Issue Orders and Discontinued EPR

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Abstract. Users gave us 104 different reasons for the failure of implementing an EPR in a surgical clinic. We classify the reasons with the issue order model, where the first issue level is for simple and technical issues, the second one for more complex and combined issues, and the third one for political or ideological issues. However, what appears as a first order issue to a manager might be seen as an insurmountable third order issue for a worker and vice versa. The issues are interrelated, and solving one issue might have a substantial influence on other issues. Also, the issues seemed to accumulate and concentrate on points. The analysis helps focus on key problems, with consideration to related issues.

Keywords. Electronic patient record, organizational implementation, social structures, issue order.

1. Introduction

During the organizational implementation of an information system [1], any number of problems may emerge. The organizational members may feel threatened when faced with, for example, the challenge of a new technology, by being forced to adjust their work practices and routines, by not having a voice in the process, or by re-emergence of old tensions (e.g., [2]). New technology may even be given the role of a scapegoat when technical issues are used as a surrogate for cultural or behavioral issues [3]. Damsgaard and Scheepers [4] argue that an information system faces a crisis at each implementation stage. When the content of the system becomes chaotic instead of organized and up to date, and when information cannot be retrieved timely and accurately, the organizational members start to mistrust the system. Mistrust transforms easily to avoiding or rejecting the system [1].

This study is about a crisis in the organizational implementation of an EPR system. The surgery clinic is a part of the second largest teaching hospital in Finland with 953 beds and 3800 employees. The surgical in-patient ward has 9 surgeons, 3 physicians, 50 nurses and a ward secretary. Even though the hospital has a long history of IT use, the electronic patient record system (EPR) was introduced in the hospital only in 2003. The crisis we discuss took place in 2005, as the EPR was rejected in a surgical out-patient clinic, and its use was discontinued in a surgical bed ward.

2. The issue level model

Inspired by Bateson's model of learning [5], Star and Ruhleder [6] studied the implementation of a large information system, and how it affected various

organizational units and stakeholders. They identified three levels of issues during the implementation.

First order issues are the ones that are quite easily solved by re-allocation of resources. These problems are often easily visible and solutions to them are practical in nature. First order problems concern, for example, getting user accounts, connecting or installing the system, or arranging user training. Typical first order problems are related to everyday situations, such as how the system should be used and how it is used.

Second order issues can be caused by a collision or combinations of two or more first order issues. These are unexpected by nature and emerge as secondary effects after the implementation. These may be caused, for example, by technical choices made or by the differences between the various cultures of practice. The uncertainty that is present during implementation is also considered a second order problem.

Third order issues are political or social by nature and as such, hard to solve. In the background are the historical reasons behind the choices made in the implementation project or the distinct features in the organizational culture. Also the differences between various disciplines or viewpoints can have a nature of permanent disputes.

According to Star and Ruhleder [6], the three levels of issues are not unambiguous as various problems can be inspected on different levels depending on the stakeholder perspective. Relationships between different issues can be affected by how the members identify these problems. In this study, the issue order model provided at first a classification for various issues and then a possibility to emphasise how different stakeholders perceived the issues through different lenses. Accounting for the various interpretations helps also to understand these issues more thoroughly.

3. The crises with the electronic patient record system

A set of semi-structured interviews were conducted during spring and summer 2006. The interviewees were two surgeons, one ward secretary, four nurses in the out-patient unit and three nurses in the ward, and three EPR implementation project members. A video recording of the EPR in clinical work was also studied. The recording shows both manual and electronic recording of patient data and a situation where a surgeon and a nurse work with one of the in-bed patients. All data were analysed as a set, regardless of the outcome of the crisis. We arranged the data first into loose groups such as technical, organizational and people related issues. Then, within these themes, we arranged recurrent issues according to the issues orders (see Appendix). We noted that the same issues could be placed on different levels depending on the perspective of the informant. In this paper, as an example, we have "slowness of use" explored on all issue orders.

First order issues were common and easily visible. The first order issues were grouped according to the themes of redistribution of work resources and working time, user training, user-friendliness, technical problems, changes in work tasks, and expected new features with the EPR). In each group, we found issues complicating the everyday working with technology.

Information access in the EPR was considered slower than using paper records at hand and the structured character of information in the EPR increased slowness of use. There are, for example, over 50 headings for recording nursing action, as described by a nurse: *"Now I have to open Miranda [EPR], to open the nursing records. Now I'll*

make the record, that takes many clicks – like surgeons name, date, and cause this and cause that. Then I'll have to choose the right headings, and then I can go and record the day visit by the patient, I can make it, and then I'll have to choose the next suitable heading… I have many phases here, phases that I have never done before… Before I just wrote, for example, 'covering letter' and 'breast cancer' on the paper and that was it."

The slowness of use affects everyday arrangements and work-around practices have emerged. During doctor's rounds, surgeon-patient interaction was disturbed because of this slowness, and this is now worked around by having two physicians. One examines and converses with a patient, and the other enters or retrieves patient information in the EPR. The medical personnel had no means to know the reasons causing slowness when they attempted to use the EPR. It could be anything from occasional capacity issues and use peaks to actual breakdown of the EPR.

The medical personnel were concerned about how time was re-divided between caring of a patient and documenting care. Documenting in the EPR was experienced as extra work that can mean even triple time for handling a patient. The focus of concentration is shifting from handling a patient to handling the computer, as one of the surgeons describes: "*With the paper system we would have handled … two thirds of the patients in the same time that it takes us to get the electronic system open and running…"* This can cause the staff to think twice whether to use electronic records or not, especially in situations when a patient has an acute need. For example, in the surgical clinic it was the nurses who decided not to use the EPR, whereas in the ward the doctors did not want to use the EPR. This caused a situation where some of the patient records were on paper and some in the EPR.

Second order issues were grouped into eight categories: the first order issues' combined effects, prolongation of the implementation, vast and constant changes at work, interpretation issues, technical issues, cultural differences, training issues and reliability or trust issues. Most of these issues relate to each other.

Exploring slowness of use on the second order level relates it to the instability of the EPR. This caused trust issues as the personnel feared information breakdowns which, in turn, prompt several practical problems. When patient information is not timely and up to date in the EPR, situations such as patient transfer can be delayed or problematic: a patient is taken care of with inadequate information, and new treatments cannot begin without the acknowledged surgeon's orders: *"What we have here is the ultimate slowness. When the hourglass stays there for 15 or 30 seconds before you get the next window open … It's a long time to wait, … because you're supposed to get on with the things, you want to reserve an appointment for a patient who's waiting there, or you should be placing laboratory orders as a patient is already on the way to the laboratory, but all you get is the hourglass."*

During the implementation, two parallel systems of patient documentation have been maintained. It felt more secure to uphold also the old documenting practices. Furthermore, at first there remained gaps in the EPR system, and there was a need to fill in those gaps with the old paper system. Still, it was conflicting to document partly with the old practices and then proceed to do some of the entries again in the EPR. In practice, this was interpreted as double documenting and as increasing work load.

Varied practices during breakdowns of the EPR add to the mistrust. During breakdowns, patient records can be written as separate text files that are afterwards added to the EPR. Problems emerge when the separate text files are attached as printouts to the paper version of the patient records and not to the EPR. This causes that

the EPR system is not up-to-date, and the staff cannot trust it. Moreover, the slowness of use is related to problems of resource allocation. One surgeon or nurse is not necessarily able to carry out multiple tasks at a time but has to prioritize. When tasks are prioritized, caring for the patients wins over documenting the care. Also, the tempo of working culture differs between the in-bed ward and the out-patient clinic. An appointment time is 15 minutes in the out-patient clinic, and this time should cover both examination and documentation.

Third order issues have a long-term and large-scale impact on the organizational context, such as, rationales for implementation and application development, attitudes, work tasks, technical issues and political viewpoints. Successful implementation demands the whole organization to commit to the goals and to the overall process of the system's implementation. If the management of the organization does not support the information system it may cause issues on all three orders with the end users.

Attitudes of those workers that act as opinion leaders easily transmit to other workers in the same unit. In this case, the surgeons' attitudes to the EPR were generally negative. As they mistrusted the EPR, they declined to use it. Most surgeons used alternative ways and tools to mediate orders concerning care, and their practices influenced nurses' attitudes towards the EPR. Moreover, the EPR's slowness caused the medical personnel to bring up the question of malpractice. If the patient information is not available quickly enough, the surgeon can make a decision regarding a patient's treatment with insufficient information. This brings up both fear and ethical questions: How one can do one's work without necessary information about the patient's status and medication? To what extent should the nursing staff be responsible for their choices about the treatment if information is unavailable?

The surgeons felt that the slowness can cause multiple third order problems. For example, while working bedside, both the surgeon and the nurse may record information quite fluently and not consider whose user account was used to log in the system. Problems of responsibility emerge when mistakes are made in the records. The one whose username was used is held responsible. Issues which can endanger patient safety or which can even cause malpractice rise up to the third order because handling of this kind of issues is related also to political factors within the organization. In the long run, the third order issues can affect the reputation of the hospital and even the hospital's financial standing.

Several issues are caused by the division of work tasks and the re-forming of work practices during the implementation. Division of work tasks also varies between the hospital units and stakeholder groups, and this causes the personnel to ask repeatedly: "Whose responsibility is this particular task?" The answer is dependent on the person who gives the answer. Also one of the third order issues is how the nurses interpret meanings behind the EPR. Most nurses state that EPR does not help their work and that instead the records are kept for a third party, such as, the hospital administration.

4. Conclusions

Exploring the EPR implementation issues show that these issues tend to cluster and accumulate as the implementation continues. Single first and second level issues cluster, and become second or third level issues. With the issue order model, we identified 104 different issues, of which 48 were on the first order, 36 on the second, and 20 on the third order. When the medical personnel declined to use the EPR, information validity

in the system became an issue. At times, the staff members did not have the knowledge where to find the latest patient information. These issues cumulated into the third order issue of responsibility, when investments, budgets, resources and project schedules needed to be modified. Orlikowski [7], among others, argues that managerial commitment is crucial for the system success. In the hospital case, managerial commitment was not experienced by the medical personnel, as they could choose to use or not to use the EPR. Especially, in the surgical clinic, it was interpreted that even the EPR project managers hesitated about committing to use. During our analysis, social and organizational issues emerged as intertwined and clustered with technical and usability issues.

McGrath [8] recommends that something of the previous routines should be preserved to give the organizational members a sense of continuity instead of heightening the sense of unfamiliarity. She proposes that a successful change can be achieved with a phase-by-phase development to increase the future users' knowledge of and trust in the new technology. In the hospital case, the medical staff experienced the change as radical and uncontrollable. Moreover, they did not expect the new documenting practices with the EPR to improve working arrangements significantly. McGrath continues her argument with the idea that a parallel use of the old and the new system could have a positive impact on the success of the organizational implementation. However, the hospital case shows that a long lasting parallel use of two systems becomes a negative issue as the number of organizational members' work tasks increase. In addition, the organizational members tend to stick to the old practices instead of learning the new practices and familiarizing themselves with the features and functions of the new system.

Star and Ruhleder [6] argue that the emerging gaps during the implementation cause further issues as stakeholders may have varied bases for adopting and learning the new system, depending on their educational and occupational backgrounds. These issues may cause communication gaps between the stakeholder groups. For example, the application supplier can use more technical terms to flourish her or his language, and the medical personnel may interpret the terms wrongly or not at all. Added tension is caused by the organizational relations and by varied interpretations between the stakeholder groups and even within them. The medical personnel interpreted the EPR in a number of different ways: it could mean just files of patient information, the whole care documentation, or a combination for making appointments and documentations, for example. Only the implementation project leaders seemed to have an understanding of a semi-integrated EPR as a whole.

Based on our experience with issue order model, this is where its strength lies. The issue order model can be used as a starting point to illustrate the various interpretations and enable various stakeholder groups to understand each others better. Thus, it helps also the decision makers to start solving the clustering issues typical to any organizational implementation.

The issue order model has been rarely used as analysis tool in later research although Star's and Ruhleder's article is much cited [9]. Even Star herself [10] has modified the model. In the later definition, the first order issues are simple such as getting the system running, the second order issued contain abstract choices that the users need to make, and the third order issues are described as political or philosophical. In this study, the original classification we applied seems to be more adaptable to our data set. In future, it would prove valuable to start the classification from the data itself, instead of using the Star and Ruhleder classification as a reified model.

From the perspective of the hospital and the EPR users, this kind of analysis provides not only the classifications, but a tool to discuss the differing perspectives on organizational implementation of an information system.

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Appendix: Grouping of issue orders

First order issues.

Issue group	Issue
Redistribution of work resources	
	New and changing work tasks
	Issues with the distribution of work tasks
	Slowness of documenting
	Too few computers in the ward
	Issues with disposition of computers
Training	
	Slow tempo of training, mixed experiences
	Complicated instructions for beginners
	Lack of time for learning the use
	Changes of documenting practices
	Terminology changes
	Changes at working processes
	Documenting became visible
	Frustrating training
	Different levels of computer knowledge
	Lack of peer support
User-friendliness	
	Demanding entries
	Slowness
	Structured character of the EPR
	Problems with allocating a new patient
	Too many 'clicks'
	Disconnectedness of patient views
	Slow to open different parts of the EPR
	Hard to get an overview of a patient
	Limitations in browse
	Usage cumbersome
	To understand of a patient's status user has to check several views
	Warning sign not linked to patient information
	Functionality is uncertain
	User can check only one patient's information at a time
	Users mistakes are complicated to repair (entries are locked)
	Readability of printouts is poor
	The EPR does not support a user
Technical problems	
	Slowness
	Breakdowns
	The EPR logs off users
	Function of the cordless network
	System lock
	Lack of parallel logon on the same computer
Changes in work tasks	
	Changes in work practices
	Patient work versus computer usage
	Not inconsistent practice in documenting
	Diminishing of discursive entries
New features and expectations	
	Smart card signature
	Flying exchange
	Promise pie in the sky

Second order issues.

Issue group	Issue
Combined effects	
	Imperfect usage of the system
	Learning the use while tending the patients
	Information breakdowns
Prolongation of the implementation	
	Exhaustion on implementations
	Staff cannot trust the information in the EPR
	Two parallel documenting methods
Vast changes	
	Changes in nursing process
	Changes in work practices
	Exhaustion by the users
	Uncertainty
	Usage resistance
Technical issues	
	Breakdowns
	Clump of problems
	Instability of the information system
	Slowness
	Issues with consolidation
	Uncertainty about the information system's functionality
	Incompleteness
Interpretive reasons	
	Fear about usage's difficulties
	Work satisfaction
	Delays to repairing
	Information system is too significant in relation to the patient work
Cultural differentials	
	Different work roles
	Different situational goals
	Different needs
	Different ways to use the system
	National versus local level
	Issues of circumstantial factors
	Issues with motivation
Training	
	Previous experiences
	Hierarchical differences
	Impact on attitude
Reliability	
	Wrongly saved entries
	Mistakes in documenting
	Sophistication of functions
	Unsystematic breakdowns

Third order issues.

Issue group	Issue
Co-operative action	
	Endangering patient safety
	Malpractices
Rationales for implementation and	

application development	
	Meaning of the documenting
	Rumours about stopping the usage
	Communication gaps
Attitudes	
	Management's commitment
	Attitude to the information system
	Weight of previous implementations
	Gap between generations
Work tasks	
	Limited possibilities to influence
	Varied practices in documenting
	Professional school differences
	Responsibility issues
	Information validity – patient safety
Technical issues	
	Slowness
	Breakdowns
Political viewpoint	
	Choosing the EPR system
	National requirements
	National archive project
	Occupational ethics and professional identity