Implications of Transforming the Patient Record into a Knowledge Management System: Initiating a Movement of Coordination and Enhancement

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Today there is often a need to re-innovate who you are and what you do and rethink the tools that are used and the business models that guide action. The purpose of this paper is to show how transforming a document, such as a patient record, might start a horizontal and vertical movement, a movement of coordination and enhancement in an organizational setting, such as a hospital clinic. The observations presented here and the conclusions drawn were obtained during a three year case study following implications of constructing and computerizing a patient record at three different hospitals. The results were then analyzed, interpreted and discussed within a framework combining theories about knowledge management and with cognitive theories about the use of interpretative schemes and representations. This paper tries to look beyond the implications of reconstructing a patient record on a micro-level or exploring if it is good or bad to computerize it, and theorizes about how rethinking the interpretative scheme for what a patient record is and how it may be used to restructure a healthcare setting. It proposes that what the employees want to achieve with the knowledge management system depends on what strategy they have for it.

Introduction

Healthcare employees often keep working in the same way, in the same type of organizations using the same tools they have been socialized into how to use. As an example, different specialists use the patient record differently. But it is always considered a place in which to record different types of information about the patient. One can express it like this: among healthcare employees exists a certain interpretative scheme for what a patient record is and how to use it. Efforts to computerize the patient record have been going on since the 1960s. It has been a difficult journey according to most people involved and it has been considered by some a 'mission' or 'a crusade' into cleaning up information giving within healthcare (Kay and Purves, 1998). Making needed information accessible all the time has been one of the goals. This is because having the right kind of information available influences how healthcare employees exercise their knowledge. It influences diagnosing, decision-making and action.

Today there is often a need to re-innovate who you are and what you do and rethink the tools that are used and the business models that guide action. The aim of this paper is to show

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an example of this. The ambition of upgrading the tools we use at work is in line with the ambition in what is often called the knowledge society (Lane, 1966; Bell, 1974; Bohme and Stehr, 1986; Drucker, 1993; OECD, 1996). Organization for Economic Co-operation and Development (OECD) has used the expression 'the knowledge-based economies' instead of 'the knowledge society' and characterized them as "those which are directly based on the production, distribution and use of knowledge and information". One important difference between 'the information society' and 'the knowledge society' is that the first one is characterized by low-cost information and a general use of information and communication technology while the key factor in the second is mainly investments in people, utilizing new information and communication technology. This paper views the knowledge society as a place in which there is a continuous structuring and restructuring, learning and relearning and construction and reconstruction of phenomenon such as knowledge going on. This transforms established work processes and influences the mental schemes and resources a knowledge worker uses when exercising his or her knowledge.

Although this paper reports some of the implications of reconstructing a patient record on a micro-level that has not been the main purpose behind conducting this study. Also the purpose has not been to discuss if computerizing a patient record is good or bad. Instead the aim has been to create an awareness of what is possible to achieve when transforming the idea behind what a tool is and how it is used. This paper directs itself towards people who are involved in different types of change-projects trying to rethink how we manage our everyday work-life both in healthcare, but also in other areas of society.

Interpretative Schemes Structures an Organizational Setting

All human beings live in a world of objects. This world is socially constructed and the meanings given to these objects are fabricated or made-up during a process of social interaction. Blumer (1969/1998) writes that in a human group the life and actions of people involved change with the changes taking place in their world of objects.

In general, sociology is macro (concerned with societies), or micro (concerned with the social relationships of individuals). Giddens has much to say about both, but little directly to say about organizations or groups of people which normally are the unit of analysis for a researcher of management, organization or institution. When Giddens does mention them, he tends to do so in a way which implies that they fall within the scope of his theory without special conditions.

"Organizations...are collectivities in which the reflexive regulation of the conditions of system reproduction looms large in the continuity of day to day practices. They depend on the collation of information which can be controlled so as to influence the circumstances of social reproduction" (Giddens, 1984).

Instead of using the word 'organizations', Giddens uses the word 'systems' and they are conceptualized as "patterns of relations in groupings of all kinds, from small, intimate groups, to social networks, to large organizations". That is, it is the patterns of enacted conduct, the repeated forms of social action and interaction, or the 'enduring cycles of reproduced relations' that form social systems.

So, human group life takes place in organizations and/or systems. In organizations or systems personal knowledge can be transmitted because a set of values are learned, permitting a shared language by which to communicate (Berger and Luckmann, 1966). This language provides a normative sanction for how activities are to be organized or what information to be collected and evaluated. Social integration then refers to face-to-face reciprocities between agents who meet in circumstances of co-presence, and therefore preserves a concern for *praxis in situ*, and system integration refers to reciprocities between absent agents, i.e., agents who are physically and/or temporally situated in different settings, which admits the possibility of inter-situational articulations of systemic patterns (Giddens, 1984).

Interpretative Schemes

This research focuses on how interpretative schemes might influence the structuring of an organizational setting and how communication and interactions, or human group life, between employees concerned take place (Giddens, 1984 and 1979). By interpretative schemes, Giddens means standardized elements of stocks of knowledge applied by actors in the production of interaction. Interpretative schemes can also be defined as mental schemes developed in a specific organizational setting (Fiske and Taylor, 1991). They are cognitive structures that represent one's knowledge about a given concept or stimulus including its attributes and the relations among those attributes. An interpretative scheme influences the encoding of new information, memory of old information and inferences about missing information. It is a way of organizing information about the world which is relevant to a particular task and can be described as a filtering mechanism. It facilitates top-down, conceptually driven, or theory-driven processes which means processes that are influenced by prior knowledge. Individual cognitive schemes can combine to form an overall interpretative scheme by mapping relevant aspects of how an organization's experience of the world is to be understood (Ranson *et al.*, 1980), and assumptions about why events happen as they do and how people are to act (Bartunek, 1984).

Interpretative schemes are difficult to change. People often ignore exceptions to the scheme, they even interpret the exception as proving the scheme. Many of the information-processing advantages of schemes would also be lost if they are changed at each encounter with slightly discrepant information. But having an incorrect scheme is also costly since it can make people insufficient problem solvers. The wrong interpretative scheme can lead one to be inaccurate by biasing encoding, memory, and inference. But still schemes are supposed to be cognitively more efficient than understanding each instance afresh (Fiske and Taylor, 1991). There are person schemes, self-schemes, role schemes and event schemes. Event schemes describe appropriate sequences of events in well-known situations. People can also have 'place schemes' for particular kinds of locations. Phenomenon such as categories and mental schemes allow us some sense of prediction and control, which is essential to our well-being. They save energy. And they make us believe that we understand the world. Stable interpretative schemes lend a sense of order, structure and coherence to social stimuli that otherwise might be too complex and overwhelming to make sense of.

The central problem in sense-making is how to reduce or resolve ambiguity, and how to develop shared meanings so that the organization can act collectively (Choo, 1998). As long as a person is making sense of his or her experiences it is possible to move ahead. But from time to time this movement is blocked by the perception of a cognitive gap. This is a situation that the person is unable to make sense of. It causes stress and uncertainty. To close such a gap a person starts searching for information to make new sense of a situation and thereby be able to continue doing what he or she is doing (Dervin, 1992). At the cognitive level, the individual's style and preferences have an impact on the processing of information. The person selects a source that has a high probability of providing information that will be relevant, usable and helpful. As an example, a physician often asks a trusted colleague if the needed information is not available. At the affective level people use information selectively, for example if they want to avoid conflict or embarrassment or support their own decisions. Personal motivation and interest in the problem also determines the amount of energy that the person invests in information seeking. At the situational level the selection and use of sources is influenced by the amount of time and effort that is required to locate or contact the source and to interact with the source to get the information needed (Taylor, 1991; Dervin, 1992; and Wilson, 1997).

Thus, as human actors communicate, they draw on interpretative schemes to help make sense of interactions; at the same time those interactions reproduce and modify those interpretative schemes which are embedded in social structure as meaning or signification. Similarly the facility to allocate resources is enacted in the exercise of power, and it produces and reproduces social structures of domination, and finally moral codes (norms) help determine what can be sanctioned in human interactions, and in doing so these codes iteratively produce structures of legitimation (Giddens, 1984). Giddens treats regularized acts as situated practices. Any action that is repeated frequently by a knowledge worker in an organizational setting, like for example performing anesthesia work in the surgery, becomes cast into a pattern, which can be reproduced with an economy of effort. A social order is created. To create a social order around a way to work is an ongoing human production and a way to save energy. It is a way to establish a structure.

Knowledge Workers Use Representations

Vision can be described as an intelligent process of active construction (Hoffman, 1998). It is a matter of perceiving sense data, synthesizing and then categorizing what people perceive. We 'see' the time and remember with pictures (Schacter, 1996). This is because the ability of humans to think rests to a great extent on our ability to create a symbolic representation of the world, a picture of the world separate from the world itself. 'What you see' has a phenomenal and a relational sense. In the phenomenal sense, what you see means "the way things look to you", "the way they visually appear to you", the way you visually experience them. But in the relational sense it means "what you interact with when you look" (Hoffman, 1998). The visual system is believed to have two components, one concerned with pattern processing and detecting 'what' while the other is concerned with location in space and conveys information about 'where'. The picture or symbol is not the thing itself, it stands for or refers

to the thing, in this case the patient: It represents the patient. Another example of this is how an icon might represent a phenomenon such as heart-problems.

A human being uses sound, gestures or symbols that stand for or refer to objects, things and concepts in his or her working or private life. In other words they use representations. A representational system has two essential ingredients: (1) the represented world: that which is represented; and (2) the representing world, a set of symbols, each standing for something in the represented world. It means that when we think we create a symbolic representation of the world that is a picture of the world that is separate from the world itself. Representations are important because they allow human beings to work with events and things absent in space and time, or events and things that never existed such as imaginary objects and concepts. Then representations that can be part of a workspace shared with others, require some sort of constructed device to support them: an artifact.

The ideal is to develop representations that capture the important, critical features of the represented world while ignoring the irrelevant. It is important that they are appropriate for the task, enhancing the ability to make judgments, and to discover relevant regularities and structures (Norman, 1993). Representations that match our perceptual capabilities are simpler and easier to use than those that require reflection. Under a heavy work load, stress, danger and time pressure representations that require reflection are not used as rapidly and efficiently as those that can be used through simple perceptual comparisons.

So, a knowledge worker is a person who uses interpretative schemes and representations when making sense of certain situations that craves a decision on how to act.

Computerizing a Key Document

One way to try to manage knowledge is to implement technology into a knowledge worker's daily work life. As an example, we may try to influence how a knowledge worker exercises his or her knowledge through implementing an information management system or a Knowledge Management System (KMS). This is part of what is considered the practice of managing knowledge. Then the project researched is considered a typical knowledge management project in the knowledge society. It assumes that the ambition behind the activity of implementing a computerized patient record is to make it possible for a knowledge worker to perform more brilliantly. Implementing technology right into a knowledge worker's daily life influences established patterns of action. A 'technology' can be physical objects or artefacts, activities or processes, what people know or what they do; one example is the 'know-how' that goes into operating a device in the operating room (Bijker *et al.*, 2001). Tools like, for, e.g., computerized patient records might confuse employees, alter social relations and manipulate with cognitive abilities. They might even change the ease of solving a problem (Norman, 1993). To computerize a key document is part of being modern, of reducing risk and trying to control the outcome of future events, or 'colonizing the future' as Giddens (1991) has expressed it.

In this study, an information system is a system that consists of at least one person, who faces a problem within some organizational context, for which he or she needs some information to arrive at a solution, and that information is made available to him/her through

some mode of presentation (Boaden and Lockett, 1991). This mode of presentation is often some sort of information or communication technology. A KMS goes one step further. It is an information system designed specifically to facilitate codification, collection, integration and dissemination of organizational knowledge (Alavi and Leidner, 1999). A typical KMS involves a database, a cataloguing system, version control, document access control, a user-friendly search and navigation capability and a possible variety of advanced features such as e-mail notification or commenting.

Earlier research about computerized anesthesia patient records show that a well-functioning information system or KMS improves patient safety by facilitating correct drug administration (Merry *et al.*, 2001), makes it possible to read what has been written in the record (Wang *et al.,* 1995), more vital sign data, more notes and drug information per case is recorded (Edsall *et al.,* 1993) and it provides data for quality assurance activities (Essin *et al.,* 1998). A computerized anesthesia patient record also frees eyes and hands and creates an opportunity for improvements and more accurate information about the patient (Edsall *et al.,* 1993). But Yamaguchi *et al.* (2000) found that ergonomic problems remain to be solved before there is a wider acceptance of the computerized patient record in clinical practice.

Systematic Reflection

This is an interpretative study and the purpose has been to explore implications of constructing and computerizing an anesthesia patient record at three different hospitals (Denzin, 1983). Data has been collected using interviews, observations and reading, following the construction of a new anesthesia patient record on paper at one hospital in Sweden, how a computerized anesthesia patient record was developed at one hospital in the US and a computerized patient record implemented and used at one hospital in Vienna. What took place has then been described, analyzed and interpreted using the theoretical framework put forward in the section above. Case studies are suitable when insight is as objective as in this research and the phenomenon to be explored is difficult to quantify and must be studied within its natural setting. This research has taken place during a multi-step process of data-collection and analysis. The interviews were tape-recorded and the interview tapes transcribed. The interview transcripts, notes and documents were then read and reread. Data-collection and data analysis overlapped and the findings on a micro-level were compared to earlier research.

Most of the time was spent at the Swedish site and all together 25 interviews were conducted with employees at various levels in the organization. At both the Austrian and the American site nine interviews were conducted. In addition to this, there were general meetings at the clinics, meetings with the company that developed the software and work in the operating room was also observed during three occasions.

A search was made for patterns in the empirical data that relate to the purpose of this study which is to answer how a patient record is constructed, why it is constructed as it is and implications of this. When searching for a pattern in the data, systematic reflection has been used. Systematic reflection means to go back and reflect over every statement from the

interviewees and every interpretation made and conclusion drawn during the research process. A picture of what took place finally emerged. And this picture is verbalized in this paper. The contribution presented here was not obvious from the beginning. First the focus was on the implications of reconstructing the patient record and computerizing it on a micro-level. With micro-level it is meant implications such as that the employees save time using the new system or that how the patient is evaluated is transformed. It took some reflection before the implications on the macro-level were realized. Reflection is often taken for granted as part of the research process. Still a more systematic way to reflect is needed. Often it seems that too little time is spent in reflecting. Then there is a possibility that we report only the first obvious results from our research. Taking the time to reflect during several additional phases might produce different and more innovative results.

In the next section, the empirical site will be described. But the cases will not be described in more detail since the findings presented in this paper are on a general level. It does not really matter where or what patient record has been transformed since the implications on a micro-level are different depending on who participates in the change process and what patient record has been reconstructed or computerized.

Among the 'Emergency-People'

Anesthesia work is performed before, during and after surgery, at the anesthesia reception desk and in the operating room. It can be described as a kind of service function, both to the surgeon and the patient. Work includes assessing the patient before surgery, making a plan for giving anesthesia during surgery, following this plan and then managing pain after the surgery.

The operating room is a unique environment, with many people involved in work, using complex equipment in a limited space. Tasks are of high intensity, acquiring data is mission-critical and loss of data unacceptable. Patient care in this specialist domain is intense and requires a keen awareness of what is happening not only with the patient but also in the operating room. It is a stressful working environment. Management of the operating room includes managing resources such as employees, information, drugs, blood, eyes and hands, equipment, supplies and time. Working in the operating room includes giving anesthesia, diluting medications and documenting. The anesthesist uses information to assess the status of the patient, if the patient is alive or if some sort of action has to be taken. These activities are all performed differently by different anesthesists.

The encounters at the anesthesia reception desk become an act that is constructed by the anesthesist and the patient together in a face-to-face situation. It soon becomes a structured and routinized activity. An interpretative scheme for how to evaluate the patient has been developed. It is a scheme that becomes part of the structure and it also helps to structure what takes place in this organizational setting. A physician formulates a diagnosis of what problem the patient might have and this is based on the data in the patient record, visual perceptions, earlier experience and verbal information from the patient. The anesthesist documents these not only because of legal requirements but also to provide other healthcare workers with the knowledge of what was used to keep the patient asleep. An anesthesist must have generated

a patient record at the end of the surgery. Therefore constructing and implementing a computerized patient record is considered to be a difficult transition period and a 'high-risk' situation, by the project leader at the American hospital. Some of the anesthesists also think that the art of the performance is at risk if the anesthesia patient record becomes computerized.

In both organizational settings, a structuring takes place as actors draw on and make sense of the institutional patterns of signification, domination and legitimation that characterize this specialist domain in order to construct roles and interpret persons, objects (such as the patient record) and events (such as evaluating the patient) in their environment (Giddens, 1984).

In this context, a younger anesthesist learns from an older one at the anesthesia reception desk and in the operating room when discussing cases. Discussing cases is also done during many of the meetings at the clinic. It is obvious that discussing, talking and debating cases embraces sense-making in a medical setting. It makes a group of colleagues agree on how to address a certain problem. At the same time an anesthesist constructs his identity, for example, as 'emergency-people', in interaction with others. In addition to this, scientific and educational efforts are continuously integrated into the work since most of the physicians are involved in different types of research projects at the same time as they perform their daily work. New knowledge is created, in this organizational setting by managing conversations, mobilizing knowledge activities and globalizing local knowledge (Von Krogh *et al.*, 2000).

Transforming the Patient Record into a Knowledge Management System

The Swedish patient record on paper consists of three parts: Pre-anesthesia evaluation, intra-anesthesia record and postoperative anesthesia care as well as pain management. At the hospital in the US, a computerized anesthesia patient record consists of a three-page software design called Monitor, Fluids and Medication. It includes pre-anesthesia evaluation, intra-anesthesia record, remote monitoring of cases, anesthesia staff assignment, scheduling accessibility, personal daily schedule care overview, quality assurance and data analysis report and automated charge services. At the Austrian hospital in Vienna they use two applications Chart Plus and Visual Care. Chart Plus registers data such as pulse and blood-pressure and Visual Care registers therapies.

When answering the questions on how and why a patient record is constructed a listing of the implications of this horizontal and/or vertical movement becomes visible. It can be translated into a movement of coordination and enhancement. The employees also talk about coordination and improved quality or enhancement when discussing the aim behind constructing and computerizing the patient record. This collected movement and the possibilities inherent in it, is what this paper wants to make the readers aware of. The implications on a micro-level are not in themselves so interesting since they vary depending on what kind of patient record it is that is constructed and what kind of changes are made. In the following two sections this paper will give some examples of what is meant by coordination and enhancement.

A Horizontal Movement: Coordination

A movement of coordination becomes visible when information from several new units are added to the patient record on paper to improve its usefulness. At the Swedish hospital a description

of how the patient enters the care of an anesthesist has been extended with emergency-alarm, trauma-alarm, helicopter/ambulance and information about the degree of trauma. The following options are already in place: primary care, secondary care and elective care. What kind of postoperative care will take place after surgery is also included. A KMS might also be used for monitoring employees and their work schedules, as at the American hospital. This means that the KMS might contribute to social integration between agents that meet in circumstances of co-presence and also system integration between absent agents. These are agents who are physically and/or temporally situated in different settings. But this design admits the articulation of systemic patterns over many units. It also admits streamlining a work-process. This paper suggests that employees might have a well worked out strategy for what units inside and outside the clinic, and inside and outside the hospital, that they want to coordinate into a network expressed and made visible in a patient record transformed into a KMS, instead of working in an ad hoc mode which is often the case today.

A Vertical Movement: Enhancement

Several different implications of upgrading and computerizing a patient record that can be perceived as a movement towards enhancing the work that is performed can be found in this research. As a first example, a computerized anesthesia patient record makes it possible with many more standard-therapies. Less modification of standard therapies decreases the workload for the physician. This is because fewer interventions are demanded when more standard-therapies are available in the software. "I want to have as few steps as possible when I work. Standard therapies exist today but 70-80% of them must be modified" (Excerpt from interview with anesthesist in Austria). Very simple figures that show the patient from the front and from the back are used in the transformed document. Using pictures both in a document on paper and a computerized one is a second example of enhancement since it eases communication and saves energy. It enhances the quality in the work that takes place. Using pictures instead of words influences the speed with which information is taken in and processed. Representations also allow human beings to work with events and things absent in space and time. This knowledge was utilized in the patient record on paper at the Swedish hospital. It is also used in the computerized patient record in the hospital in Vienna.

When constructing a new patient record employees are forced to define work routines for one element of performing anesthesia, such as dilution of medication. In anesthesia there are many problems that might appear as one works. One of them has to do with giving the wrong medication. To produce routines for how to dilute medication is therefore seen as something good. This is consistent with Merry *et al.*, 2001, who found that a well-functioning system improves patient safety by facilitating correct drug administration.

When it comes to text in a document like a patient record, there is always a conscious choice about what and how much text to use. The project group searches for 'the optimal' amount of information needed for improved performance at the anesthesia and intensive care unit. In this case employees prefer to get everything about the patient on one page in the software, or two pages that are easy to change between. It has also been found that computerized patient records decrease double and triple documentation. An example of this

is that in Sweden they recorded anesthetica, the substance used during surgery, at three different places before transforming the patient record. Now they record it at one place. A computerized patient record also makes it possible to read what has been written in the record, which is a change from when it was on paper. This is consistent with Wang *et al.*, 1995, who also found that a computerized anesthesia patient record was more legible and complete than a manual record. More vital sign data points and more notes and drug information per case is also recorded and this is in accordance with Edsall *et al.*, 1993. With a computerized patient record information is always available and the text, if designed properly, is easier to read than in handwritten documents. It eliminates distractions, such as trying to make sense out of sloppy texts, and it makes some activities automatic, such as recording pulse and blood-pressure. All these improvements enhance the work process. Design plays an important part when it comes to constructing documents and information systems that enhances a work process. As an example, different colors might represent the urgency of doing something, such as giving the patient 300 ml of a substance. The size of the numbers on the screen as well as the color of text are crucial and can be used for different purposes such as reminding employees about duties to perform. A third example is that with both a new patient record on paper and a computerized one, it is possible to control the use of a resource such as blood during the surgery. In Austria, the use of blood decreased after the clinic implemented a computerized patient record.

An anesthesist uses his or her hands a lot during surgery. "All the senses go through my hands" (Excerpt from interview with one of the anesthesists in Austria). Getting away from manual documentation frees the hands, says one of the anesthesists in Austria. Computerized documentation also makes it possible for the anesthesist to keep his or her eyes on the patient which is an important part of anesthesia work. "I get information from the patient by looking at her" (Excerpt from interview at the Swedish hospital). This confirms Edsall *et al.,* 1993, who also found that an information system frees eyes and hands and creates an opportunity for improvement and for more accurate information about the patient.

In addition to this, implementing a computerized patient record improves the learning processes in the organization and strengthens the identity of the professional. "Now we can study and discuss what happened if there was a problem during surgery, even if the person who did it is not here", says one anesthesist in Austria. "Computerized documentation makes it possible to go back and study the course of an anesthesia minute by minute". This is consistent with Essin *et al.*, 1998, who wrote that computerized patient records provided immediately available data for quality assurance activities. In Austria the employees also look at the computerized patient record as a tool to 'explore data' and investigate trends. In this way an expansion of organizational capabilities is possible. A computerized patient record can, for example, be used when searching for trends in a patient's medical history. Also, to maintain your identity as an anesthesist means continuing to build on earlier knowledge. Anesthesia could stagnate as a specialist domain without scientific improvements. An organization learns by constructing, testing and restructuring its theories of action. Research, education and learning are made possible with a computerized information system.

There are also ergonomic consequences of implementing a computerized patient record. The employees have to change how they move around the patient in the bed in the room. This confirms Yamaguchi *et al.*, 2000, who found that ergonomic problems remain to be solved before there is a wider acceptance of the computerized patient record in clinical practice. This research also shows that implementing a computerized patient record improves security with things such as pincodes and electronic trails. This is the case in Austria and will be the case at the American hospital also. Another service that is included is information about what personal items the patient brings with him or her to surgery such as eyeglasses or hearing aids. Now they will not get lost when the patient leaves surgery and the operating room.

The idea behind a technology like a computerized patient record is in general improved performance. One develops a KMS to enhance the quality of a work process in a specific setting. But at the same time the employees are forced into an additional structuring and restructuring of how they exercise their knowledge. Therefore a computerized patient record can be described as the subordination of cognitive abilities to 'the best possible performance'. A second idea behind a technological move like computerizing a patient record is efficiency. By efficiency it is meant that documenting using the new information system is supposed to save energy. A computerized patient record is also a subordination of 'bodily freedom' to the 'best possible performance'. By bodily freedom is meant the possibility to move around more freely in the limited space of an operating room. A patient record on paper (and a computerized one) not only improves the documenting of data, but also enforces integrating mechanisms between different units of the clinic, including services outside the clinic such as ambulance care. Integration mechanisms as on the level of face-to-face interaction takes place. This means reciprocity between actors in the context of co-presence, in this case in the operating room or at the clinic.

But integration also refers to connections with those who are physically absent in time or space. This is the same as reciprocity between actors of collectivities across extended time-space. Here computerized information systems facilitate extended network integration, such as between the clinic and units outside the hospital. Both the document on paper and/or the KMS structures and restructures the context. All physicians are individualists and care in general only for their own part of the care process. A different design and transformed use of the patient record hopefully makes the anesthesist realize how his or her work fits into the whole care-process of the patient.

Conclusion

The primary purpose of documenting in anesthesia is to show how the patient responds to anesthetica and surgical manipulations. And the original idea behind the anesthesia patient record is to be a representation of the course of an anesthesia during surgery, to show the anesthesia curve. But today the idea behind what a patient record is and may be, is transformed every time it is upgraded. The contribution of this paper is to show how its content is expanding in response to new legislation about what should be included in a patient record and to new

ideas in society about how to perform healthcare, improve work processes and satisfy demands on quality assessments of care processes.

The findings indicate that the implications of constructing a new patient record on paper and then computerizing it are both cognitive and social, both inside and outside the individual. In writing this is meant that not only the anesthesist, and his or her way of taking in information and exercising his or her knowledge, is influenced by a computerized patient record, but also the organizational setting surrounding the specialist, including the resources such as time and space used. This research shows how a movement takes place both when a patient record on paper is reconstructed and when it is computerized. The movement becomes visible when the research questions 'how' and 'why' are answered. Then this paper suggests that a document like the patient record should be used to monitor a healthcare setting by deciding how much coordination and how much enhancement is desired. This may be a new and innovative way to use the patient record in process improvement in healthcare.

This paper theorized that what interpretative scheme the employees have for what a patient record is influences how they use it. In Austria and the US they used the word KMS for the patient record and they have also included many new interesting features into the system. A lot of status and feelings are attached to the patient record but if you stop calling it a patient record maybe it becomes easier to transform it into a tool that might be useful in many more new ways than before. Another contribution in this paper is to create an awareness of what is possible when thinking differently about the tools we use in our daily work-life.

This paper suggests that conceptualizing a computerized patient record as a KMS may facilitate a new and different view of how to use it, as a tool to enhance and coordinate care processes in healthcare networks. It is a tool that might influence what takes place at many different levels in both the organization and the society. Conceptualizing the computerized patient record as a KMS initiates a new thinking and an awareness of the possibilities embedded in a KMS. Implementing a KMS might support a horizontal influence, coordination, and a vertical one, enhancement of medical services in a healthcare setting. This is perceived by this paper as a collected movement of a network connected to both improved performance and efficiency. How far the influence of these transformations extends depends on the level of ambition among the employees and the strategy for the KMS constructed, designed, implemented and used. ∎

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