STRATEGIES FOR OVERCOMING SOLUTIONISM

Challenging the belief in simple solutions: The need for epistemic practices in professional work

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Abstract

Context: As a contribution to the State of the Science issue on ‘The problem with solutions’, this paper discusses how technology-mediated and assumedly simple and straightforward solutions to professional problems in fact require extensive work from professionals in order that generalised tools and procedures can be made sense of, adapted and employed in local practice.

Theoretical perspective: The authors introduce a perspective on epistemic practices in professional work and learning in order to conceptualise and discuss the diversity of the knowledge-related actions required to perform professional services. They discuss how the growing numbers and diversity of knowledge-generating actors who aspire to inform professional practice create ‘multi-charged’ work settings, imbued with multiple objectives and purposes. This development presents new epistemic challenges to professionals, which require extended capacities for knowledge work.

Summary: The authors give examples from empirical studies conducted in Nordic health care settings, which relate to nurses’ engagement with repositories of clinical procedures and to the development of new medical technologies for clinical use. They show how work performance in both cases depends on a range of epistemic practices (ie, collective ways of exploring, assessing, critically examining and justifying knowledge claims), which are necessary if the general tools and technologies are to be put to work in the local environment. This forms a core dynamic in practitioners’ work-based learning as it moves between what is known and what remains to be explored or improved.

Conclusions: The paper argues that the widespread belief in simple or versatile solutions is challenged by research that reveals the diversity of the knowledge practices needed to perform professional services. The paper suggests that professional communities might pay more attention to epistemic practices as means to handle complexity. It raises intriguing questions and discusses implications for medical education.
1 | INTRODUCTION

Work in the health care sector has been significantly transformed in recent years owing to the introduction of increasingly advanced digital technologies and information systems. These include systems for documenting and sharing patient information, technologies for the self-care and remote care of patients with chronic illnesses, as well as digital repositories of research-based information and clinical guidelines. Some technologies are introduced in response to the global overflow of medical information and research-based knowledge, which generates a need to filter and safeguard the collective knowledge that is entrusted to inform professional practice. Others are motivated by the need to cope with ageing populations, growing medical costs and efficiency concerns. Digital technologies are seen as providing a means to empower clients to take responsibility for their own health, as well as to substitute for human labour in the delivery of care. Moreover, as care technologies become increasingly embedded into workflows, the very process of innovating such technologies and their related practices imply new forms of work, often of an interdisciplinary nature in which health care professionals play important roles.

Common to the main discourse around these various health technologies is an instrumental notion that the technologies by nature will solve pressing problems. As Deborah Lupton puts it, the focus is on ‘...what digital technologies can offer both lay people and professionals and how they might operate as “solutions” to the problems of healthcare delivery, growing medical costs, improving people’s health and wellbeing and preventing illness and disease.’1 This notion is accompanied by a techno-centred approach to the technologies as stand-alone solutions that can be ‘implemented’ in health care and thereby resolve problems of practice.

In this paper, we consider this belief in simple solutions as a discourse of ‘solutionism’. Solutionism may be defined as ‘the belief that all difficulties have benign solutions, often of a technocratic nature’.2 In the health care sector, this discourse is also manifested in the way information is organised and displayed in digital systems, which typically involve the standardisation and documentation of data in structured, predefined categories.3,4 By way of such standardisation, digital tools and information systems carry promises of efficiency and ease in the sense that professionals are expected to act immediately on the information that is displayed, so that issues can be closed and signed off and space can be made for new ones.

However, this belief in simple solutions and straightforward ways of informing professional actions is increasingly met with critique, especially from practice-oriented research in the social sciences.

Scholars have shown how digital health technologies create ambivalences, which need to be locally examined and sorted out, such as contradictory value systems, reconfigured power relations and relationships between key actors, and questions about how to navigate increasingly complex information environments.5 Standardisation leads to tensions between the universal and local that need to be resolved. Paradoxically, standardisation strategies to increase transparency in some processes consign other processes to the black box.3,4,6 A shared argument refers to the need to attend to the level of practice in research on professional work and to acknowledge the multiple social and material relations that bring work and learning into existence. This will also pave the way for a better understanding of how graduates can be prepared for work in digitalised health care contexts during initial professional (e.g., medical) education.

In this paper, we contribute to this agenda and argue that the discourse of solutionism is at odds with the knowledge systems underlying professional practices. More specifically, we focus on the epistemic dimensions of professional practice and discuss how the current belief in simple or versatile solutions is challenged by research that reveals the diversity of knowledge practices needed to perform work in epistemically dense information environments. An overall argument is that expert knowledge by nature follows an unfolding and diversifying logic7 and that the sustainability and growth of professional communities depend on the actions that keep knowledge growing through the recurring exploration and critical evaluation of knowledge claims.

We begin by introducing an overall perspective on professions as knowledge-sharing communities and an epistemic practice perspective on professional work and learning. We follow with examples from work in health care, which relate to engagement with digital repositories of clinical procedures and the development of new medical technologies for clinical use. In both cases, we illustrate how work performance depends on a range of epistemic practices that are necessary if the general tools and technologies are to be put to work in the local environment. We further discuss how this dynamic generates complexity, which calls for extended epistemic engagement among professionals rather than quick solutions. We conclude by discussing potential implications of these insights for medical education.

2 | PROFESSIONAL PRACTICE AS EMBEDDED IN ‘MACHINERIES OF KNOWLEDGE CONSTRUCTION’

One way of conceptualising professions today is to see them as expert communities that are constituted of distinct ways of generating and sharing knowledge.8,9 This distinctiveness relates to a set of tools, instruments and institutional arrangements, as well as to the specific strategies, visions and procedures that guide collective action. Together, these arrangements and mechanisms form the machinery of knowledge construction, which, in a given expert culture, makes up ‘how we know what we know’.7

One of the hallmarks of our time is the growth in both number and diversity of the knowledge-generating actors and production
contexts involved in such machineries. In addition to scientific and practitioner communities of various kinds, a range of other groups, such as technology developers and providers, publishers, government agencies, clearing houses, consultancies, consensus groups and user communities, aspire to influence professional practice. Professional knowledge and ways of knowing are therefore generated—and even verified—by a multitude of actors and their various concerns. The contributions of various actors become inscribed in tools and information systems, often distributed across a range of work settings in the health care sector.

When distributed across organisations, the products of different knowledge-generating activities lead to what have been termed ‘multi-charged knowledge settings’ in professional education and work. Such settings typically incorporate multiple objectives and purposes, which are likely to generate tensions at the level of practice. For instance, knowledge that is distributed via tools and information systems may include advice generated by controlled scientific experiments, knowledge generated and brought forward by users or other stakeholders such as consultancies and start-up firms, or experiential knowledge that has been systematised and generalised within a specific professional community. All of these cannot be easily integrated. For instance, there are inbuilt tensions between evidence-based knowledge that claims to be globally valid, and knowledge that aspires to be sensitive to cultural or personal needs. The relative emphasis given to knowledge forms and their impetus for professional action will therefore need to be locally considered.

The diversity of knowledge-generating actors may contribute to the pressure for solutions, in the sense that it strengthens the need for clear guidelines and the governance of services. At the same time, this development may question solutionism as the main discourse to ensure the quality and efficiency of work. To handle the complexity described above, practitioners face extended responsibilities not only for client-related services, but also to carry out the knowledge work they need to explore which procedures may be relevant for their case, assess alternatives and find ways forward. Rather than effecting solutions as their first actionable step, they often need to engage in selecting, assessing, integrating and adapting various knowledge resources to resolve the problem at hand. Moreover, in the context of user involvement and personalised care, the patient may be involved in these processes, which increases the complexity of such knowledge work. We suggest that the concept of epistemic practices is helpful to clarify these aspects of professional work and the complexity they entail for practitioners.

**3 | AN EPISTEMIC PRACTICE PERSPECTIVE OF PROFESSIONAL WORK AND LEARNING**

The concept of epistemic practices draws attention to the specific ways in which knowledge is approached, generated and shared in a given culture. These practices involve the collective practices of examining and verifying knowledge or finding solutions to problems. Epistemic practices can be defined as the socially accomplished ways by which members of a profession communicate, assess and legitimise knowledge claims. They are the means through which knowledge is explored, refined and shared in a professional community.

Different forms and representations of knowledge require different epistemic practices to be ‘opened up’ to scrutiny or use. To make use of resources, such as standardised procedures, diagnostic tools or general descriptions of good practices, practitioners need to examine what they mean ‘by themselves’ and what they mean ‘here and now’. That is, they need to understand not only the resource and the knowledge it mediates, but also how this knowledge can be useful in the situation at hand. This may involve processes of adapting resources for local use, as well as efforts to integrate these resources into the wider set of tools and procedures at play in the service. Hence, epistemic practices play a critical role in making knowledge actionable and in making skilled performance transparent for newcomers to the profession (eg. students in medical education).

An important function of epistemic practices is their role in developing and circulating joint objects in the professional community. Expert communities are typically object-centred in the sense that they are oriented toward exploring, developing and mobilising epistemic objects. Examples of such objects in the medical domain are diagnoses, diagnostic methods and tests, clinical guidelines, standards for user involvement, and documentation systems, such as electronic patient records. Epistemic objects should, however, not be understood as stand-alone materials. They are better described as ‘complex amalgams of material and symbolic resources that constitute knowledge around a problem and which, through their inherent complexity, activate a set of opportunities when they are approached’. Although initiated to guide professional actions and provide solutions to defined problems, they often generate new questions as much as solutions when they are approached. As Knorr Cetina states about epistemic objects in general, when practitioners try to reveal them, they often add to, rather than reduce, their complexity. However, these unfolding characteristics should be seen as productive to the practice rather than as challenging to efficiency. By triggering further questions and inquiries, the objects may stimulate critical reflections in professionals and hinder the ‘blind acceptance’ of simple solutions; in this way, they may strengthen the safety and quality of care. Such critical stances and inquiries are important in the continuous development of expert knowledge and ways of knowing, both on an individual basis and for the professional community. In what follows, we provide two examples of how such dynamics unfold in two contexts in the health care sector.

**4 | THE ROLE OF EPISTEMIC PRACTICES IN PUTTING SCRIPTED PROCEDURES TO WORK**

The first example concerns nurses’ engagement with digital repositories of clinical guidelines and the work needed to understand and adapt such guidelines for local use. As products of the
evidence-based movement, clinical practice guidelines and their development groups help to strengthen the safety, standardisation and efficiency of health care by providing scripts for action. The belief that clinical guidelines can be implemented in practice in a straightforward way is seen as a manifestation of a solutionism discourse.

Several studies of such guidelines at work have shown how scripted procedures are not ready for use but, rather, depend on practitioners negotiating their meaning, recontextualising and integrating different forms of knowledge, and adapting the guidelines to the specificity of the local care setting. One seminal study focused on medical protocols and described such processes as a matter of ‘achieving local universality’ through interaction, which leads not only to a change in practice but also to changes in the protocols themselves. Subsequent research has attended to the way clinical guidelines development groups need to negotiate sets of epistemic concerns and criteria to arrive at their recommendations. Furthermore, a study of the implementation of clinical procedures in a hospital setting showed how only 18% of the procedures could be implemented easily in various care settings, whereas the remaining 82% needed further adaptation or were rejected. These examples clearly demonstrate how ‘readymade solutions’ are not straightforward and that any standard for work performance needs to be reworked through a number of knowledge-based actions. This, in turn, requires the capacity for epistemic work on the part of the practitioners who are mandated to make versatile procedures and resources actionable in professional settings.

Building further on these insights, Nerland and Jensen employed the concepts of epistemic objects and practices to examine what local work with clinical guidelines repositories entails in epistemic terms. Their analysis was based on two projects that followed nurses’ work and learning through individual and group interviews, learning logs, document analyses, a survey study, and focused case studies of work in hospital settings. By contrasting two approaches taken in different hospitals, one top-down and one bottom-up in the organisation, Nerland and Jensen showed how the work in both cases required a set of epistemic practices that allowed the nurses to examine clinical guidelines as epistemic objects. Through these practices, the guidelines were explored, imaginarily tested for their relevance in specific care or ward settings, validated, adapted and approved or disapproved. In the first case, which followed a top-down approach, a digital repository of standardised procedures called ‘Practical Procedures for the Nursing Service’ formed a starting point for the work of clinical guidelines groups. These groups were mandated to critically assess, adapt, approve or reject procedures for their local wards. From an epistemic practice perspective, the nurses who participated in this work oscillated between opening up and exploring the details and possible implications of the procedure as described in the repository, adapting the procedure further (eg, by bringing in nuances from local work experience), and coming to a temporary closure by approving the procedure for use in the local work setting. In the case that followed a bottom-up approach, nurses volunteered to participate in developing procedures from below in their hospital ward, after undergoing training in evidence-based ways of working. This approach engaged nurses not only in assessing and adapting existing procedures, but also in developing new ones that filled the gaps in what can be termed their epistemic infrastructure (see also Jensen and Christiansen). This work included translating the problems experienced into searchable questions, which were then entered into digital databases of evidence-based procedures (the Cochrane Library). The further work implied mapping and assessing evidence relevant to the problem and developing written procedures informed by this evidence as well as by clinical experience.

In both cases, the nurses involved in the clinical guidelines groups became involved in knowledge-generating practices that linked their local work with the wider machinery of knowledge construction in their profession. Clinical guidelines took the form of epistemic objects that were explored, instantiated and circulated in the local community. At the same time, the products of their work became part of digital repositories and thereby potential resources for professionals in other sites of practice. One example of this refers to the way nurses in prenatal care shared and discussed their ways of working across hospital settings. Through the sharing of epistemic objects, communities that in a collective way could take responsibility for their part of the knowledge system underlying professional practice were formed. This required, however, both sufficient space for explorative activities during busy working days and capacities for epistemic actions among the practitioners involved. We will return to the implications of these insights after our next example.

5 | DEVELOPING NEW MEDICAL TECHNOLOGIES FOR CLINICAL USE: EPISTEMIC PRACTICES AND CLASHES

The second example highlights physicists’ and clinical neurophysiologists’ engagement in developing a new diagnostic tool and method for clinical decision making and preoperative planning in specific brain diseases, and the first attempts to apply the new knowledge in clinical practice in hospitals. Such endeavours were supported by national innovation funding policies that encouraged spin-offs from university research and were aimed at developing marketable solutions for the clinical market. Research groups that acquired the biggest research grants were able to master both the technology (‘hard science’) and a solutionism discourse.

The knowledge base for the potential new diagnostic tool and method originated from basic research in low-temperature physics at Helsinki University of Technology. The technological innovation developed, the neuromagnetometer device, is a measurement instrument for use in brain research and diagnostics. It integrates biomagnetism, low-temperature physics and superconductivity. The neuromagnetometer and its use in studying the brain are called magnetoencephalography (MEG). In terms of epistemic practices, this case can be described as a trajectory in which the epistemic practices of high technology development engineers meet the epistemic practices of clinical professionals in various pre-clinical contexts and clinical services.
Building on the insights from sociotechnical research in the medical field (eg, 25), Hasu26 employed the concept of technological artefact (a technological device producing new information for medical diagnosis) as both an epistemic object and a work tool to examine the implementation of the innovation in two hospitals, one in Finland and the other in the USA. The research showed that the case involved not only the formation of a new epistemic object, but also examples of clashes of epistemic practices in terms of different epistemic objects in the trajectories toward a viable tool in clinical practice.26

The development of a new diagnostic method that challenges or complements the previous reference-standard test in the context of diagnosing a specific disease can be seen as an example of a critical phase that triggers the formation of a new epistemic object. Gaining acceptance of a diagnostic method can be a long and demanding process, and requires excessive exploration, assessment, communication and the legitimisation of knowledge claims within and across professional communities. As a potential new diagnostic method such as MEG, which represents an emerging epistemic object, becomes available, the reference standard may change over time. However, the processes of progressing acceptance of a diagnostic method into a standard have seldom been straightforward. Often, the status of reference standard as a solution is not awarded to the best-performing test available, but to the best test available under reasonable (efficient, practically optimal) conditions. The new method needs not only to be practically usable, but also to become integrated into already existing systems.

Hasu’s analyses26 show how MEG started to become a partially shared epistemic object between different practice domains; however, it has not yet become a reference-standard solution in clinical practice.

A phase of pre-clinical tests of MEG as a new diagnostic tool in two hospital contexts, in Finland and the USA, highlighted clashes of epistemic practices in terms of different epistemic objects. For instance, developers’ ignorance of clinical standards and lack of experience in the development of clinical procedures in related diagnostic tools, such as electroencephalography or magnetic resonance imaging, caused severe problems in terms of collaboration and communication with professionals in pre-clinical trials.27 In pre-clinical laboratory contexts led by non-clinical (male) experts, clinical practitioners experienced major difficulties in being seen and heard regarding their concerns about the practical operability and usability of the system.28 Certain practitioners, such as nurses and female medical doctors, experienced a lack of power, strategy and terminology in assertively voicing their concerns and points of view when interacting with the developers in the epistemic domain dominated by ‘high-tech geniuses’, as they named the low-temperature physics engineers.26,29 They felt that their work for improving the implementation setting was not recognised. Using Hasu’s analyses26 as a starting point, a network meeting with facilitated dialogue between technology developers and clinical users was arranged.30

The clashes between practice domains manifested in miscommunications and breakdowns in operating the medical technology at clinical user sites. They revealed critical blind spots, interpreted as a lack of a shared object and a need for a partially shared epistemic object. Hasu’s analyses26 suggest that, if a technological artefact is to become a clinical tool and part of clinical practice and clinical service, its developers need to take an interest in the epistemic object and practice of the clinical professionals (to see the technological artefact as a clinical epistemic object, a tool for its users). In addition, the clinical staff as tool users need to take some interest in the epistemic objects of the developers (to see the clinical tool as a technological epistemic object, the artefact)26,27 and invest time in influencing its application prerequisites. This requires laborious and dedicated rounds of shared communicative actions in various local contexts and practice domains, as well as new, shared representations to reconfigure—even reinvent—the artefact into a viable tool.

This type of critical transition in terms of epistemic practices and related local competences can be seen in the implementation and reconfiguration of health care information systems, as contemporary information systems are not tailor-made for health care organisations.31 Practitioners participating in implementation projects may have difficulties in identifying the often unvoiced clashes between participant groups that come with different epistemic practices. There can also be invisible work at the implementation sites in terms of preparation and coordination that does not belong to any of the main practice domains. Making sense of the complexity may require a special facilitator competence that is seldom included in projects.

DISCUSSION

The examples presented above illustrate how professionals’ engagement with the digital tools and information systems initially believed to provide solutions generates a need for exploration and negotiation to make the resources useful. When approached in specific practice contexts, technologies tend to turn into epistemic objects whose multiple opportunities for interpretation and use spur further investigation and a need for the reconfiguration of the practice and the tool itself. These modes of engagement go beyond instrumental use. They form a core dynamic in practitioners’ work-based learning as they move between what is and what is yet to be, or, in other words, what is known and what remains to be explored or improved.

As we briefly reviewed in our introduction, a range of studies within the sociology of professions and information systems research have shown how the introduction of digital tools and information systems is not straightforward and how decision making in professional practice is challenging. This paper highlights the knowledge work professionals need to do in order to make sense of, develop and adapt digital resources for local use. By employing epistemic practices as an analytical concept, it is possible to further distinguish what such work entails in epistemic terms and bring awareness to the specific ways of assessing and justifying knowledge claims in various communities. This insight implies an important critique of the discourse of solutionism as a means to secure the quality and efficiency of professional services. If we acknowledge the professional foundation of health care work, the practices used to safeguard knowledge and justify actions should be seen as key to securing the quality of services.
Moreover, the enactment of epistemic practices and the objects under scrutiny connect local professional practices with extended knowledge worlds. This is important because staying connected to wider knowledge developments is critical both for professionals’ motivation and for ensuring that actions are grounded in professional ways of knowing. As we have shown, however, this cannot work as a simple top-down mechanism through which readymade solutions are imported to specific work settings. Rather, practitioners need to have the resources and competencies necessary to allow them to take responsibility for examining the knowledge mediated through tools and information systems, and for stabilising this knowledge to ensure responsible use.

These insights raise a number of new questions and challenges, such as how tasks and responsibilities in work settings can be distributed in such a way that most professionals can engage in explorative and constructive modes of practice, thereby becoming included in wider loops of development. Moreover, for research on professional practice and learning, the issue concerns how we can (re)theorise professional identity, agency and commitment in a way that takes engagement with unfolding knowledge objects into account. Recent research shows that workers tend to encounter new tools and technologies in different ways relative to their level of competency and status in the work community. Those with lower status and less competency tend to accept solutions and procedures as given, rather than engaging in examining their assumptions and implications. To maintain the quality of health care services and to ensure that workers are given long-term opportunities to stay included in the work community, it is vital to secure access to expansive work and learning experiences for all. This may also be a matter of managing status differences between different expert communities, as our second example shows.

Another set of questions concerns professional education and the qualification of newcomers: How can education programmes prepare students to work in a state of insecurity and, at the same time, provide them with the necessary means to cope? How can the capacity to resist solutionism and quick fixes be enhanced so that future professionals will raise the necessary critical questions and more deeply engage in questions about the knowledge and assumptions underlying professional practice? One way to address these questions is to pay more attention to epistemic practices as a means of handling complexity. As collective strategies for exploring, assessing, critically examining and justifying knowledge claims, these practices constitute a collective knowledge-generating and warranting system that may relieve individual practitioners of some of the burden without limiting their critical and explorative engagement. We will conclude with some possible implications for professional education.

7 | IMPLICATIONS FOR MEDICAL EDUCATION

Professional education may be seen as the main arena in which students are introduced to and enrolled in the expert culture and practices of their future profession. As such, identifying the core epistemic practices in the profession, and ensuring students’ access to and participation in these practices during their initial education is important. Scholars in the engineering domain have recently attempted to identify and describe epistemic practices in that profession as a basis for designing education programmes. A similar approach is likely to be useful in medical education. Such an approach could draw attention toward important practices that go beyond immediate problem solving or instrumental use of knowledge in clinical settings and more broadly engage students in exploring, assessing and legitimising the knowledge claims that are believed to inform their professional actions in a given situation. This extends beyond training in practical skills and includes forms of epistemic reflexivity toward the procedures and guidelines for actions students are presented with in various situations. For instance, although simulation training and problem-based learning are important and widely used pedagogical approaches to the fostering of work-related skills and competencies in medical education, one can imagine these approaches complemented with open-ended forms of inquiry learning. In the discursive landscape of solutionism, it seems increasingly important that students learn to investigate aspects of the knowledge base underlying medical procedures, critically examine how medical knowledge is represented in and translated through the digital technologies used in health care, and gain experience in assessing evidence that potentially may inform various cases. Experiences from other education contexts suggest that such inquiry processes are better organised as group work, among other things, because it stimulates the need to justify claims.

Moreover, engaging students in epistemic practices is a productive way of introducing them to the wider machinery of knowledge construction in their profession. By making the connections between specific problems, knowledge sources and the actors engaged in generating these sources transparent, students and other actors may expand their understanding of their tasks and, more generally, of the field of knowledge and how it evolves. This has proved valuable in other contexts, such as in legal education, in which insights into the role that different knowledge-generating and warranting actors take in the evolving professional culture were found to make students aware of what sources they could trust and for what purposes. The examples presented in this paper show how skillful practice often requires consideration of the wider machinery to, for instance, assess the relevance of knowledge sources or validity of claims. To prepare students for such challenges, providing procedures and predefined solutions to problems is not sufficient. Students must learn to identify and frame problems, assess the possible implications of different routes of action, analyse the various implementation contexts of new knowledge, and communicate with others to explore and justify the rationales for their final decisions. In this way, knowledge may become actionable for the practitioner in a way that simultaneously makes the actions knowledgeable. This dual process provides a more robust way of thinking than that offered through the discourse of solutionism.

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CONFLICT OF INTEREST

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Both authors contributed equally to the conception and design of this paper, and to the drafting and revision of the text. Both authors approved the final manuscript for publication.

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