Chapter 7
Epistemic Cultures and Trust in Professional Work in Norway: Explorations into Three Settings in Nursing

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Introduction

Professions may be conceptualised as expert communities which, on the basis of specialist knowledge and competencies, are entrusted with responsibilities for core services in society. The basis for professional work today lies, as in previous times, in the capacity to perform work in ways that are informed, guided by and validated against shared knowledge and established conventions for practice. At the same time, it is recognised generally that a profession's knowledge is not stable, but rather contested and subjected to continual transformations (Bechmann et al., 2009; Jensen et al., 2012). Knowledge is marked by uncertainty, in both trustworthiness and how it should be best employed. This ambiguity generates different efforts and strategies for restoring trust, securing the quality of practice and enhancing the further development of professions as expert communities.

One aspect in this regard is the ways in which discourses of managerialism enter professions and pave the way for new accountability regimes and their related allocations of responsibilities. A culture of performativity comes to the fore, in which professionals are entrusted on the basis of their ability to achieve a set of performance indicators audited by external actors and systems (Brint, 2001; Dent & Whitehead, 2002). Researchers have expressed concern that this development may lead to deprofessionalisation or deskilling, as these indicators give rise to direct regulation of work, decreasing the space for professional judgement (e.g., Forrester, 2000; Strathern, 2000; Carey, 2007; Broom et al., 2009).

Another aspect is that several professional communities, including the nursing profession, now reorient themselves and establish new or closer links to science. The quest for certainty in an ambiguous world, as well as the general emphasis given to science-generated knowledge in today's society, give rise to new

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relationships between research and professional practice, generating an overall emphasis on making practice 'knowledge-based'. New subfields of science emerge, with special responsibilities for serving professions. Today, typically in many professional fields, an extended research orientation toward education and work exists (Nerland & Jensen, 2014).

In the wake of these developments, expectations on practitioners are changing in ways that also open up new responsibilities for knowledge. From the perspective of the sociology of professions, professional work is described as a matter of, "applying somewhat abstract knowledge to particular cases" (Abbott, 1988: 8). While one can argue that this description always has been simplistic as a way of conceptualising professional work, it is increasingly one-sided. Professionals today often are faced with tasks that imply active engagement with knowledge beyond contexts of application. Also included are responsibilities for selecting, validating and safeguarding knowledge in the context of work; analysing and documenting incidents and activities; and engaging oneself in exploring opportunities for improvement (Callon, 2002; Levay & Waks, 2009; Jensen et al., 2012).

In a wider context, professionals' knowledge world and its related standards and strategies for producing and warranting knowledge stretch beyond the nation-state and into an extended globalised space (Brint, 2001). As explained by Collier and Ong (2005), more abstract and symbolic modes of representation give rise to 'global forms' of knowledge, i.e., forms that have a "capacity for decontextualization and recontextualization, abstractability and movement, across diverse social and cultural situations and spheres of life" (op.cit, 11). Such forms of knowledge circulate quickly across various sites, while simultaneously needing to be 'localised' to become useful in specific practices. This localisation, in turn, highlights critical questions with respect to epistemic trust, such as, "Whom or what do we believe? How do we decide?" How does one "design arrangements to facilitate these judgements?" (Van House, 2002: 2).

The above developments have led to researchers arguing that today's society and work realms are infused with knowledge. Knorr Cetina (2002), a researcher in science studies, describes this development in terms of knowledge processes spreading in society, which also elicits ideas about unbounded processes and outcome uncertainty. Not only are products of science dispersed – i.e., science-generated knowledge in different material and symbolic forms – but also modes of practice characteristic of scientific institutions. As Knorr Cetina (2002: 177) expresses it, the emergence of the knowledge society involves "more than the presence of more experts, more technological gadgets, more specialists rather than participant interpretations. It involves the presence of knowledge processes themselves (…) It involves the presence of epistemic practice." However, what this means in professional contexts is not clear. Knorr Cetina argues that despite all the discussions about contemporary Western society as a knowledge society, little attention has been paid to the nature of knowledge processes and the workings of expert systems. Furthermore, as expert communities become increasingly specialised and positioned with responsibilities for continuous services and problem-solving, epistemic practices and processes are likely to be distributed in different ways among various

settings, roles and tasks that simultaneously depend on each other and come together to form the profession's local and extended knowledge base. To understand how trust in knowledge is established and maintained today, we need to consider this wider dynamic.

To shed light on knowledge processes and the workings of expert systems, Knorr Cetina introduces the concept of epistemic cultures, which she asserts are structural features of knowledge societies and are not limited to science. She defines *epistemic cultures* (emphasis in original) as "those amalgams of arrangements and mechanisms…which, in a given field, *make up how we know what we know*" (Knorr Cetina, 1999: 1). This chapter employs perspectives and concepts from Knorr Cetina to discuss how professional work is embedded in knowledge cultures. Our interest is not to map the knowledge culture as such, but rather to discuss how the safeguarding of knowledge in and for professional work poses challenges that involve professionals in different types of epistemic practices. The challenges resemble 'wicked-problem situations' (Kastenhofer, 2011) that typically are marked by uncertain facts, disputed values, high stakes and the need for urgent decisions. Moreover, they include problems related to a multitude of sites for the production of evidence, and many epistemic cultures and actors are involved (ibid.). Taking the nursing profession in Norway as an example, we explore how such problems generate safeguarding and warranting practices in different knowledge settings, with special attention given to how tasks, roles and agencies are distributed and how they form different epistemic orientations that intersect, producing and safeguarding professional knowledge.

The chapter is organised as follows. First, we present more in-depth core premises and concepts in the epistemic culture perspective. Next, we provide a short portrait of the nursing profession as embedded in epistemic cultures. Then we draw on research carried out in two Norwegian projects on nurses' knowledge work to illustrate how the perspectives and concepts launched in this chapter may be used to explore issues related to ensuring trust. We conclude by discussing what the chosen perspective may contribute to our ways of conceptualising how trust in knowledge is established and maintained in professional work.

Epistemic Cultures and Trust Practices

Delineated as, "cultures that create and warrant knowledge" (Knorr Cetina, 1999), the concept of epistemic culture highlights the logics and arrangements through which knowledge comes into being and is circulated, approached and collectively recognised within expert communities. On the one hand, such logics and arrangements incorporate common characteristics of how knowledge is produced and recognised in contemporary society. For instance, in our times, we have witnessed a general expectation to make processes related to knowledge production transparent and to include user value as one criterion for recognising valuable knowledge (Gibbons et al., 1994; Knorr Cetina, 2002; Bechmann et al., 2009). On the other

hand, they carry features that are distinctive for the knowledge domain in question, thereby providing analytical means to distinguish between different domains and disciplines. Knorr Cetina suggests that the word 'culture' is appropriate as it alludes to a richness of factors, including history and ongoing events; attention to symbols and meaning; and especially, diversity.

She further roots her definition of culture in practice: the acts of making knowledge and the dynamic patterns of activity that vary in different settings of expertise. She is interested not in the production of knowledge, but in the construction of "the machineries of knowing composed of practices", technical (e.g., tools and instruments) and social (e.g. how decisions are made). She argues that these machineries comprise knowledge and actors, i.e., epistemic subjects (in our case, individual professionals and collectives, in addition to their tools and instruments), which are shaped and determined by the practices and machineries of knowing. Hence, one might say that in this perspective, it is the community that knows. What we consider 'good' work, whom we believe and how we decide, are determined and learned in the wider epistemic communities of professions. While epistemic cultures operate in specific knowledge settings, their knowledge and practices reach far beyond the immediate contexts of local work. For example, in nursing, we see the emergence of new organisations and community formations that operate on different levels in society to produce, as well as safeguard and warrant, knowledge. Knorr Cetina (2007: 367) uses the concept of macro-epistemics to draw attention to increasing knowledge-verifying units and organisations that, "take on specific knowledge-related tasks in larger knowledge contexts." For example, these may include organisations responsible for synthesising evidence and setting standards for knowledge-based practice in specific domains, such as the Cochrane centres[1], or agencies that certify knowledge products and expertise on a multi-national scale. She claims further that in today's society, such entities and organisations form networks and linkages that come to constitute what she terms as the larger 'machineries' of knowledge construction.

Accordingly, knowledge and practice in a profession like nursing are embedded in complex machineries that comprise a range of organisations, levels and agencies. Focusing on nursing and its ways of handling knowledge, it also becomes clear that nurses typically are embedded in a multitude of epistemic cultures. For example, nursing's knowledge basis comprises contributions from bio-medical research, clinical practice and population studies, and it is formed at the intersection of different epistemic orientations. Knorr Cetina argues for magnifying this aspect of contemporary knowledge because it reveals the fragmentation of contemporary science, displaying, "different architectures of empirical approaches, specific constructions of the referent, particular ontologies of instruments and different social machines" (Knorr Cetina, 1999: 3). In other words, it elicits diversity within various fields,

[1] These are regional centres that contribute to evidence-based decision making in healthcare by producing high-quality independent research and systematic reviews that are free from commercial sponsorship. See https://consumers.cochrane.org/cochrane-and-systematic-reviews for more information.

producing vastly different products. For nurses, navigating this landscape requires the ability to handle the simultaneous presence of varied logics and knowledge representations, as well as negotiate different concerns and dilemmas. How this complexity is dealt with needs to be investigated empirically, but the concept of epistemic orientations provides a means for doing so. To discuss different epistemic orientations, we distinguish between orientations directed toward control, complexity and experience. At the same time, roles and responsibilities may be distributed across the profession in ways that generate different orientations, or ways of envisioning knowledge, among practitioners in different knowledge settings. Thus, epistemic cultures are complex loci of behaviours, and questions of authority, credibility, trust and expertise are, from this perspective, complex and contingent.

In the following sections, we illustrate how this perspective can be employed to explore epistemic practices in Norway's nursing profession by focusing on three settings in which knowledge credibility is at stake: the regulatory knowledge work of the nurses' professional association, the work of clinical nurse educators, and work that concerns validating and developing clinical nursing procedures in a hospital ward. Our focus is on epistemic trust, and the starting point for this investigation is the following question: By what means and practical devices is trust in knowledge generated? We begin by describing the nursing profession's characteristics and relation to science.

The Nursing Profession and the Development of an Expert Culture

The nursing profession has a long history of creating and maintaining links to science as a strategy to render knowledge credible[2]. Beginning in the context of establishing national and international nurses' associations at the beginning of the twentieth century, efforts to base the profession on science gradually moved toward university-based education (Wingender, 1995) and more overall efforts to prepare nurses by ensuring relevant education, competence development and further understanding of the profession's ethical standards.

In Nordic countries, nursing science was established as an academic discipline in Norway, Sweden and Finland in 1979–1980, with Denmark following soon afterward (Nieminen, 2008; Laiho, 2010). The discipline has been concerned with developing a research-centric knowledge basis for nursing and has been characterised by orientations toward complexity and experience, in the sense that human care and holistic work models have been emphasised. At the same time, keeping abreast of

[2] In line with other science-technology study (STS) researchers, Knorr Cetina rejects the assumption that science is a special form of knowledge production. However, because science has been much studied and is generally considered "the premier knowledge institution throughout the world" (Knorr Cetina, 1999: 1), it is often considered to be a useful source for understanding critical issues in society.

international developments has been important, facilitated by nurses' international cooperation and the embeddedness of nursing education in higher education institutions with international outreach (Hvalvik, 2005; Laiho, 2010). More recently, requirements for a scientific knowledge core of professional practice have been formalised in an overall agenda for evidence-based best practices (Nieminen, 2008). Professional associations play a key role as mediators, as do macro-epistemic organisations, e.g. the Cochrane collaboration (Holleman et al., 2006; Van Achterberg et al., 2006). Hence, an extended evidential culture geared toward validation and control has emerged. Efforts to 'scientise' different aspects of nurses' work form a core discourse today. However, organisations and professionals have implemented this differently. While evidential cultures create forms of knowledge that, "aspire to become a global standard" (Featherstone & Venn, 2006: 2), they need to be recontextualised to become relevant in local settings. This generates new roles and practices in the profession, which call for intellectual work (Purkis & Bjornsdottir, 2006), as well as a variety of epistemic practices, to be carried out. Moreover, to handle wicked problem situations, new strategies and arrangements come to the fore that seek to maintain a space for other epistemic cultures to influence professional knowledge and work. For example, this is reflected in efforts to balance experience-based knowledge development with a conceptualisation of nursing as 'intuitive' and care-oriented work (Purkis & Bjornsdottir, 2006; Nieminen, 2008).

In the wake of these developments, the nursing profession is characterised by a multitude of epistemic cultures and concerns, by transnational circuits of knowledge as well as a richness of epistemic practices related to vetting and warranting knowledge. The profession is embedded in larger machineries of knowledge construction, comprising a range of epistemic settings and agencies at macro, meso and micro levels. At the same time, activities carried out in different settings share an overall ambition of contributing to good practice and patient care.

In the following section, we focus on hospital nurses in Norway and how their work is framed through epistemic practices and machineries. Drawing on two larger Norwegian projects that investigated knowledge relations and learning across four professions, we look into the three aforementioned settings, where knowledge is at stake.

Trust Practices in Three Knowledge Settings in Norway

Our first example is taken from two studies that explore how professional associations engage themselves in efforts to produce, secure and disseminate knowledge in their professional domains (Karseth & Nerland, 2007; Nerland & Karseth, 2013). These studies focused on the different responsibilities and strategies taken by four associations in this respect, by means of analysing documents and debates and by interviewing core representatives in respective associations. In the following

section, we draw on a Norwegian Nurses Organisation (NNO)[3] analysis to illustrate ways in which this association has engaged in issues concerning trust in knowledge through several means.

From the time of its foundation, NNO has worked to ensure higher education at all levels for their students and have through this strategy been able to consolidate the profession of nurses as highly respected and trustworthy (Karseth & Nerland, 2007). In recent years, acknowledging the complexity of knowledge, NNO has expanded its engagement in several ways. One is by taking an intermediary role between the macro-epistemic landscape, nursing research, and professional practice. A core concern for NNO has been to uphold the importance of the value of various sources of knowledge in clinical practices. In describing the knowledge basis of nursing, NNO tries to combine different approaches and argues that different sources of knowledge lay the groundwork for knowledge-based practice. As stated in a document describing the discipline of nursing: "The use of knowledge-based practice implies that nurses use various sources of knowledge in clinical practice, among others research-based knowledge. At the same time, research-based knowledge is insufficient. Professional judgement based on clinical experience and ethical assessment, together with the patient's wishes, must be the basis for nursing actions" (NNO, 2008a: 6). To secure the development and availability of different types of knowledge, NNO engages actively in ordering research and reports on different aspects of professional practice. For instance, if insufficient research exists on certain medical issues within the wider epistemic culture, NNO may initiate and finance research on such issues, such as elderly home care.

Despite the aforementioned emphasis on a variety of knowledge, NNO exhibits overall concern about the lack of systematic documentation and uniformity in nurses' clinical work and its possible consequences for patient care. Hence, NNO is heavily engaged in standardising practice and promoting evidence based modes of work. NNO has a publishing house, Akribe, which provides a structure for developing and circulating knowledge on nurses' work. Akribe has, in partnership with NNO and research communities, developed 'Practical Procedures for the Nursing Service', a commercial ICT-based repository containing a set of basic, standardised nursing procedures that adhere to legal regulations, national standards, professional guidelines and research-based knowledge (Nes & Moen, 2010). The development of this repository stretches across epistemic settings and comprises a range of actors, from science communities to expert professional practitioners. Its embedded epistemic orientations are also manifold, as the procedures draw on results from laboratory sciences, which are oriented towards control; system-oriented research oriented towards complexity; and experience- oriented approaches based on medical practice (Kastenhofer, 2011).

These efforts also are directed toward other infrastructures for information and documentation, e.g. the electronic patient-record system. In 2008, NNO established

[3] This organisation was established in 1912 and is the only organisation for registered nurses in Norway. NNO speaks on behalf of all registered nurses, nurse specialists, midwives and public health nurses in Norway and has about 88,000 members.

a council to examine and assess the terminology used in this system. The council recommended creating the International Classification of Nursing Practice to establish terminology for documentation in Norway's nursing sector (Rotegaard & Ruland, 2010). In this way, NNO promotes a standardised professional language to link nurses' practice to scientific output and provide tools to categorise and generalise local experiences. This in turn becomes a structure for circulating research-based and experience-based knowledge across geographical regions, while simultaneously structuring how this can be done.

However, this concern for the evidential and standardised is balanced with efforts to promote experience-based knowledge. NNO argues for establishing a practice-based route toward a master's degree in nursing, a philosophy reflected in the formal organisation of NNO, which comprises more than 30 specialised professional interest groups through which NNO aims to create a meeting place for professional development and contribute to the development, application and dissemination of knowledge gained through both research and experience (NNO, 2008b). Through these groups, practitioners are invited to participate in epistemic practices beyond the contexts of local work. The interest groups form arenas for connecting local experience with general advancements in the discipline, as well as taking part in the profession's object-centred practices (Knorr Cetina 2001). In sum, the NNO's efforts constitute an important extended context for nurses' work and learning. In the next section, we move into the hospital setting and explore how knowledge is engaged within the professional setting of clinical nurse educators.

'Localising' Knowledge: The Work of Clinical-Nurse Educators in Norway

This example is taken from a study among clinical-nurse educators (hereafter CNEs) as they engage themselves in selecting, validating and translating knowledge for professional work (Christiansen et al., 2009). In Norway, the CNE position is held by registered nurses who have proven to be successful in their clinical practices and ideally (but not always) hold master's degrees. Currently, this position is being further academised with the introduction of the title 'research nurse'. In short, the CNEs have a twofold mandate. The first is directed toward bringing new and relevant science-based knowledge into the workplace, and the second is facilitating the use of it in professional practice. Hence, they are engaged in developing and warranting knowledge for practice within their different specialist areas. Such work previously has been described in terms of knowledge brokering (Meyer, 2010), in which the professionals involved move around to facilitate the distribution, translation and transformation of knowledge to render it more accountable and robust. It involves several vetting processes through which nurses' knowledge is managed, explored, locally materialised and circulated. In the present study, we held in-depth interviews with five CNEs and visited their respective departments within two large

hospitals. The data gathered also comprised photos and copies of material artefacts utilised and developed in their work.

Among CNEs' tasks is to identify science-generated knowledge to be utilised in the context of patient care and transform it into ready-to-use tools. The CNEs emphasise the development of handbooks containing procedures with related explanations and illustrations, which become material instantiations of good practice that nurses carry in their pockets. As one CNE described it, these handbooks are used frequently in daily care: "The nurse knows that the procedures in their books can be trusted. And particularly for the new ones (..), it becomes a checklist". The CNEs' role is to validate knowledge and ensure that the descriptions in the handbook are correct and properly understood. As one informant said, "To be 100% sure that no one makes a mistake, it is very detailed (…). We have even included pictures of the medical equipment so that no one will make a mistake."

The epistemic practices involved here are marked by validation and predominantly oriented toward control and closure. However, the CNEs simultaneously are very concerned about continually updating the handbooks. This implies remaining in touch with wider circuits of knowledge and comparing their work and artefact production with that carried out by colleagues elsewhere. To do this, CNEs form specialised networks between geographically dispersed hospital departments through which they share 'freebies' (e.g., reference lists, keywords for online searches and procedures) and insights in the latest developments within their areas of expertise. This represents explorative and investigative approaches to knowledge objects directed 'outward' and which temporarily are more complexity-oriented. While linking with macro-epistemic structures and more global circuits of knowledge, the CNEs express concern for not only 'absorbing what is out there', but also critically considering cultural differences and assessing knowledge that they bring into practice. In this regard, the distinct tradition of nursing in Scandinavia, which emphasises individual integrity, is highlighted. As one CNE put it:

> Even if the large, heavy results come from continental Europe, the caregiving nursing is different here. We think that Scandinavia is leading in this area, so we find it important to cooperate with those that we find to be leading thinkers in the field.

Viewed from an epistemic culture and practice perspective, two points should be made here. First, the notion of a distinct Scandinavian tradition gives rise to epistemic communities and practices at the meso-level, comprising specialists from different hospitals in a national and Scandinavian context. Second, the work taking place here involves negotiating different epistemic cultures when knowledge is explored. The human-centred tradition described above generates orientations toward experience, while more global evidential culture proposes an orientation toward control. The CNEs are positioned at the intersection of these ways of thinking. Through their identifying, validating and justifying practices, their work may lead to the development of a knowledge culture that integrates ideas from both human-centred approaches and control-oriented ones.

Another activity that CNEs organise is called Workplace Learning Forums (WLFs), comprising a more explorative site in which new questions and

possibilities open up. In this context, the nurses are oriented toward exploring knowledge complexity based on the many questions nurses have during their daily work. By taking notes on questions that arise between forums, the CNE can explore the issues raised. If the theme catches on, they may agree to invite colleagues from other hospitals to give a talk at a WLF, or even take things further by arranging a seminar open to all staff in the hospital. As one CNE expressed it, regarding her particular theme of interest (postnatal care):

> You can start with something, but it spreads. I work with newborns, but if you do that, you touch on themes like pain management and prenatal care (...) It's like throwing a stone in the water and watching the rings spread. (...) So, even if all our nurses are specialised, when people from Newborn, Pain and Prenatal meet (...) it's not hard to get a conversation going....

This quote points to how knowledge is interlinked in multiple ways and forms specialist areas. At the same time, it has the capacity to 'branch off' into new instantiations and practices. With reference to Knorr Cetina (2007), we can say that knowledge is self-multiplying, and in the context of nursing, its different expressions become assembled in new configurations in some activities, or dispersed in others. For nurses, workplace-learning forums provide other, more explorative knowledge practices than in the context of patient care. These contexts are interlinked through multidirectional mobilisation of questions and possible interpretations that interplay in forming conditions for nurses' learning. The workplace learning forums also function as access points to wider knowledge worlds beyond the frames of specific questions. The meetings are used to distribute information about conferences, seminars and new journals, and increasingly to 'leak results' from ongoing research by colleagues pursuing master's or PhD degrees.

In summary, CNEs' evolving practices comprise several modes of epistemic practice geared toward safeguarding knowledge. A third activity, in which CNEs are allocated core responsibilities, is the safeguarding and development of clinical procedures for nurses' work. This task engages both clinical nurse educators and nurses in the ward, and implies not only efforts to 'localise' knowledge, but also to document and standardise ways of working from 'below' in the local community.

Generating Trust 'from Below': Developing and Validating Clinical Guidelines

Our third example pertains to the setting and practices of revising and/or developing procedures for nurses' work and draws on results from the aforementioned study of CNEs, as well as on a longitudinal interview study in which the 'epistemic trajectories' of 10 clinical nurses were followed for over 8 years (Jensen, 2014). The interviews revealed how the clinical nurses increasingly became involved in epistemic practices that stretched beyond the context of local work, engaging themselves in efforts to create standards for good practice. One example is from an interview in

2005 with a nurse with 2 years of work experience who attended international conferences for 'lung people' to learn more about issues like 'running tests, asthma and the like'. Back home, she played an active role in forming a lung group in Norway that meets regularly for the purpose of standardising the way tests are performed. As she explains:

> Doctors do not normally conduct tests themselves, so we are aiming to form our own subgroup to develop procedures, real procedures, for different tests because I think it is a bit here and there around the country.

Other stories provide related descriptions of how clinical nurses assume responsibilities for developing standards and procedures, often based on interests and voluntary participation. When re-interviewed in 2009, all the nurses, in one way or another, had been engaged in activities related to procedural development in collecting and summarising clinical-trial reports, in scoring and ranking these according to their level of evidence or in summarising results and representing them in an easily understandable form. Whether reflecting greater work experience or shifts in knowledge arrangements, the nurses describe a shift in focus from how to process information to how to produce and secure knowledge. As described by one informant:

> Now I have experienced nursing from a different angle and, hence, have a different outlook. For example, I now look for the difference between effective and ineffective ways of organising not only mine, but nurses' collective work.
>
> So you take a different approach to knowledge than before?
>
> Yes, I think we all do. We are far more systematic … and channel our attention. One may or may not contribute to further development, and most nurses pay attention to what is going on and want to learn more. But that's not going to make a difference in patient treatment. It is more about universal rules, what happens in other places (…) It is more about finding your place in a wider framework.

These examples point to how nurses become involved in efforts to safeguard knowledge and how they understand that their work is embedded in a wider machinery of knowledge construction. They also indicate efforts to bridge gaps between orientations toward experience and control. Procedural development represents complex problem situations marked by uncertainty and a multitude of evidence and concerns.

In the hospitals where informants work, procedures had a life span of 2 years, after which they needed to be looked over and reapproved. However, initiatives to revise or produce new procedures could come from nurses' own needs. In the first case, the collective exploration and discussion of the validity of established procedures contribute to making the evaluation criteria that are present in their production explicit. In this context, rules, conventions and technologies developed by the Cochrane centre and other macro-epistemic agencies are used as a framework. Hence, the very principles for warranting knowledge for nursing practice are in play, and since this profession is embedded in several epistemic cultures, the principles need to be negotiated and justified. In the second case, principles for identifying knowledge and standardising procedures are also in play, but in this case, the epistemic practices comprise more explorative work prior to validation. In the case

in question, the nurses engage in work to develop a model for developing procedures and protocols in one of the hospitals (Jensen, 2014). The history behind this model entails one of the CNEs working in Australia for a while, where nurses became accustomed to asking questions about clinical practice and working according to the principles of evidence-based practice (EBP), then introducing this system to Norway upon his return. He initiated a pilot project in his department with a goal of developing evidence-based nursing protocols in the intensive care unit where he worked (which turned out to be successful). From this experience, it spread throughout the hospital and was on its way to being utilised in other hospitals. The model's core component entails small interdisciplinary groups trained in EBP, facilitated by a clinical educator and nurses working in the wards. The work is organised in line with a five-step model developed by Sackett (2000). Our description is based on an interview with the CNE, as well as the materials he supplied.

First, the group meets to discuss clinical scenarios and formulate questions. A 'PICO' form – Patient/problem (type of patient and illness, e.g., prenatal), Intervention (what type of treatment it concerns), Comparison (what the intervention is compared with) and Outcome (intended effect) – can be completed. By considering these issues, a question that serves as a basis for extant-literature searches is formulated. Say your question is: 'In the neonatal population, what amount of sucrose is safe and efficient to relieve pain?' The next step is to search relevant databases. Hospital librarians, who have extensive experience facilitating searches, can provide lists of possible websites. All searches are described comprehensively, and this documentation is included as an appendix to the finished protocol/guideline. The third step is to evaluate the quality of the search. It is recommended that group members read all the articles they have found to ensure they can discuss their content and quality. Here, knowledge claims are judged in relation to the amount and quality of evidence mustered in their support. The group also fills out a form stating the relevant evidence and each article's quality. In the fourth step, the protocols are written or updated based on the evidence found and group members' clinical experiences. In this process, what is possible to do in the relevant wards is considered within the context of the hospital's resources. The best evidence found is combined with their own clinical experiences to write protocols that are usable in the wards. The fifth step involves signing off on the procedures. The signature here serves as a proxy confirming the procedures' validity and truth-like status.

What becomes clear here is that the nurses have taken on and become involved in strategies for producing and warranting knowledge for use in their local environments. Furthermore, while knowledge is in some contexts subjected to validation efforts, testing and types of evidence-making oriented toward closure and (preliminary) fixedness, other contexts form an explorative tool in which new questions and possibilities are opened up in an elaborative manner.

Concluding Discussion

This chapter has introduced an epistemic culture perspective and its related concepts as a framework for exploring issues related to epistemic trust. In developing the notion of epistemic cultures, Knorr Cetina has opened the black box on knowledge processes, introducing concepts that are useful for capturing the inner workings of expert communities and the ways in which they work to safeguard and warrant knowledge. Four aspects of Knorr Cetina's framework are particularly important here.

First, this perspective foregrounds the collective nature of knowledge essential to professional work, in which we rely on others who are present or distant (known and unknown) (e.g. Van House, 2002). Hence, the framework brings into focus the type of trust of most interest in this chapter, which has been called epistemic trust; i.e., how knowledge is made sufficiently trustworthy for use.

Second, the idea that knowers are produced by epistemic cultures highlights that professionals' understanding of what is important and valuable stems from education and the communities in which they participate and are trained. Our research shows the key role that the Norwegian Nurses Organisation (NNO) has played with respect to preparing individual knowers by ensuring relevant education and competence development. It also shows that the NNO has worked to ensure that collective infrastructures exist to safeguard knowledge. Indeed, a key strategy with respect to safeguarding professional knowledge and work has been to affirm the significance of shared standards that can be promoted as research-based and aligned with what the organisation perceives as 'best practices'.

Third, Knorr Cetina's framework emphasises the amalgam of practices and mechanisms, i.e., the variety of efforts and strategies related to ensuring trust in knowledge. By doing so, it provides a tool for theorising trust relationships beyond the boundaries of a single site. Hence, we see how both education and work activities undertaken in other settings are important, as well as how these come together to make knowledge accountable. The work and roles of clinical nurse educators, along with the described models and arrangements for creating local repositories, protocols and work procedures, represent intermediate sites where knowledge is vetted and epistemic trust becomes materially instantiated through practices of signing procedures. Thus, by emphasising practice – the actual day-to-day work activities in which people in different settings perform to make knowledge accountable – we observed how trust and credibility are essential elements in professional work. However, the significance of these cannot be studied at a single analytical site, so we call for researchers to study multiple locations and occurrences.

Fourth, the framework emphasises diversity and discontinuity. By viewing the challenges of safeguarding knowledge in and for professional work as a matter of negotiating different epistemic cultures for handling complex, wicked problem situations, we have illustrated how nurses become oriented toward control and establish standards that aim to link their work with standards for identifying, validating and justifying knowledge in their profession. At the same time, they emphasise the

importance of experience-based knowledge and patient-centeredness, while creating work arrangements that allow experiences and questions from practice to emerge and fuel collective exploration. This chapter shows how the tension between control and complexity is resolved in nurses' work through roles and agencies in different knowledge settings that interplay in complex ways to produce and safeguard nursing knowledge.

Last, but not least, the notion of epistemic cultures and their distinct strategies and orientations provides a basis for distinguishing between different expert cultures, revealing specific ways in which knowledge is produced and warranted in different areas of expertise. Hence, the framework is useful, for comparative purposes, in revealing how professions differ in their strategies and orientations toward developing and safeguarding knowledge. Taken together, the examples above show how the nursing profession is infused with strategies, arrangements and epistemic practices designed to generate trust in knowledge.

Inevitably, aspects of importance in trust exist that Knorr Cetina's perspective does not address sufficiently. By focusing on knowledge and its related processes, other aspects of social and organisational life may fall out of scope. For instance, the epistemic culture perspective does not address power mechanisms or questions related to social standing. This means that the variety in professions' social positions and history in different countries is not addressed. Furthermore, regarding other perspectives on trust, we may argue that this perspective does not sufficiently address how professional work rests on affect-based trust and may conceal the role of trust in expectations. Thus, rather than basing conceptualisations of professional practice and learning solely on this chapter's spotlighted perspectives, Knorr Cetina's approach should be further developed and combined with other perspectives to highlight the epistemic dimensions of such activities.

References

Abbott, A. (1988). *The system of the professions: An essay on the division of expert labour*. University of Chicago Press.

Bechmann, G., Gorokhov, V., & Stehr, N. (2009). *The social integration of science: Institutional and epistemological aspects of the transformation of knowledge in modern society*. Edition Sigma.

Brint, S. (2001). Professionals and the 'knowledge economy': Rethinking the theory of postindustrial society. *Current Sociology, 49*(4), 101–132.

Broom, A., Adams, J., & Tovey, P. (2009). Evidence-based healthcare in practice: A study of clinician resistance, professional de-skilling and inter-specialty differentiation in oncology. *Social Science & Medicine, 68*(1), 192–200.

Callon, M. (2002). Writing and (re)writing devices as tools for managing complexity. In J. Law & A. Mol (Eds.), *Complexities: Social studies of knowledge practices* (pp. 191–217). Duke University Press.

Carey, M. (2007). White-Collar Proletariat? Braverman, the deskilling/upskilling of social work and the paradoxical life of the agency care manager. *Journal of Social Work, 7*(1), 93–114.

Christiansen, B., Carlsten, T. C., & Jensen, K. (2009). Fagutviklingssykepleieren som brobygger mellom forskning og klinisk praksis [The role of the advanced nurse practitioner in bridging the gap between research and clinical practice]. *Sykepleien Forskning, 4*(2), 100–106.

Collier, S. J., & Ong, A. (2005). Global assemblages, anthropological problems. In S. J. Collier & A. Ong (Eds.), *Global assemblages: Technology, politics and ethics as anthropological problems* (pp. 3–21). Blackwell Publishing.

Dent, M., & Whitehead, S. (2002). Configuring the 'new' professional. In M. Dent & S. Whitehead (Eds.), *Managing professional identities: Knowledge, performativity and the 'new' professional* (pp. 1–16). Routledge.

Featherstone, M., & Venn, C. (2006). Problematising global knowledge and the new encyclopaedia project: An introduction. *Theory, Culture & Society, 23*(2–3), 1–20.

Forrester, G. (2000). Professional autonomy versus managerial control: The experience of teachers in an English primary school. *International Studies in Sociology of Education, 10*(2), 133–151.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge*. Thousand Oaks.

Holleman, G., Eliens, A., van Vliet, M., & van Achterberg, T. (2006). Promotion of evidence-based practice by professional nursing associations: Literature review. *Journal of Advanced Nursing, 53*(6), 702–709.

Hvalvik, S. (2005). *Bergljot Larsson og den moderne sykepleien*. Akribe.

Jensen, K. (2014). Signing communities. Dealing with non-knowledge: Some cases from nursing. *Professions & Professionalism, 4*(2), 1–13.

Jensen, K., Lahn, L., & Nerland, M. (2012). A cultural perspective on knowledge and professional learning. In K. Jensen, L. Lahn, & M. Nerland (Eds.), *Professional learning in the knowledge society* (pp. 1–26). Sense Publishers.

Karseth, B., & Nerland, M. (2007). Building professionalism in a knowledge society: Examining discourses of knowledge in four professional associations. *Journal of Education and Work, 20*(4), 335–355.

Kastenhofer, K. (2011). Risk assessment of emerging technologies and post-normal science. *Science, Technology & Human Values, 36*(3), 307–333.

Knorr Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Harvard University Press.

Knorr Cetina, K. (2002). Transitions in post-social knowledge societies. In E. Ben Rafael & Y. Sternberg (Eds.), *Identity, culture and globalisation* (pp. 611–628). Brill Academic Publishers.

Knorr Cetina, K. (2007). Culture in global knowledge societies: Knowledge cultures and epistemic cultures. *Interdisciplinary Science Reviews, 32*(4), 361–375.

Laiho, A. (2010). Academisation of nursing education in the Nordic countries. *Higher Education, 60*(6), 641–656.

Levay, C., & Waks, C. (2009). Professions and the pursuit of transparency in health care: Two cases of soft autonomy. *Organisation Studies, 30*(5), 509–527.

Meyer, M. (2010). The rise of the knowledge broker. *Science Communication, 32*(1), 118–127.

Nerland, M., & Karseth, B. (2013). The knowledge work of professional associations: Approaches to standardisation and forms of legitimisation. *Journal of Education and Work, 28*(1), 1–23.

Nerland, M., & Jensen, K. (2014). Changing cultures of knowledge and professional learning. In S. Billett, C. Harteis, & H. Gruber (Eds.), *International handbook of research in professional and practice-based learning* (pp. 611–640). Springer.

Nes, S., & Moen, A. (2010). Constructing standards: A study of nurses negotiating with multiple modes of knowledge. *Journal of Workplace Learning, 22*(6), 376–393.

Nieminen, P. (2008). Caught in the science trap? A case study of the relationship between nurses and 'their' science. In J. Välimaa & O.-H. Ylijoki (Eds.), *Cultural perspectives on higher education* (pp. 127–141). Springer.

NNO. (2008a). *Sykepleie: Et selvstendig fag* [About nursing as an independent and professional field]. Norsk Sykepleierforbund.

NNO. (2008b). *Norwegian Nurses Organisation's (NNO's) objectives, statement of principles and constitution (2008–2011)*. Norsk Sykepleierforbund.
Purkis, M. E., & Bjornsdottir, K. (2006). Intelligent nursing: Accounting for knowledge as action in practice. *Nursing Philosophy, 7*(4), 247–256.
Rotegaard, A. K., & Ruland, C. M. (2010). Patient centredness in terminologies: Coverage of health assets concepts in the International Classification of Nursing Practice. *Journal of Biomedical Informatics, 43*(5), 805–811.
Sackett, D. L. (2000). *Evidence-based medicine: How to practise and teach EBM* (2nd ed.). Churchill Livingstone.
Strathern, M. (2000). The tyranny of transparency. *British Educational Research Journal, 26*(3), 309–321.
Van Achterberg, T., Holleman, G., van de Ven, M., Grypdonck, M., Eliens, A., & van Vliet, M. (2006). Promoting evidence-based practice: The roles and activities of professional nurses' associations. *Journal of Advanced Nursing, 53*(5), 605–612.
Van House, N. A. (2002). *Trust and epistemic communities in biodiversity data sharing* (JCDL 2002). ACM Press.
Wingender, N. B. (1995). *Fem svaner i flok: sygeplejerskers samarbejde i Norden 1920–1995*. SSN: Aarhuus Stiftstrykkerie.

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