

Systems Perspectives in Health Knowledge Management

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Abstract

This paper reviews three cases from the health knowledge management literature chosen as examples of a separate focus on critical, soft, and hard systems. These prioritise knowledge normalisation, and knowledge application, respectively. The case on operating theatre relationships prioritises knowledge creation via a focus on personal experience, and interpretations and judgments made under severe time constraints. Memorial Sloan-Kettering Cancer Centre in New York City prioritizes knowledge normalization via extensive consultations among specialists to achieve a consensus for action. Access Health prioritizes knowledge application via the execution of standardized procedures using explicit knowledge. In practice, all three systems perspectives operate simultaneously. Each provides evaluation criteria that guide distinct aspects of systems integration. Yet the tensions remain, and attempts to resolve them may account for many of the stresses of working in health.

Keywords

Multiple perspectives, systemic intervention, competing values

1. INTRODUCTION

“Knowledge management, as a field of study, has suffered from issues of definition since before the term caught the attention of practicing managers and IS professionals. Put simply, it is unclear what it is that everyone is trying so hard to manage.” [1]

As suggested by the above quote, knowledge management is a diverse field that means different things to different people. The purpose of this short paper is to identify the dominant perspectives in the field, and the challenge of integrating them. Three perspectives on health knowledge management may be discerned in the literature. [2] The first perspective proposes that health organizations have different types of knowledge, and that identifying and examining these will lead to more effective means for generating, sharing and managing knowledge in organizations. This perspective treats knowledge as standardized and applicable across social contexts. Improvement in patient care is sought in the development of explicit organization-wide policy, procedures and technologies. This perspective is called “Knowledge Application” (*Hard systems*). A second perspective on knowledge in health organisations proposes that knowledge is inseparable from knowing how to get things done, or ‘know how’. Improvement in patient care is sought in the collective capability to organize. This perspective is called “Knowledge Normalization” (*Soft systems*). A third perspective on knowledge in health organisations proposes that knowledge is aspirational and contested. Improvement in patient care is sought in focus is development of trust and expression of personal values. This perspective is called “Knowledge Creation” (*Critical systems*).

It is important to emphasize that each of these perspectives constitutes a facet, or partial view, of an underlying complex phenomenon. It is not suggested that knowledge creation, normalization, and application form a linear flow observable in health organizations. The principle that organizes these perspectives is not “work flow” but “degree of structure”. Knowledge application refers to knowledge that is out in the open for everyone to see, as though it was an object, solid as a brick, with properties that are well-defined. Knowledge normalization refers to the pattern of interaction of health workers and patients, who collectively have the ability to respond in an innovative (i.e., less structured) way. Knowledge creation is the acts of individuals that are directly born from their own personal experience. In a way knowledge perspectives are analogous to the three states of matter – solid, liquid and gas. These distinctions are a useful way to think about what, in health practice, should be solid, structured and stable over time and place; what should rightly belong to the fluid organizing capability and norms of a workgroup; and what should be celebrated as something that emerges instantly and intuitively from the experience and aspirations of individuals. As an elementary example, computers and patient record systems

store and disseminate data objects with great efficiency, but are not endowed with the self-organizing capability of workgroups, or the aspirations of individuals to do better.

Section two investigates these three facets of knowledge via an examination of three health knowledge management cases. Each has been chosen as an exemplar of just one perspective. Section three introduces the work being undertaken to integrate them. The stresses of health work should emerge in some clarity from an appreciation of just how different these perspectives are, and how difficult it is to get the right weight on each.

2. THREE SYSTEMS PERSPECTIVES ON KNOWLEDGE

This paper reviews three cases from the health knowledge management literature. These prioritise knowledge creation, knowledge normalisation, and knowledge application, respectively.

2.1 Knowledge Created by Operating Theatre Relationships [3]

Svennson (2007) discusses the personal responsibility for patient care of an anaesthesiologist in an operating theatre. Existing technical expertise and prior experience in operating theatres is necessary but not sufficient. In this case the focus is not on pre-existing or a priori issues, but on the dynamics of individual problem solving, and the relationships between physicians, anaesthesiologists, and supporting alarm technology.

Knowledge in this context is viewed primarily as personal experience. Because an individual's sensations and perceptions change in seconds, personal experience is volatile, or unstructured. Consequently the physician-patient interaction is marked by a time-critical commitment to care.

The overriding goal in this case is personal (ethical) practice, as enshrined in the Hippocratic Oath. Physicians have been known to express frustration with resource constraints and long patient waiting lists for surgery. The assumption underlying this view is that knowledge is both aspirational and contested. Negotiation across heterogeneous roles (health worker, operations management, financial, governance) is required to resolve conflict. Evaluation is based on 'truthfulness' (sincerity of personal values). The focus of systemic development is the development of trust and the psychological safety that supports the expression of personal values.

Systems theorists would say that a 'critical' systems perspective has been adopted that focuses on the personal aspects of emergence. Those interested in research methods would say that interpretive and critical research paradigms are likely to be adopted, so as to focus on both personal values and power relations. All of the above are characteristics of an organisational unit that focuses on knowledge creation. (Table 1).

Table 1. Three Perspectives on Knowledge

Knowledge perspective	<i>Knowledge creation</i>	<i>Knowledge normalization</i>	<i>Knowledge application</i>
Case	Operating Theatre Relationships (Svensson, 2007)	Memorial Sloan-Kettering Cancer Centre in NY City (Hansen et al., 1999)	Access Health (Hansen et al., 1999).
Topics discussed	Roles and relationships in an operating theatre	Health care for patients whose needs are complex	Multiple walk-in medical centres across the USA.
Knowledge	Knowledge viewed as personal experience	Knowledge is viewed as social action (<i>tacit, emergent</i>).	Knowledge is viewed as a representational object (<i>explicit, a priori</i>)
Degree of observable structure	Personal experience is fluid and dynamic, or unstructured.	Intra-group and inter-group norms are semi-structured.	Evidence base is stable, and structured.
Focus on time interval	Sensations and perceptions change in seconds.	Expectations attached to roles are stable for weeks.	Best practice procedures may be stable for years.
Physician-patient interaction	Marked by a time-critical commitment to care	Marked by extensive consultations to reach a consensus position	Marked by extensive classification codes and standardized procedures.
Goal	The goal is personal (ethical) practice	The goal is sufficient mutual understanding of each presenting patient.	The goal is the efficient application of evidence from previous cases.
Assumption	The assumption is that knowledge is both aspirational and contested.	The assumption is that all cases are unique and that knowledge is innovation within a social context.	The assumption is that knowledge is standardized and applicable across diverse social contexts
Evaluation	Evaluation is based on ‘ <i>truthfulness</i> ’ (sincerity of personal values)”	Evaluation is based on the ‘ <i>rightness</i> ’ of community norms.	Evaluation is based on the <i>objective truth</i> of the evidence base.
Focus of systemic development	Development of <i>trust</i> and expression of personal values	Development of a broad consensus through dialogue	Development of explicit organization-wide <i>policy</i> , and technical procedures
Research paradigm and focus	Interpretivist or critical, focussing on personal values	Positivist or interpretivist, focussing on social norms	Positivist, focussing on objective facts
Systems theoretical perspective	Critical systems, focussing on the personal experience	Soft systems, focussing on the social aspects of emergence	Hard systems, focussing on knowledge that has emerged

2.2 Knowledge Normalization in Memorial Sloan-Kettering Cancer Centre in New York City [4]

Memorial Sloan-Kettering Cancer Centre in New York City (Hansen et al, 1999) typically cares for patients whose needs are complex. Existing technical expertise is necessary but not sufficient - considerable judgment is also required. Multiple interacting health workers are required in the treatment of a single patient. Memorial Sloan-Kettering views knowledge as emergent from a local community of practice, or tacit. The organization has adopted a 'personalization' strategy. This is based on the creative channelling of individual capabilities via the norms guiding each semi-autonomous community of practice. Because technical expertise is located inside the clinic it is updated as an integral part of the individual and organisational learning that occurs naturally in clinical practice.

In this context, knowledge is viewed as tacit, and emergent in social action. Because expectations attached to roles are stable for weeks, intra-group and inter-group norms are semi-structured. Physician-patient interaction is marked by extensive consultations among specialists to reach a consensus position.

The overriding goal is to obtain sufficient mutual understanding of each presenting patient. The assumption at Memorial Sloan-Kettering is that all cases are unique, and that innovation stems from the sharing of intuition and know-how by individual physicians in a particular context. Evaluation is based primarily on the 'rightness' of community norms. The focus of systemic development is therefore the development of a broad consensus on norms governing intergroup interactions.

Systems theorists would say that a 'soft' systems perspective has been adopted that focuses on the social aspects of emergence. Those interested in research methods would say that positivist and interpretive research paradigms are likely to be adopted, so as to focus on human agency and social norms. All of the above are characteristics of an organisational unit, or organisation, that focuses on knowledge normalization. (Table 1).

2.3 Knowledge Application at Access Health [4]

Access Health (Hansen et al, 1999) operates multiple walk-in medical centres across the USA. Cost containment is a major objective. Because more difficult cases are referred elsewhere, existing technical expertise is considered to be sufficient. Unless efficiency considerations determine otherwise, only a single health worker treats a patient. To meet the requirements for efficiency, Access Health views knowledge as clear or explicit and adopts a 'codification' strategy based on rules and the re-use of pre-existing knowledge. Heavy reliance is placed on the use of information sourced from technical specialists outside of clinical practice, and delivered to the clinic via computer technology. The case provides no information on how the computer data is updated in the light of practice.

In short, knowledge is viewed primarily as an explicit, a priori representational object. Because the evidence base is stable and structured, procedures recognised as 'best practice' may be stable for years at a time. Physician-patient interaction is marked by extensive classification codes and evidence-based medicine.

An important organizational goal is the efficient application of evidence from previous cases. The assumption is that knowledge is standardized and applicable across geographically dispersed social contexts. Evaluation is based primarily on the 'objective truth' of the evidence base. The focus of any system-wide or 'systemic' development is the development of explicit organization-wide policy, procedures, and technologies.

Systems theorists would describe Access Health as having adopted a 'hard systems' perspective, meaning that the focus is on knowledge that has already emerged, and constitutes an evidence base that may be accessed remotely via computer technology. Those interested in research methods would say that a positivist research paradigm has been adopted that focuses on utility and objective facts. All of the above are characteristics of an organisation that focuses on knowledge application. (Table 1).

2.4 Summary

The cases presented above prioritise knowledge creation, knowledge normalisation, and knowledge application, respectively. Operating theatre relationships prioritise knowledge creation via a focus on the personal aspects of emergence, and prospective and retrospective sensemaking in real time. Memorial Sloan-Kettering Cancer Centre in New York City prioritizes knowledge normalization via a consensus for action reached by consultations among specialists that operationalize tacit or emergent knowledge. Access Health prioritizes knowledge application via the execution of standardized procedures using explicit knowledge.

3. THE INTEGRATION CHALLENGE

"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"

“An enormous challenge, however, is how to construct representations that are meaningful to all health professionals who work with a patient.” [5]

In practice, reliance on a single strategy is not without its difficulties. Knowledge application via the use of standardized (“global”) electronic patient record systems in heterogeneous areas has proven difficult for “local” users [6]. Even “best practice” based on the collection and dissemination of objective evidence, has failed to banish the need for flexibility. Knowledge normalization, or social agreements about “how we do things around here”, may not always be easy to obtain [7].

“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.” [8]

“She steps forward and points at the indication of the blood pressure on the monitor screen and tells Michael, ‘I think this is pain’” [3]

As suggested by the above quotes, knowledge created in the patient-health worker encounter may be unique to that context, retaining an emergent character difficult to understand from other perspectives. This difficulty may lead to operational systems that neglect the user perspective [9].

A duty of care informs the knowledge created in the patient-health worker encounter in a particular context, such as in a rehabilitation clinic [5], maternity care [9], or an operating theatre [3]. 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 bound to specific predefined procedures (rules) but organizing capabilities embedded in the flow of work [10].

Martin et al. (2007) [11] provides an overview of the ongoing work required to integrate disparate technical systems, semi-autonomous workplace procedures, and specific creative work practices within wider organizational requirements (Table 2).

Table 2. Integrating multiple perspectives in health knowledge management. Adapted from [11].

Perspective	Integration work required
Knowledge creation	Integration of “knowledge as objects” and “knowledge as collective capability in organizing” perspectives with the “personal creativity and commitment” associated with front-line patient-health worker encounters in a particular context
Knowledge normalization	Coordination of semi-autonomous workplace procedures in different but interdependent specialty units that form the upstream and downstream elements of a workflow, and hence depend on each other for system-wide success
Knowledge application	Technical integration of disparate digital systems used in different but interdependent specialty units such as accident and emergency, pathology and imaging

4. SUMMARY

The three health knowledge management cases identify pure strategies that provide an understanding of the characteristics defining knowledge creation, knowledge normalisation, and knowledge application, respectively. In practice, all three perspectives must operate simultaneously. As described in Table 1, each provides evaluation criteria that guide distinct aspects of systems integration. Individuals, workgroups, and organisations must manage the tensions associated with simultaneous performance against competing values and associated evaluation criteria. *The gold standard of excellence in health knowledge management can now be stated as follows: personal commitment (validated by personal truthfulness about one’s own values and sincerity in expressing them) to an interpersonal consensus (validated by rightness of community norms) for technical excellence (validated by the objective truth of the evidence base).* [12] Clearly integration is a work in progress, and the tensions between these evaluation criteria will always remain [13, 14]. This suggests the possibility that attempts to accommodate value conflict account for many of the stresses of working in health. Thankfully, this short paper has only the modest goal of identifying three perspectives in health knowledge management, and the competing values that make integrating them a lifelong challenge.

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