

Due to its situated nature, this study has limitations. First, our focus on radiological practices in Denmark may limit the generalizability to other professional contexts and healthcare systems. However, due to the typical characteristics of critical cases (Flyvbjerg 2006), our interpretations may be transferable to other situations (Gioia 2021). Second, the early stage of NT-AI implementation in the studied sites means that longer-term impacts on professionalism and agency are not evident. Longitudinal studies could help understand how professionals' strategies for managing AI integration evolve over time. Future research should explore these dynamics across diverse professional contexts and with different types of AI systems.

Conclusion

Our study was guided by the hypothesis that NT-AI might both enable and diminish professional agency, affecting agency and expertise in radiological professions. Our findings largely support this hypothesis but require a more nuanced understanding of how agency is reconfigured rather than simply enabled or diminished.

First, our findings confirm the potential dual nature of NT-AI's impact on professional agency. At both sites, NT-AI simultaneously expanded certain aspects of professional agency while constraining others. However, rather than creating a zero-sum game where AI gains agency at the expense of humans, we observed the emergence of what social-cultural psychologist Anne Edwards (2011) would describe as new forms of 'relational expertise' exercised by (several) contributors—humans as well as AI systems (Anne Edwards 2011). In our study, NT-AI was unquestionably augmentative in purpose, yet its presence also had subtle displacement effects (e.g., radiologists doing slightly different work than before, radiographers taking on extra interpretive tasks as well as explicitly considering issues of professional accountability). The professionals did *not* view the situation as either/or but rather asked *how* to integrate the AI in

their practices. Our study thus aligns with the insights of Bergquist and colleagues in Sweden (2022), who found that successful AI integration in diagnostic work comes from focusing on 'collaboration' with the technology and developing innovative practices to enhance performance (Bergquist et al. 2022). In both contexts, the message is clear: meaningful integration is achieved by redesigning work practices to incorporate contributions from AI as a valuable tool, not by viewing implementation as a zero-sum game.

Second, our findings highlight the importance of boundary work in reconfiguring professional agency. As argued by Edwards (2011) and Dionne and Calile (2024), it is crucial to build a common ground between professional practices. Drawing on Edwards' (2011) notion of *relational agency* (Edwards 2007, 2011) as a capacity to work with others on complex problems, we observed how radiological professionals recognized how NT-AI contributed in significant ways to solve problems. They developed new forms of collaborations as they learned to work with NT-AI systems.

A third point relates to problematizing the *either/or* aspect of agency as outlined by Schatzki (2025) in his critique of the posthumanist *blackmail*. Upon Schatzki's (2025) proposals, we move beyond the binary question of whether AI will *replace or augment* professionals This dichotomy overlooks the rich 'middle ground' (Schatzki 2025) where most implementations actually occur. The sorting out of agencies in our ethnographic study indicates that it is (still) humans who make the decisions—not the NT-AI. It is (still) humans who are held responsible for these decisions—not the NT-AI. And it is (still) only humans who are held accountable within the professional practices and thereby act within regimes of normativity (making them liable of enacting professionalism in appropriate ways). We therefore suggest that the reconfiguration of agency during the NT-AI implementation occurs through recompositions of the practice-arrangement bundle (Schatzki 2019). The NT-AI systems effected the professional practices by performing tasks and achieving results—but the impact of the NT-AI significantly lacked the teleoaffective element of rich *acting* agency that determine professional practices through actors' intentional, purposeful, and self-conscious activities as *accountable* and *caring* beings (Rouse 2023).

Fourth, the professionals were not simply concerned with technical performance but with the ethical implications of their work. Radiologists and radiographers were concerned with the appropriateness of their activities—a uniquely human normative feature that involves considering what is the right way to continue a professional practice (who or what to *trust?*) and taking *responsibility* for one's actions and their consequences.

Finally, the professionals defaulted to caution and sometimes resistance when they felt uncertain. In extension of Rouse's notion of *accountability* (2007, 2023) and Schatzki's (2002) notion of *teleoaffective structures* as constitutive elements of practices, we found that professionals need to make sense of the AI in the context of their work, gain mastery in using it, and have it integrated into the professional community's norms (a sense of belonging as this-is-how-we-do-things-around-here). We suggest that these psychosocial dynamics are key to maintaining what might be called a *healthy professional agency-climate* during the transition of AI implementation. If professionals feel competent and see the AI as aligning with the purposefulness of their professional practices rather than detracting from it, they are more likely to incorporate new technology in their practices (e.g., Ågnes 2022; Schneider & Sting 2020). Indeed, the radiographers and radiologists, over time, began to take pride in developing new skills and delivering

faster services with the help of NT-AI, which indicates a restoration of ownership and meaning in the changed workflow.

Funding

This work was supported by 'Innovation Fund Denmark' under the Grant 'Industrial PhD' running three years, and by 'Department of Digitalization', Capital Region of Denmark and Radiological AI Test Center (RAIT) under the Grants 'AIKOA' and 'SMARTCHEST'.

Conflict of interest

There are no competing interests to declare.

References

Abbott, A. (1991). 'The future of professions'. *Research in the Sociology of Organizations*, 8, 17–42, JAI Press Inc.

Ågnes, J. S. (2022). 'Gaining and training a digital colleague: Employee responses to robotization', *Journal of Applied Behavioral Science*, 58/1: 29–64. https://doi.org/10.1177/00218863211043596

Armour, J., & Sako, M. (2020). 'AI-enabled business models in legal services: From traditional law firms to next-generation law companies?', *Journal of Professions and Organization*, 7/1: 27–46. https://doi.org/10.1093/jpo/joaa001

Barley, S. R., & Beane, M. I. (2020). 'How should we study intelligent technologies' implications for work and employment?' *Work and Technological Change*, pp. 69–115. Oxford University Press. https://doi.org/10.1093/oso/9780198795209.003.0003

Barad. K. (2007) *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press, https://doi.org/10.1215/9780822388128.

Berberian, B. (2019). 'Man-machine teaming: a problem of Agency', *IFAC-PapersOnLine*, 51/34: 118–23. Elsevier B.V. https://doi.org/10.1016/j.ifacol.2019.01.049

Bergquist, M. & Rolandsson, B. (2022) Exploring ADM in clinical decision-making: Healthcare experts encountering digital automation. In Pink, S., Berg, M., Lupton Deborah and Ruckenstein. M. (eds), *EVERYDAY AUTOMATION – Experiencing and Anticipating Emerging Technologies*, pp. 140–153. New York, Tayler & Francis.

Bergquist, M., Rolandsson, B., Gryska, E., Laesser, M., Hoefling, N., Heckemann, R., Schneiderman, J. F., et al. (2023). 'Trust and stakeholder perspectives on the implementation of AI tools in clinical radiology', *European Radiology*, 34/1: 338–47. Springer Berlin Heidelberg. https://doi.org/10.1007/s00330-023-09967-5

Le Besnerais, A., Moore, J. W., Berberian, B., & Grynszpan, O. (2024). 'Sense of agency in joint action: a critical review of we-agency', *Frontiers in Psychology*, 15/January: 1–6. https://doi.org/10.3389/fpsyg.2024.1331084

Caspar, E. A., Christensen, J. F., Cleeremans, A., & Haggard, P. (2016). 'Coercion changes the sense of agency in the human brain', *Current Biology*, 26/5: 585–92. Cell Press. https://doi.org/10.1016/j.cub.2015.12.067

Dahlin, E. (2024). 'And say the AI responded? Dancing around "autonomy" in AI/human encounters', *Social Studies of Science*, 54/1: 59–77. https://doi.org/10.1177/03063127231193947

Dépelteau, F. (2018). Relational thinking in sociology: Relevance, concurrence and dissonance. In Dépelteau, F. (ed.), *The Palgrave Handbook of Relational Sociology*, pp. 3–33. Springer International Publishing, https://doi.org/10.1007/978-3-319-66005-9_1.

Dionne, K. E., & Carlile, P. R. (2024). 'The pragmatic cycle of knowledge work: Unlocking cross-domain collaboration in open innovation spaces', *Human Relations*. https://doi.org/10.1177/00187267241234003

Dolan, B., & Tillack, A. (2010). 'Pixels, patterns and problems of vision: The adaptation of computer-aided diagnosis for mammography in radiological practice in the U.S.', *History of Science*, 48/2: 227–49. https://doi.org/10.1177/007327531004800204

Dreyfus, H. L., Dreyfus, S. E., Athanasiou, T. (1986). *Mind Over Machine: The Power of Human Intuition and Expertise in the Era of the Computer.* United Kingdom: Basil Blackwell.

Edwards, A. (2007). 'Relational agency in professional', *An International Journal of Human Activity Theory*, 1/1: 1–17.

Edwards, A. (2011). 'Building common knowledge at the boundaries between professional practices: Relational agency and relational expertise in systems of distributed expertise', *International Journal of Educational Research*, 50/1: 33–9. Elsevier Ltd. https://doi.org/10.1016/j.ijer.2011.04.007

Emirbayer, M. (1997). 'Manifesto for a relational sociology', *American Journal of Sociology*, 103/2: 281–317. https://doi.org/10.1086/231209

Emirbayer, M., & Mische, A. (1998). 'What is agency?', *American Journal of Sociology*, 103/4: 962–1023. https://doi.org/10.1086/231294

Eyal, G. (2019). *The Crisis of Expertise*. Cambridge: Polity Press.

Flyvbjerg, B. (2006). 'Five misunderstandings about case-study research', *Qualitative Research Practice,* 12/2, 390–404. https://doi.org/10.4135/9781848608191.d33

Galsgaard, A., Doorschodt, T., Holten, AL., Müller, F., Boesen, M. and Maas, M. (2022). 'Artificial intelligence and Multidisciplinary Team Meetings; A communication challenge for radiologists' sense of agency and position as spider in a web?', *European Journal of Radiology*, 155/October 2021: 110231. Elsevier B.V. https://doi.org/10.1016/j.ejrad.2022.110231

Geertz, C. (2021). 'Thick description: Toward an interpretive theory of culture [1973]', *Readings for a History of Anthropological Theory, Sixth Edition*, 302–6.

Gioia, D. (2021). 'A systematic methodology for doing qualitative research', *Journal of Applied Behavioral Science*, 57/1: 20–9. https://doi.org/10.1177/0021886320982715

Goto, M. (2021). 'Collective professional role identity in the age of artificial intelligence', *Journal of Professions and Organization*, 8/1: 86–107. https://doi.org/10.1093/jpo/joab003

Grynszpan, O., Sahaï, A., Hamidi, N., Pacherie, E., Berberian, B., Roche, L., & Saint-Bauzel, L. (2019). 'The sense of agency in human-human vs human-robot joint action', *Consciousness and Cognition*, 75/December 2018: 102820. Elsevier. https://doi.org/10.1016/j.concog.2019.102820

Heimstädt, M., Koljonen, T., & Elmholdt, K. T. (2024). 'Expertise in management research: A review and agenda for future research, *Academy of Management Annals*, 18(1): 121–156. https://doi.org/10.5465/annals.2022.0078

Hoeyer, K., & Wadmann, S. (2020). '"Meaningless work": How the datafication of health reconfigures knowledge about work and erodes professional judgement', *Economy and Society*, 49/3: 433–54. Taylor & Francis. https://doi.org/10.1080/03085147.2020.1733842

Hopwood, N., Day, C., & Edwards, A. (2016). 'Partnership practice as collaborative knowledge work: Overcoming common dilemmas through an augmented view of professional expertise', *Journal of Children's Services*, 11/2: 111–23. https://doi.org/10.1108/JCS-08-2015-0027

Jones, M. (2014). 'A matter of life and death: Exploring conceptualizations of sociomateriality in the context of critical care'. *MIS Quarterly,* 38(3): 895–925.

Kristensen, C. J. (2016). Shadowing – observationer af enkeltpersoners praksis (eng: Shadowing – observations of individuals' practice). In C. J. Kristensen, & M. A. Hussain (eds.), *Metoder i samfundsvidenskaberne*, pp. 169–184. Samfundslitteratur.

Kronblad, C., & Jensen, S. H. (2023). '"Being a professional is not the same as acting professionally"—How digital technologies have empowered the creation and enactment of a new professional identity in law', *Journal of Professions and Organization*, 10/2: 99–119. https://doi.org/10.1093/jpo/joad005

Kvale, S. & Brinkmann, S (2015), *Interview – det kvalitative forskningsinterview som Håndværk*, 3rd. ed. København. Hans Reitzels Forlag.

Latour, B. *Reassembling the Social: An Introduction to Actor-Network-Theory*. 1st ed. Oxford University Press, 2005, https://doi.org/10.1093/oso/9780199256044.001.0001.

Leonardi, P. M., & Barley, S. R. (2008). 'Materiality and change: Challenges to building better theory about technology and organizing', *Information and Organization*, 18/3: 159–76. https://doi.org/10.1016/j.infoandorg.2008.03.001

Lombi, L., & Rossero, E. (2024). 'How artificial intelligence is reshaping the autonomy and boundary work of radiologists. A qualitative study', *Sociology of Health and Illness*, 46/2: 200–18. https://doi.org/10.1111/1467-9566.13702

Mylopoulos, M., & Regehr, G. (2007). 'Cognitive metaphors of expertise and knowledge: Prospects and limitations for medical education', *Medical Education*, 41/12: 1159–65. https://doi.org/10.1111/j.1365-2923.2007.02912.x

Pakarinen, P., & Huising, R. (2023). 'Relational expertise: What machines can't know', *Journal of Management Studies,* 0/0, https://doi.org/10.1111/joms.12915

Pink, S. (2022). 'TRUST, ETHICS AND AUTOMATION: Anticipatory imaginaries in everyday life'. In: Pink, S., Berg, M., Lupton, D., & Ruckenstein, M. (eds.), *Everyday Automation: Experiencing and Anticipating Emerging Technologies*, Cpt 2, pp. 44–58, Taylor & Francis, https://doi.org/10.4324/9781003170884-4

Redaelli, R. (2023). 'Different approaches to the moral status of AI: a comparative analysis of paradigmatic trends in Science and Technology Studies', *Discover Artificial Intelligence*, 3/1. Springer International Publishing. https://doi.org/10.1007/s44163-023-00076-2

Rouse, J. (2007). Normativity. In: Kiverstein, J. (ed.), *THE ROUTLEDGE HANDBOOK OF PHILOSOPHY OF THE SOCIAL MIND*, London & New York: Routledge Taylor & Francis Group.

Rouse, J. (2023). *Social Practices as Biological Niche Construction*. Chicago: University of Chicago Press.

Schatzki, T. (2001). Introduction: Practice theory, In: Schatzki, T. (ed.), *The Practice Turn in Contemporary Theory*, pp. 1–14. London: Routledge.

Schatzki, T. R. (2019). *Social Change in a Material World*. New York: Routledge.

Schatzki, T. R. (2025). Agency, *Information and Organization*, 35/1: 100553, ISSN 1471-7727. https://doi.org/10.1016/j.infoandorg.2024.100553

Schneider, P., & Sting, F. J. (2020). 'Employees' perspectives on digitalization-induced change: Exploring Frames of Industry 4.0', *Academy of Management Discoveries*, 6/3: 406–35. https://doi.org/10.5465/amd.2019.0012

Smets, M., Aristidou, A. & Whittington, R. (2017). Towards a practice-driven institutionalism. In: Greenwood, R., Oliver, C., Lawrence, T. B. & Meyer, R (Eds.), *The SAGE Handbook of Organizational Institutionalism,* pp. 384–411. 2nd ed. London: SAGE.

Susskind, R., & Susskind, D. (2022). *The Future of the Professions: How Technology will Transform the Work of Human Experts, updated edition*. Oxford: Oxford University Press.

Timmermans, S. & Tavory, I. (2022). *Data Analysis in Qualitative Research: Theorizing with Abductive Analysis*. Chicago: University of Chicago Press.

Ulfert, A. S., Georganta, E., Centeio Jorge, C., Mehrotra, S., & Tielman, M. (2023). 'Shaping a multidisciplinary understanding of team trust in human-AI teams: a theoretical framework', *European Journal of Work and Organizational Psychology*, 00/00: 1–14. Routledge. https://doi.org/10.1080/1359432X.2023.2200172

Wesche, J. S., Hennig, F., Kollhed, C. S., Quade, J., Kluge, S., & Sonderegger, A. (2024). 'People's reactions to decisions by human vs. algorithmic decision-makers: the role of explanations and type of selection tests', *European Journal of Work and Organizational Psychology*, 33/2: 146–57. Routledge. https://doi.org/10.1080/1359432X.2022.2132940