

Inquiry in health knowledge management

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Abstract

Purpose – The purpose of this paper is to reduce ambiguity in diverse approaches to health knowledge management by surfacing key issues, perspectives and philosophical assumptions.

Design/methodology/approach – Knowledge management research in health is critically reviewed. Issues are grouped into research domains, and examined in the light of associated knowledge management perspectives, and philosophical assumptions.

Findings – Systemic complexity in health knowledge management derives from tensions within and between issues in three domains: specific value-laden aspects of clinic practice (knowledge creation); integration of workplace practice into generic process flows (knowledge normalization); and the technical integration of disparate information systems (knowledge application). These concepts are related to three knowledge management perspectives, viz., personal values, social norms and objective facts, respectively. Both domains and perspectives are anchored in philosophical assumptions about the interests served by knowledge (viz., emancipatory, practical, and technical), and in approaches to inquiry (critical pluralist, interpretivist, and positivist).

Research limitations/implications – The findings are based on selected literature about Western health care practices

Practical implications – The framework assists understanding of the practical reasoning that motivates the use of technology in health knowledge management. The conceptual linkages that are developed are of value to practitioners and researchers sensitive to the intertwining of facts, norms and values.

Originality/value – In total, the concepts and relations developed in this paper constitute both a framework for inquiry in health knowledge management, and a normative theory for a critique of patient care. Recognising, and articulating, the relative importance one ascribes to facts, norms, and values is crucial in tackling the hard problems in health knowledge management.

Keywords Health and medicine, Knowledge management, Knowledge creation, Patient care

Paper type Research paper

Introduction

Before Hanna even enters the scanning room, a contradiction arises. Ultrasound examinations are a routine element of Western maternity care. They are designed to reduce anxiety, and often succeed in doing so, yet at the same time they provoke it (Büscher and Jensen, 2007, p. 25).

Health knowledge management is a discipline that has emerged in tandem with the establishment of the “knowledge economy” – the emergent economic era in which intellectual, rather than physical, capital is the principle source of wealth and power. The belief that putting intellectual capital effectively to work in organizations will create unique competitive advantage motivates researchers and practitioners to unlock the potential of knowledge which is supposedly lying dormant within the organization. “If only we knew what we know” (Davenport and Prusak, 1998, p. xii) is a phrase often cited in knowledge management that captures practitioners concerns about their limited ability to identify their

most important intellectual resources, and to utilize those resources in ways which positively impacts the performance of their firm.

While these broad principles of knowledge management are straightforward, the concept of “knowledge” has proved to be far more elusive. The term has been used rather loosely in the literature. It is for this reason that knowledge management has been criticised as management fad. Some have argued that in much of the literature “knowledge” is synonymous with “information” and that “knowledge management” is merely marketing rhetoric which replaced “information management” when “information” fell out of fashion with consultants (Wilson, 2002).

There is evidence that knowledge management is not just another passing management fad. Ten years after knowledge management first became popular there continues to be significant literature output (Peachy and Hall, 2005). Furthermore, a preliminary time-series analysis of knowledge management article counts suggest that knowledge management is not following the same “boom-bust” cycle as Quality Circles, Total Quality Management, and Business Process Re-engineering (Ponzi and Koenig, 2002). Therefore, this paper is motivated by the assumption that knowledge management is a useful endeavour, but that foundational work is needed to achieve a satisfactory level of conceptual coherence about research output, and to promote mutual understanding among knowledge management researchers.

There still remains the problem that the elusive nature of knowledge makes it difficult to make sense of the knowledge management literature as a whole. As a discipline, knowledge management is replete with frameworks, theories, and definitions that altogether lack cohesiveness and conceptual integration (Guo and Sheffield, 2006). One consequence of this is that debates among knowledge management researchers appear to focus almost exclusively on empirical studies and the reporting of facts. With a few exceptions (primarily from outside of the USA), there is no discussion about values (ethics) and no attempt to reach consensus on the shape of the discipline. In particular, there is little attempt to surface the assumptions underlying knowledge management research, so as to provide a conceptual foundation with the potential to reduce fragmentation, and to develop mutually supportive links between theory and practice. Papers such as Marshall and Brady (2001) which examine conceptual linkages among facts, organizational norms and values in a business setting are rare.

This research is part of a larger study that promotes conceptual integration in the knowledge management discipline via awareness of one’s epistemic commitments and those of others. The objective of the larger study is to analyse the philosophical assumptions of knowledge management perspectives and theoretical frameworks that emerge from the knowledge management literature, and to draw implications from this analysis. In other words, the larger study aims to interpret the way in which those perspectives and theoretical frameworks treat knowledge and then examine how that affects their use in guiding research and practice in knowledge management.

This study focuses on conceptual development in a specific application domain, namely that of health knowledge management. There is widespread agreement that patient care is provided by health practitioners in a systemically-complex environment. Conceptual development is required to identify underlying values, norms and expertise, and the way that these are intertwined. The research aims is to reduce ambiguity in diverse approaches to health knowledge management by linking issues to broader knowledge management

“Another useful approach to understanding knowledge is to identify taxonomies.”

“A knowledge perspective/type may be associated with multiple knowledge interests/approaches to inquiry.”

perspectives and philosophical assumptions. The resulting framework for inquiry constitutes a normative theory for a critique of patient care.

The remainder of this paper is organized as follows. The next three sections identify conceptual domains in health knowledge management, knowledge management perspectives, and philosophical assumptions, respectively. The penultimate section discusses the results and the last section concludes the research.

Conceptual domains in health knowledge management

On the table there are several documents: a rehabilitation plan, paper-based patient records and personal notebooks for each of the professionals. The atmosphere in the room is marked by intense concentration (Ellingsen, 2003, p. 45).

An enormous challenge, however, is how to construct representations that are meaningful to all health professionals who work with a patient (Ellingsen, 2003, p. 49).

A critical review

An early study (Hansen *et al.*, 1999) ascribes quite different knowledge management strategies to two healthcare organisations, Access Health and the Memorial Sloan-Kettering Cancer Centre in New York City. Access Health, a call-in medical centre, viewed knowledge as explicit and adopted a “codification” strategy that provides high-quality, reliable and fast information systems and the re-use of codified knowledge. Memorial Sloan-Kettering Cancer Centre in New York City viewed knowledge as tacit and adopted a “personalization” strategy that provides creative, analytically rigorous advice on high-level strategic problems by channelling individual expertise.

Hansen *et al.* (1999) may be read as suggesting that a whole organisation can adopt a single strategy, and thereby avoid the complexity of dealing with situations that call for the management of intertwined tacit and explicit knowledge. The assumption at Access Health is that knowledge about all products and services is standardized, and will retain its usefulness and meaning as it is captured from many individuals and re-used by many others. The assumption at Memorial Sloan-Kettering is that all products and services are customized, and that innovation stems from the sharing of intuition and know-how by individuals. This either-or logic may not apply to other organizations, which need strategies for managing intertwined tacit and explicit knowledge.

For example, Ellingsen and Monteiro (2003a) argue that today's hospitals must combine codification and personalization strategies in an environment of technological, organizational, institutional, and political complexity. Hospital executives “do not believe that information technology supports health's operational processes, particularly in clinical areas” (England and Stewart, 2007). Physicians are concerned about their “inability to customize the system to make it do what I want it to do”, as well as about costs, lack of universal or national standards, and integration issues (Vishwanath and Scamurra, 2007, pp. 127-8). It remains unclear what assumptions underlie mixed strategies developed for work practices in situations where individuals or groups – and thus the organisation as a whole – regularly deal with situations involving intertwined explicit knowledge, tacit knowledge, and politics. These issues are addressed below.

Access Health and the explicit knowledge management strategy remain as a vision of the benefits of efficient exercise of technical expertise and technology (knowledge application). The management of explicit knowledge is currently supported by electronic patient record systems (Ellingsen, 2003), and evidence-based healthcare (Bali and Dwivedi, 2007), that

have proven useful to patients and doctors alike (Cauldwell *et al.*, 2007; McGrath *et al.*, 2007; Seeley, 2007). However electronic patient record systems have proven to be heterogeneous (Ellingsen and Monteiro, 2003a) and there are difficulties with the collection and dissemination of evidence (Jaded *et al.*, 2000). Aidemark (2005) proposes that implementing a hospital intranet involves a “delicate trade-off between social and cognitive perspectives” and that “these two aspects must be handled in an interconnected and balanced way”. While health informatics technology reduces heterogeneity (e.g. see www.orionhealth.com/products.htm), standardization is seen as a necessary but insufficient goal for health knowledge management. For success, knowledge application requires the technical integration of disparate systems used in different but interdependent specialty units such as accident and emergency, pathology and imaging (Martin *et al.*, 2007).

Memorial Sloan-Kettering and the tacit knowledge management strategy remain as a vision of effective communities of practise (knowledge normalization). Bate and Robert (2002) proposes that the use of a collaborative methodology will contribute to the improvement of the National Health system in the United Kingdom. They describe the role played by different types of “communities of practice” in moving the NHS from “explicit” evidence to “tacit” experience; from “information” to “knowledge”; and from “knowledge application” to “knowledge creation”. These conceptual linkages and related themes are also addressed by the Association of State and Territorial Health Officials (ASTHO) (2005); Bali and Dwivedi (2007); Ellingsen and Monteiro (2003b); and Van Beveren (2003). For success, knowledge normalization requires the integration of workplace procedures in different but interdependent specialty units that form elements of generic process flows (Jenkins, 2007; Martin *et al.*, 2007).

The authors cited above provide considerable evidence that an individual's own value commitments and their commitments to the values and norms associated with their role and/or professional group (viz, patient, health practitioner specialty, academic researcher, or a mixture of these, and other roles) are important in personal and organizational learning (knowledge creation). Caring informs the knowledge created during the patient-health worker encounter in a particular context, such as in an operating theatre (Svensson, 2007), maternity care (Büscher and Jensen, 2007), or mental healthcare (Clarke *et al.*, 2007). In such contexts knowledge emerges directly from individuals, their social resources, and emergent patterns of conduct, communication and collaboration. Information and other technologies are not separate objects but capabilities embedded in the flow of work (Hindmarsh *et al.*, 2007). For success, knowledge creation requires the integration of the system with specific, value-laden aspects of work practices (Martin *et al.*, 2007).

Disambiguating divergent perspectives

Four proposals can be inferred from the literature reviewed above. First, the dominant purpose of a large majority of articles falls naturally into one of three domains: knowledge application, knowledge normalization, and knowledge creation. In each domain nuanced approaches to health management are required to identify the issues, and to interpret patterns of findings from different research approaches. Second, most articles recognise that these domains are mutually interdependent, and that success requires initiatives in one domain to be carefully integrated with practice in other domains. Third, integration work in these three domains must be integrated with wider organizational concerns, including relationships with funding agencies and other interest groups. Fourth, no papers provide foundational theory to support all four types of integration work. Yet in many organizations patient care is provided by health practitioners in a systemically-complex environment in which expertise, norms, and values are intertwined. In summary, the review suggests that research is required in health knowledge management to build the foundational theory necessary for a normative critique of patient care, and that this theory must establish relations to three distinct but mutually interdependent conceptual domains: the exercise of technical expertise and technology (knowledge application); communities of practise (knowledge normalization); and personal learning (knowledge creation).

Knowledge management perspectives

Self-reflection on, and expression of, personal values is required in any examination of how knowledge is, and ought to be, linked to power, and power to knowledge.

Hierarchical perspective

Some 40 frameworks in published knowledge management research are reviewed in Lehaney *et al.* (2004). Older knowledge management frameworks defined knowledge by distinguishing it from data and information and placing them all onto a three-level hierarchy as shown in Figure 1. Stenmark (2002) explains that the hierarchy is an extension of the relationship between data and information established in Information Systems: data are raw facts and figures; information is processed data made meaningful by placing it in a context relevant to the recipient of that information. Knowledge is then information somehow transformed to make it more valuable than the original information.

Underlying this hierarchy appears to be the perspective of knowledge as an object – an object which is the result of processing two more fundamental objects lower in the hierarchy. This assumes that knowledge can be universal. For example, two individuals both possessing the same mental framework (e.g. relevant professional training) can obtain the same knowledge if they both have access to the same information, which was previously derived from the same data. The implication of this for organizations is the imperative to generate knowledge by building systems which can move up the hierarchy. Of course, such an imperative presupposes that knowledge creates the capability for action, i.e. individuals, and collectively, organizations will know what to do with the knowledge once it is obtained.

Other perspectives

Hierarchical and other knowledge perspectives from Alavi and Leidner (2001) and their implication for knowledge management research and practice are summarised in Table I. Knowledge as an object, access to information and a capability has been alluded to above. Alavi and Leidner (2001) explain that one source of “personal knowledge” is the “personalization” that occurs when an individual evaluates objective information against previous knowledge, then incorporates it into his or her current knowledge. In contrast to the assumption of knowledge as an object, Stenmark (2002) notes that the perspectives of knowledge as a state of mind, process and capability alternatively regard knowledge as action-oriented, socially-situated and context-dependent. This idea will be developed further in the discussion of knowledge taxonomies below.

Knowledge taxonomies

Another useful approach to understanding knowledge is to identify taxonomies, i.e. the orderly classifications of different types of knowledge that are intended to provide comprehensive coverage via a parsimonious set of well-defined categories. Perhaps the most widely-adopted taxonomy of knowledge in knowledge management is the distinction between “tacit” and “explicit” knowledge as popularised by Nonaka (1994), and Nonaka and Takeuchi (1995). Tacit knowledge can be thought of as that which we inherently know

Figure 1 The data, information, knowledge hierarchy

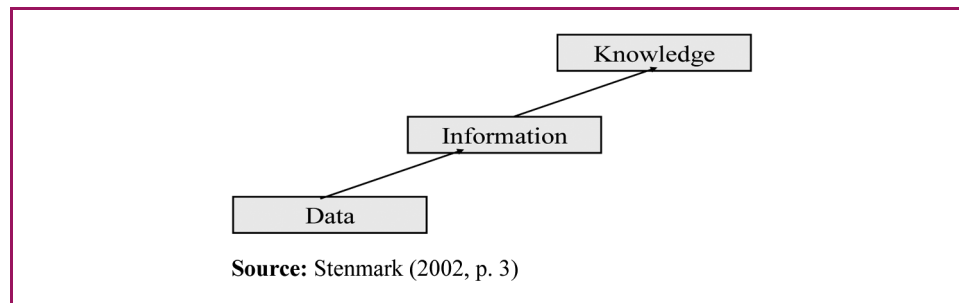


Table I Other perspectives on knowledge

<i>Perspectives</i>	<i>Definitions</i>	<i>Implications for knowledge management</i>
Knowledge <i>vis-à-vis</i> data and information	Data is facts, raw numbers. Information is processed/interpreted data. Knowledge is personalized information.	Knowledge management focuses on exposing individuals to potentially useful information and facilitating assimilation of information
State of mind	Knowledge is the state of knowing and understanding.	Knowledge management involves enhancing individual's learning and understanding through provision of information
Object	Knowledge is an object to be stored and manipulated.	Key knowledge management issue is building and managing knowledge stocks
Process	Knowledge is a process of applying expertise.	Knowledge management focus is on knowledge flows and the process of creation, sharing, and distributing knowledge
Access to information	Knowledge is a condition of access to information.	Knowledge management focus is organized access to and retrieval of content
Capability	Knowledge is the potential to influence action.	Knowledge management is about building core competencies and understanding strategic know-how

Source: Alavi and Leidner, 2001, p. 111

but find difficult to articulate and explain. Alavi and Leidner (2001), quoting Nonaka (1994, p. 110), describe tacit knowledge as "rooted in action, experience, and involvement in a specific context" and comprised of cognitive elements, including "mental models, beliefs, paradigms, and view-points", and technical elements, including "concrete know-how, crafts, and skills which apply to a specific context". On the other hand, explicit knowledge has been "articulated, codified, and communicated" in some form (Nonaka, 1994, p. 110).

Table II provides examples of the knowledge types identified by Alavi and Leidner (2001, p. 113). These knowledge types include: tacit/explicit knowledge, mode of knowledge creation/existence (mind of the individual, norms of the social collective), knowledge-orientation (know-about, know-how, know-why, know-when, know-with), and pragmatic classifications.

While the above taxonomies are useful, their simplicity does not fully capture the aspects of knowledge phenomena that are "multi-faceted and complex" (Blackler, 1995, p. 1,032). A more sophisticated classification scheme is offered by Blackler (1995) who identifies five

Table II A taxonomy based on Alavi and Leidner (2001)

<i>Knowledge types</i>	<i>Definitions</i>	<i>Examples</i>
Tacit	Knowledge is rooted in actions, experience, and involvement in a specific context	Ways of approaching an individual patient
Cognitive tacit	Mental models	Individual's belief on cause effect relationships
Technical tacit	Know-how applicable to specific work	Surgery skills
Explicit	Articulated, generalized knowledge	Knowledge of types of patients, illnesses, and treatments
Individual	Created by, and inherent in, the individual	Insights gained from completed project
Social	Created by, and inherent in, collective actions of a group	Norms for inter-group communication
Declarative	Know-about	What drug is appropriate for an illness
Procedural	Know-how	When to administer a particular drug
Causal	Know-why	Understanding why the drug works
Conditional	Know-when	Understanding when to prescribe the drug
Relational	Know-with	Understanding how the drug interacts with other drugs
Pragmatic	Useful knowledge for an organization	Best practices, treatment protocols, case analyses, post mortems

Table III A taxonomy based on Blackler (1995)

<i>Knowledge type</i>	<i>Description</i>
Embodied	"Knowledge that is action oriented and is likely to be only partly explicit", p. 1,024; practical thinking
Embedded	"Knowledge which resides in systemic routines", p. 1,024; emerges through relationships and material resources
Embrained	"Knowledge that is dependent on conceptual skills and cognitive abilities", p. 1,023; abstract thinking
Encultured	"The process of achieving shared understanding", p. 1,024; emerges specifically through inter-personal interaction within groups
Encoded	"Information conveyed by signs and symbols", p. 1,025; explicit knowledge

knowledge types (embodied, embedded, embrained, encultured, encoded) in his review of the organizational learning literature. An overview of those knowledge types is given in Table III.

Analysing the taxonomies presented in Tables II and III shows that they also have commonalities and underlying perspectives just as did the hierarchical and other perspectives presented earlier. To begin, the examples of knowledge under the knowledge-orientation (know-about, know-how, know-why, know-when, know-with) and pragmatic classifications appear mostly oriented towards describing knowledge either contained within or associated with rules. These could actually be subsumed under the embrained knowledge type – knowledge associated with abstract thinking. As such, these classifications share in common an underlying perspective of knowledge that is generalized and universal – which corresponds to knowledge as an object. This perspective also underlies the explicit/encoded knowledge type (the two terms are synonymous).

In contrast, the underlying perspective of both the social and encultured knowledge types (which are almost synonymous, differing only in that the former is static and the latter is dynamic) is that knowledge is action-oriented, socially-situated, and context-dependent. Key assumptions of this perspective are that knowledge is emergent and that it is only meaningful when interpreted in the specific context created by previous emergence. Meaning is recursive in the sense that it operates on a previous meaning, which operates on previous meaning, etc. The passing of time sediments social knowledge into layers that can only be understood by historical excavation. There are several implications of this perspective. First, organizations cannot hope to "know what they know" until an event occurs that calls for putting organizational knowledge into action. Second, an intervention that attempts to manage knowledge as a "thing" to be extracted, transferred, stored and applied is misguided. Instead the focus should be an appreciation of the interpersonal relationships and social conditions ("the way we do things around here") which facilitate shared understanding and meaning between individuals. Third, an appreciation of how existing organizational knowledge both enables and constrains the creation and normalisation of new organizational knowledge could provide a useful perspective on how knowledge evolves within particular organizations.

Another underlying perspective on knowledge that has not been discussed yet is that knowledge is inherently value-laden. Health professionals are motivated by values, such as those enshrined in the Hippocratic Oath, that are distinct from those in other professions and sectors of the economy. This value-laden perspective can be interpreted as consistent with the popular definition of knowledge as a "justified true belief" (Nonaka and Takeuchi, 1995, p. 21) because beliefs are founded on feelings which in turn are associated with values. While this perspective underlies both the social and personal knowledge types, it is arguably more relevant to personal knowledge considering that knowledge by way of mutual understanding within a collective does not guarantee equivalent positions regarding the validity of that knowledge among individuals (Marshall

and Brady, 2001). In other words, an individual does not have to personally accept what is known in the organization. An implication of this perspective is that it allows for ethical considerations in knowledge management if individuals are free to examine and challenge the values and interests motivating knowledge. Self-reflection on, and expression of, personal values is required in any examination of how knowledge is, and ought to be, linked to power, and power to knowledge. Another implication is that an organization will become more open to the possibility of radical change if individuals at all levels of an organization feel they can challenge the established “way we do things around here” without repercussion.

The preceding discussion has identified three underlying perspectives on knowledge: objective, social and personal. So far, each knowledge type has been linked to just one of these underlying perspectives. However, it should be noted that these perspectives are neither mutually exclusive nor incompatible with each other. This is illustrated by the tacit knowledge type, which can be interpreted as incorporating all three perspectives. First, we can perceive tacit knowledge as an object because it has the potential to be articulated as if it were a heuristic. A heuristic can be considered a generalization because it can be applied in different contexts. However, a heuristic will never be a rule because its application depends upon the judgement of the actor who is applying it. In this way the social perspective also underlies tacit knowledge because tacit knowledge is grounded in experience and emerges through action sensitive to context. Third, because tacit knowledge exists within the mind it must also incorporate values and therefore be guided by the interests of the knower. Finally, while the social knowledge perspective strongly underlies both the embodied and embedded knowledge types they can also be seen to partially incorporate the perspective of knowledge as an object as well.

Philosophical assumptions

Health is a challenging environment with many interest groups (England and Stewart, 2007, p. 5).

Knowledge interests

In our exploration of hierarchical and other perspectives on knowledge, and knowledge taxonomies, a framework which identifies three fundamental perspectives of knowledge (objective, social and personal) has begun to develop. This section will continue to develop this framework by adopting the three “knowledge interests” examined by Habermas (1987b) in *Knowledge and Human Interests* and located in the “knowledge worlds” described in his Theory of Communicative Action, Habermas (1984, 1987a). The reason for drawing on Habermas is because he provides a more precise articulation of the three underlying perspectives of knowledge already identified.

Jürgen Habermas is a prominent German philosopher and sociologist. His Theory of Communicative Action can be broadly described as concerned with “discourse ethics” (Endres, 1996). Within his theory, Habermas defines the “system-world” and the “life-world”. The system-world is the totality of social systems whereas the life-world is the totality of an individual’s lived experiences. Each is defined via its relationships to three broad classes of knowledge (“knowledge worlds”) and the purpose (“knowledge interest”) and focus of attention (“concern”) motivating each. The first world of knowledge is “the objective world, which represents facts independent of human thought and serves as a common reference point for determining truth”. The second knowledge world is “the social

“The health knowledge management literature is characterized by its relationship to three conceptual domains: personal learning, communities of practice; and the exercise of technical expertise and technology.”

Table IV Knowledge interests			
<i>Knowledge interest</i>	<i>Technical</i>	<i>Practical</i>	<i>Emancipatory</i>
Knowledge world	The objective world, which represents facts independent of human thought and serves as a common reference point for determining truth	The social world, comprised of inter-subjective relationships	The personal or subjective world of private experiences
Concern	Instrumental interventions for controlling humans' interaction with the physical world	Achieving shared interpretation and meaning between individuals	Self-reflexivity and recognizing "systematic communicative distortions"

world, comprised of inter-subjective relationships." The third knowledge world is "the subjective world of private experiences" (Endres, 1996). The purposes served or knowledge interests associated with each of these knowledge worlds are identified as technical, practical and emancipatory, respectively. The technical interest is concerned with instrumental interventions for controlling humans' interaction with the physical world. The practical knowledge interest is concerned with achieving shared interpretation and meaning between individuals. The emancipatory knowledge interest is concerned with recognising one's own value commitments (self-reflexivity), and "systematic communicative distortions" (Guo and Sheffield, 2006, p. 2), including those that are the result of excessive and/or improper application of the system-world to the life-world, and which cause the latter to become emaciated, hollowed-out or "colonized" (see Table IV).

Approaches to inquiry

Habermas's knowledge interests are aligned with approaches to inquiry commonly used in a wide variety of research settings (Cavana *et al.*, 2001), including those involving considerable ambiguity, confusion and conflict (Sheffield, 2004). All research reflects assumptions about what exists (ontology) and what counts as valid knowledge of that reality (epistemology), although these assumptions may be tacit rather than explicit. The authors' experience is that an inability to express one's underlying epistemic commitment increases ambiguity and leads to dysfunctional communication, e.g. a personalisation and escalation of the conflict, and a resort to silence, dogmatism, and the exercise of power. On the other hand, an ability to articulate one's own ontological and epistemological commitment reduces ambiguity and increases perceived validity and mutual understanding. Interpersonal conflict understood as commitments to different epistemologies thus reduces communicative distortions.

Habermas's technical knowledge interest reflects an ontological assumption that reality is structured in a law-like manner independent of human intervention; and the criteria for valid knowledge is technical excellence validated by objective truth. Habermas's practical knowledge interest reflects an ontological assumption that warrants (and is warranted by) the constructionist belief in meaning as it is interpreted, understood, and shared; and valid knowledge is interpersonal consensus validated by rightness. Habermas's emancipatory knowledge interest reflects an ontological assumption that improvement in the human

Table V Approaches to inquiry			
<i>Approaches to inquiry</i>	<i>Positivist</i>	<i>Interpretivist</i>	<i>Critical pluralist</i>
Ontological assumptions	Reality is structured in a law-like manner independent of human intervention	Constructionist belief in meaning as it is interpreted, understood, and shared	Improvement requires a dialectical synthesis of, and a self-reflection on, both technical and practical approaches
Criteria for valid knowledge	Technical excellence validated by objective truth	Interpersonal consensus validated by rightness	Personal commitment validated by truthfulness

Table VI Philosophical assumptions of health knowledge management domains

<i>Philosophical assumption</i>	Technical Positivist Objective (facts)	Practical Interpretivist Social (norms)	Emancipatory Critical pluralist Personal (values)
<i>Stenmark (2002)</i>			
Data, information, knowledge hierarchy	XXX		
State of mind		XXX	
Object	XXX		
Process		XXX	
Access to information	XXX		
Capability		XXX	
<i>Alavi and Leidner (2001)</i>			
Tacit	XX	XX	XX
Explicit	XXX		
Individual			XXX
Social		XXX	
Declarative	XXX		
Procedural	XXX		
Causal	XXX		
Conditional	XXX		
Relational	XXX		
Pragmatic	XXX		
<i>Blackler (1995)</i>			
Embodied	X	XXX	
Embedded	X	XXX	
Embrained	XXX		
Encultured		XXX	
Encoded	XXX		
Conceptual domain in health knowledge management	Knowledge application	Knowledge normalization	Knowledge creation

condition requires a dialectical synthesis of, and a self-reflection on, both technical and practical knowledge interests; and valid knowledge is personal commitment validated by truthfulness (see Table V).

In summary, the three Habermasian knowledge interests (technical, practical and emancipatory) and their corresponding approaches to inquiry (positivist, interpretivist and critical pluralist) provide a rich store of theoretical concepts to support the objective, social, and personal perspectives of knowledge that were seen as underlying the hierarchical and other knowledge perspectives and taxonomies identified in the previous sections.

Results and discussion

She steps forward and points at the indication of the blood pressure on the monitor screen and tells Michael, "I think this is pain" (Svensson, 2007, p. 18).

Mapping knowledge management perspectives to philosophical assumptions

Aligning each knowledge perspective/type with the appropriate knowledge interest/approach to inquiry surfaces the underlying theoretical perspective and epistemological commitment. For example, the declarative, procedural, causal, conditional and relational knowledge types presented in Table II all have a common technical interest in explaining, controlling, and predicting phenomena concerned with human "work" as defined by Habermas. This insight, together with the concepts discussed in previous sections, lead to the mapping of knowledge perspectives and types defined by Alavi and Leidner (2001), Blackler (1995), Nonaka and Takeuchi (1995) and Stenmark (2002) onto the knowledge interests/approaches to inquiry developed by Habermas and others. A key assumption is that these knowledge interests/approaches to inquiry are broad enough to provide a comprehensive categorization of knowledge. Because knowledge phenomena

are inherently complex and multi-dimensional these categories are not mutually exclusive. A knowledge perspective/type may be associated with multiple knowledge interests/approaches to inquiry. At the risk of oversimplifying the richness of the relationships the result is presented graphically in Table VI. The presence of one or more "X" represents the strength of association between a particular knowledge perspective/type and a particular knowledge interest/approach to inquiry. The conceptual domains in health knowledge management (knowledge application, knowledge normalization, and knowledge creation) are included at the base of Table VI.

To summarize, the purpose of this study is to reduce ambiguity in the patchwork quilt of approaches to health knowledge management by searching for conceptual domains and stitching these into broader knowledge management perspectives and philosophical assumptions. The health knowledge management literature is characterised by its relationships to three conceptual domains: personal learning (knowledge creation); communities of practise (knowledge normalization); and the exercise of technical expertise and technology (knowledge application). These concepts are related to three knowledge management perspectives, viz., personal values, social norms and objective facts, respectively. Both domains and perspectives are anchored in philosophical assumptions about the interests served by knowledge (viz., emancipatory, practical, and technical), and in approaches to inquiry (critical pluralist, interpretivist, and positivist).

Conclusion

In total, the concepts and relations developed in this paper constitute both a framework for inquiry in health knowledge management, and a normative theory for a critique of patient care. The framework may be useful to researchers and practitioners for three reasons. Firstly, the objective or factual basis for the theory constitutes a resource supportive of technical excellence. Secondly, the social or normative basis of the theory is supportive of interpersonal consensus about, and practical action towards, issues that are recursively intertwined. Thirdly, the personal or value-driven aspects of the theory may guide the self-reflection of individuals who experience conflict between technical and practical approaches, and conflict between how knowledge is, and should be, linked to power.

The development of such conceptual linkages is of value to practitioners and researchers interested in the practical reasoning that informs the use of technology in health knowledge management. The conceptual linkages that are developed are of value to practitioners and researchers sensitive to the intertwining of facts, norms and values. Recognising, and articulating, the relative importance one ascribes to each is crucial in tackling the hard problems in knowledge management. More generally, the paper contributes to the literature that seeks to understand systemic complexity in health knowledge management via awareness of one's epistemic commitments and those of others. An important limitation is that the findings are based on selected literature about Western health care practices. Subsequent research studies will further investigate the links between the health knowledge management, theoretical frameworks for in the broader knowledge management literature, and systems of inquiry.

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