



Technologic: Conceptualising Health Care Transformation With the Electronic Patient Record

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Abstract

In Denmark, as elsewhere, electronic patient records are being presented as the solution to a multitude of problems in health care. However, in spite of these promises, the practical development and implementation of EPRs have consistently run into problems. I present material based on field studies in a Danish region, which have been working hard to develop and implement a standardized EPR. Meanwhile involved people have also been contemplating how the introduction of this new technology may affect hospital organization and work routines. Although development and implementation have run into a variety of problems, the ways of analyzing and reacting to these problems remain remarkably similar. I propose that patterns of envisioning and working with the EPR follow a *techno-logic*, which enables involved actors to imagine technical benefits of the new technologies while downplaying non-technical issues in developing and using them. This understanding constructs a persistent *enigma of organization*, because it is blind to the continuous intertwinements in practice between the technical and the organizational, the material and the discursive; or, between systems, signs, and action.

Keywords: Electronic patient record (EPR), implementation, development, organization, technologic.

1 Introduction

In Denmark and in Western countries more broadly, electronic patient (or medical) records (EPRs) are being presented as the solution to a multitude of problems in health care. During the recent 2004 American presidential campaign, for example, George W. Bush advocated electronic records in the following terms:

The 21st-century health care system is using a 19th-century paperwork system. These old methods of keeping records are real threats to patients and their safety and are incredibly costly. Implementing a system where everyone has their own personal electronic medical record will protect patients, improve care and reduce cost¹

However, in spite of these promises, the practical development and implementation of EPRs have consistently run into problems, and they are presently not used on a grand

¹ From <http://www.thebostonchannel.com/health/3243106/detail.html>, visited 11-12-04.

scale with such beneficial effects anywhere in the world; nor will they, according to commentators, for the foreseeable future (e.g. Berg 1999).

In this paper, I present material based on field studies in a Danish region, whose hospitals have been working hard to develop and implement a standardized EPR. Meanwhile involved people have also been contemplating how the introduction of this new technology may affect hospital organization and work routines. Although development and implementation activities have continually run into a variety of problems, the ways of analyzing and reacting to these problems remain rather similar.

This paper outlines some of these relatively consistent patterns of imagining what the EPR can do and of working to develop and implement it.

Jacques Derrida has analyzed what he calls a: “logic of supplementarity” at play in much Western thinking (Derrida, 1976)². Translating this notion into the realm of technical and organizational development, I propose that patterns of envisioning and working with the EPR follow a *techno-logic*. I suggest that this techno-logic informs the visions of IT-use in health care, and enable politicians, managers, and technologists to imagine that an assortment of benefits would accrue from the use of such systems while downplaying non-technical issues in developing and using them. As I show below, technologic works by consistently separating technical from organizational issues and prioritizing the technical, only in order to later struggle with the question of how to get the latter back into view. This understanding is limiting for an understanding of the relations between technical development and health care transformation. It constructs a persistent *enigma of organization*, and thereby also of technology, because it is blind to the continuous intertwinements in practice between the technical and the organizational, the material and the discursive; or, as we might say in this particular forum, between systems, signs, and action.

The paper is organized as follows. In part two I outline two ways of envisioning the development of the EPR. In part three I outline four steps in Derrida’s logic of supplementarity and translate those steps in what I call a technologic. Part four discusses step one in this logic, the separation of the organizational and the technical into distinct domains, and the prioritization of the latter. This part analyses three reports, written by doctors, nurses and secretaries, in which they imagine how the EPR might change their work practices. In part five, I discuss a report on the pilot testing of one part of the EPR to illustrate the second and third steps of technologic, in which the organizational supplement to the technical increasingly comes into view as a problem. Part six discusses various aspects of the implementation strategy of the EPR in order to exemplify the fourth step in technologic, in which the organizational supplement is perceived as “dangerous”, yet, while no obvious strategy presents itself for dealing with it. In this section I also start to outline an alternative to technologic, by drawing on science and technology studies (STS), viewing technical development processes as always and simultaneously technical and political, economical and cultural. I draw out some implications in section seven.

² Derrida’s logic is not formal logic, but refers to a pattern of thinking that unfolds, as if inevitably. I outline the steps of this pattern below and show how it can be used to analyze ways of thinking about organization transformation processes and the role of the EPR in them.

2 Envisioning Technological Development

It does not, I think, require an eye made especially sober by the light of too many setting suns to find in the word *new* a certain pathos (Smith 1978: 157)

In contemporary Denmark technologies are proclaimed as harbingers of better times to come with an obviousness that merits consideration. In a future, soon to arrive, the EPR is imagined as simultaneously facilitating more efficient administrative practices, more productive health practitioners, vastly improved research possibilities, coordinated interdisciplinary workflows, rationalized medical decision-making and, increasingly, lowered costs.

Science and technology studies have shown how technological success and failure are often analyzed in a distinctly asymmetrical manner (Latour 1986). When technical projects are successful then success is seen as simply ensured by the beneficial effects of the technologies. But when technological projects fail, then the technology as such is persistently perceived as neutral and an extra component needs to be invoked in order to explicate what went wrong. Most often this component is perceived as having to do with something intangibly “social” or “cultural” or “organizational”, which promotes “resistances” of certain sets of actors towards the new technologies or prevent their efficient adoption. In this way, an effect of the pathos of the new is brought into play, for those who promote new technologies can now be viewed as struggling against social stasis in the name of a brighter technological future.

There is a paradoxical quality to this situation. On the one hand technological development is imagined as following a development that cannot be avoided, as when an IT-strategy for Danish health care suggests that:

A systematic development of the quality of health care activities can today hardly be managed without the use of electronic patient records (EPR) and clinical databases. The EPR will also ensure quality improvements, for instance, by lowering errors in medication (Ministry of Health, 1999: 9)

This line of thinking views those who work on EPR projects as mere *facilitators* of technological progress. But at the same time they also regard themselves as something like the “technological entrepreneurs” of health care practices; *experimental pioneers*, who must always move uphill against the conservatism of established norms and habits.

During an interview with a prominent health informatician, I asked why the development of electronic patient records was presently so important. The rather deterministic response was that since an informatting (Zuboff 1988) of the health care system would occur *anyway* it would be by far preferable to *guide* the process. The formulation emphasised that while technological development cannot be prevented it can be sensibly steered. My interviewee, who has been working in medical informatics for years, and who has participated in constructing it as a field, analysed this work as *passive*; a matter of facilitating technological development, which would presumably happen anyway. In this view the enormous amount of work, which has gone into envisioning, developing and implementing the Danish EPR disappeared. One dimension that was lost in this formulation was the *constructive* and *creative* but also *political* effects of the contribution of him and his colleagues. Another consequence, as we

shall see, is that this view systematically underestimates the capacity of the health care practices for changing the outcomes of such rationally guided efforts.

However, an entirely different interpretation was put forward by the same person. Thus, under the banner of the EPR-observatory, a partially state funded organization, which develops methods for implementation and make annual evaluations of Danish projects, my interviewee and his colleagues develop the quite different argument that their analyses and interventions are a *sine qua non* for the successful implementation of these technologies. The very goals of the project signal the importance of shaping EPR development very actively. Thus, the observatory “aims to further development of a common conceptual model for the EPR,” while “establishing networks, exchange of knowledge, and dialogue, between EPR development projects, decision-makers and the central health authorities.”³

A dual register between passive facilitation and active construction obtains then, in which the person sometimes “‘uses’ or ‘exploits’ the technology” while at other times the technology “‘determines’ or ‘allows’ the person to do this or that” (Strathern 1992: 83). How to analyse this “double vision”, which enables technological development to be interpreted in terms of something “inevitable”, which is nevertheless “resisted”, and health informaticians as simultaneously passive facilitators and very active promoters?

This paper analyzes the double asymmetry that turns technologies simultaneously into inevitable progression *and* positive achievement, while in the same move constructing social and organizational practices as blank surfaces for technological innovation *and* opaque domains resistant to change. It argues that there is a pattern to seemingly contradictory statements as those we have just encountered, and it suggests that this pattern can be elucidated by means of Jacques Derrida’s notion of the “logic of supplementarity.” Following this idea, I diagnose a techno-logic, a patterned set of visions and actions, which has become discernible through studies of the development of an EPR in a Danish region.

The notion of technologic enables me to make sense of a number of practical effects, which arise as a result of the dual register used to evaluate technology, organization and their interrelations. In particular it makes possible the characterisation of what could be called the *persistent enigma of organization* within the discourses and practices of Danish EPR projects

Although my observations are specifically tied to the Danish EPR landscape, I am going to venture that this technologic has wider currency, and would be encountered quite broadly in visions and plans for technical development. This is indicated, for example, by the striking similarity between the formulations of President Bush and those at my Danish field site.

Although the present paper is primarily diagnostic, it also needs to point ahead. If technologic constructs an enigma of organization, how can we escape it? Following STS-studies, the technological and the organizational may be understood as hybrid rather than as distinct domains. This is at variance not only with technologic as described in this paper, but also with what I will call *technologic in reverse*, in which the organizational rather than the technical is prioritized, but in which these “dimensions” are still seen as constitutionally separated. This is the case in much social sci-

³ From <http://www.epj-observatoriet.dk/> (visited 29/3-06)

ence research, including theoretical projects as diverse as semiotics, systems theory and activity theory.

To take the non-humanism (Jensen, 2004) of this approach seriously requires recognizing that “technical development” involves processes in which the organizational and the technical intermingle in hybrid processes. In development projects the technical, social, political, and economical is simultaneously at play; they are co-produced. Technological success emerges from the association of specific elements – technical, political, and organizational – whose fit cannot be presupposed prior to experimentation in practice. The focus on emerging consequences due to specific interactions infuses technical projects with life. Far from instantiating inert schemes, which can be mechanically “rolled out”, technical projects turn out to be exceedingly diverse and unpredictable entities. This is a lesson, which Danish EPR developers are currently learning at significant cost.

3 From the Logic of Supplementarity to Technologic

This play of the supplement, the always open possibility of a catastrophic regression and the annulment of progress... (Derrida 1976: 298)

In this section, I briefly describe four steps in the logic of supplementarity as analyzed by Derrida. Subsequently, I indicate how each of these steps function in the case of the EPR development project. The empirical analysis that follows, spells out these steps in more detail.

In the logic of supplementarity, an issue, concept, or idea, emerges, which initially seems evident and self-explanatory. But it is quickly realised that the basic point of reference is not self-contained; that it is defined in relation to something else. As Derrida says, the concept always has a supplement. This recognition uncovers what he calls an “additive substitution” (Derrida 1976: 270); it makes “the something” stand out as a topic in its own right. But the process does not stop there. Once the supplement has been brought into the open it gains in visibility and becomes increasingly important and problematic. Eventually it begins to unsettle the original priority between terms, and the originally inferior term increasingly becomes a “dangerous supplement,” (308) threatening, as Derrida says “catastrophic regression and the annulment of progress” (298). This sounds rather esoteric and quite far from EPR development. But let us briefly reconsider each step in the process.

It is often imagined that the health care sector may be improved by a “technological fix.” In the case of the EPR, the expansive list of benefits, noted above, which it would bring to health care practice, were initially presented as rather unproblematic, except for their technical specification. In the earlier citation from the National Strategy of IT in Health Care, the technological fix is considered necessary to maintain the health care in a manageable state at all. Improvements of the health care sector were thus imagined as following from a technological progression into which one merely needed to tap.

Yet it was quickly realised that the EPR did not stand by itself. There was *something* to manage, and this was health care practice, conceptualised as unruly and without sufficient quality and efficiency. Information technology thus had an organizational supplement. And, of course, new technologies were advocated precisely as

means to enhance this organizational “something” in various ways. So far, though, it does not pose a special problem.

Technology may seem to simply improve organization. But in time it is recognized that technologies not only solve organizational issues but also make new ones appear. This is the point at which organization as an “additive substitution” is “laid bare” (Derrida 1976: 270). From then on the organizational supplement seemed to take on a life of its own. Thus current EPR projects constantly emphasise the importance of organization and the necessity of its transformation. From *within* the discourse of project managers and health informaticians involved in the Danish projects, it has by now become a mantra that “organization is 80% and technology is 20%”. The original priority between the technical and the organizational is unsettled, as technologies are re-interpreted as *mere tools* to be used in *living organizational practice*. Thus, organization as “addition” threatens to substitute and replace the original focus on technology as solution (“technological fix”).

But while organization is thus increasingly turned into a central concern it is still perceived as uncontrollable (contrary to how technology is perceived). Thus, the problem of how to ensure the beneficial organizational use of new technologies, finds no simple or general answer. At this point organizational practice turns into a “dangerous supplement” (308) threatening to annul the progress, which was supposed to be guaranteed by technological development in the first place. In the language of a project manager: “We knew the dogma, which says that technology is only 20% of a development project, while organization is 80%, but we did not know it would be this hard”.

Organization as a supplement, which it is imagined that one can sensibly steer, which *must* indeed be sensibly steered, seems to be: “Less than nothing and yet, to judge by its effects, much more than nothing” (314). In Derrida’s characterisation the supplement “is neither an absence nor a presence” (314). In EPR projects, health care practice and organization is certainly not an absence: it is constantly talked about, worried over, and intervened in. Yet, at the same time, as we shall see below the organizational referent often seems spectral; strangely absent, *in spite* of its manifest presence.

In the following sections these points are spelled out in more detail through empirical analysis. To illustrate the first step of technologic, I turn to a discussion of three reports written by doctors, nurses and secretaries to imagine what it would be like to work with the EPR.

4 Imagining Changed Work Practices with the EPR

To be sure, reliable information on risks and benefits was limited and incomplete in all cases. Studies of particular clinical innovations have shown that the poorer the data and the less rigorous the evaluation, the more exaggerated the claimed benefits tend to be. Such uncertainties, commonplace in the early stages of medical innovation, provide a built-in bias toward further development (Dutton 1988: 231)

In the early summer of 2001, three working groups, consisting of a number of doctors, nurses, and secretaries at Aarhus University Hospital, were commissioned to develop perspectives on ordinary work-life after the EPR implementation at the hos-

pital. Specifically, the groups were asked to respond to “how they would work on 01/04-04?⁴, how it would be possible to plan a good implementation process to make all groups of personnel feel safe about the new system? how to de-mystify the EPR?, and how to prepare the personnel in IT-terms?” (Secretaries’ report: 34, Nurses’ report: 4).

After a number of meetings each of these groups produced a report (each 20-30 pages long), which summed up their considerations and was placed on the EPR-homepage of the Aarhus Region. What immediately struck all groups as peculiar was their organization into separate groups. Doctors, for instance, stated that “We found that co-operation with other groups on the issue (EPR) was impeded for the obvious reason that we were not in group with them, and had no opportunity for discussing points of contact with the EPR” (3). Secretaries wrote that they had worked “in a mono-disciplinary group with patient administrative tasks...early in the work processes [could be] concluded that the analysis of work-flow could not be conducted in mono-disciplinary groups” and that “It has been an exciting work process, although we have missed interdisciplinary dialogues and discussions” (1).

The groups thus had a keen sense of one important consequence of the framing of their commissioned task: that its main point, to get an initial grasp on some of the multiple organizational “aspects” of implementing EPRs was already slipping between the fingers of the groups, because those issues had to do quite precisely with the redistributions of tasks and responsibilities that would emerge as a consequence of the interactions between members of those groups with the advent of the EPR.

This had an additional consequence, the negative implications, of which the group of secretaries had a particularly firm idea; that is, that in keeping the groups apart, the tendency of each group to re-create old patterns of professional relationships would be considerably increased, just because ideas of what the relevant issues were from the alternative points of view of other groups did not need to surface. The secretary group pointed to several areas, such as organizational format, co-operative interfaces, task distribution, conception of other professional groups, culture, norms and attitudes that all would have to be carefully worked through on each hospital ward, otherwise “there will be a risk that the EPR is not used optimally, because problems will remain [in an idiomatic Danish expression “the pixie will move along”] and bad old habits will stay” (22).

In the nurses’ report a similar problem is noted; that “the lack of contact between the groups has necessitated an array of assumptions concerning the routines and work flows of other professional groups” (5). But the separation has already had a narrowing consequence in this report, for in their consideration of the entailment of interdisciplinary work, this work is conceived only as relating to doctors, and secretaries are nowhere mentioned: “The different professional groups will get easier access to the work tools of one another. Doctors will work become more oriented towards [patients’] needs, and nurses will become better at documentation” (19).

Finally, the lack of interaction between groups was also noticed in the doctors’ report, but here the quite different problem raised focuses on doctors’ need to protect

⁴ On 01/04-04 doctors, nurses, and secretaries worked exactly as they have always done, as the system here discussed is still far from ready for implementation and everyday use. Exaggerated projections for change are part of the logic of supplementarity, the premises of which I attempt to make explicit in the following.

themselves against unwanted new tasks: “Will the implementation of the EPR entail task slippage, so that the group of doctors will be expected to take care of more routine tasks, such as writing in the record, booking of examinations etc ‘*since it is so easy*’?” (Doctors’ report: 4, original emphasis). With this worry in mind, they therefore proposed that: “it is important that specific groups retain the possibility of emphasising/justifying the specific interests and problems in relation to its own tasks” (5).

Given the lack of precise information, the nurses’ group decided to discuss a number of different models that could be used in relation with implementation. They evaluated advantages and disadvantages relating to the possibility that “EPR work spaces are located in an office adjacent to the ward”, “a portable computer is placed on a moving table, transported to the patient”, “doctors and nurses each have a pocket PC” (7) and so forth. They emphasised the need to solve practical and economical problems such as “too few PCs, PCs that are too old and unreliable, and complicated and slow log-on and off functions” (17). This led them to conclude that: “it is necessary to work with the attitude of the personnel. Frequent problems with and crashes of the current IT-systems effect user attitudes negatively” and “implementing the EPR will not enable economical savings in the short run”. They also suggested that educating users would be costly but necessary. And, undoubtedly inspired by the leader of the group, who had a background in health informatics, they advocated the necessity of conducting workflow analyses on several of the wards.

As noted, secretaries were highly sceptical of the benefits of mono-disciplinary groups. In their recommendations they focused on “implementation – the good process” (24), and proposed the appointment of an interdisciplinary EPR implementation group on each ward. They also suggested that an EPR user organisation based around super-users should be developed.

The doctors’ group, however, took a quite different position. Initially they indicated “frustration” regarding the lack of exact information about the EPR-project in terms of “budget and schedule” as well as the separation from other groups (3). But this situation was also productive for a certain discourse. It enabled the group to concentrate fully on the “EPR viewed with visionary doctors’ eyes” (3). These visionary eyes looked at the EPR through the lens of technologic. Although a number of relevant economical, administrative, co-operative and technical issues were briefly noted, the group agreed that: “these questions should not have the effect of inhibiting enthusiasm” (5). Issues of technology and organization were thus immediately separated and cordoned off into distinct domains.

This view had distinctive consequences for the writing style of the report. For example, the appendix called “an anaesthesiologists’ expectations of the EPR” is littered with sentences like “everything concerning security and backup is, of course, solved, such that the system is up 99,9% of the time, and the remaining 0,1% is taken care of”, “the table top of the moving table for the ward round, by the way, is a computer with finger touch screen”, capable of showing x-rays and “when you have dictated a note to the EPR (secretary or ‘voice recognition’) it immediately appears as a draft on the screen” (9), and so on.

The visionary attitude gives rise to a number of issues, of which the easy conflation of the EPR and a secretary is only one instance. This mode of writing renders irrelevant the consideration of an array of topics relating, for instance, to the interests of other disciplinary groups, to the everyday working relations between doctors and

others groups of personnel, and to the relation between technological visions and economical reality.

The visionary modus thus turned the doctors' report decisively away from any realistic estimation of the implications of the EPR as a work tool in an organizational practice. Rather than "demystifying" the EPR, it rendered its potentials and potential problems more opaque. Some of these issues will re-appear, as I turn to a description of the first pilot-test of the medicine module a little over a year later. The next section describes the return of the organizational supplement and the increasing recognition of its implications – step two and three of technologic – through an analysis of this pilot test.

5 Pilot Testing the Medicine Module, Fall 2002

It is interesting to note how the common observation of the many difficulties of *other* innovative projects continue to easily co-exist with the feeling, or at least the steadfast argument, that precisely this project, *here*, will be different and deliver the envisioned goods. This understanding was literally brought to the test as the Aarhus system began to materialise and could finally be used experimentally on pilot wards.

Here I relate the experiences from the test of a medicine module, one of several independently developed modules comprising the system, in the autumn of 2002. These were reported in detail by an observing anthropologist and a participant from the medicine module project group.

As argued elsewhere, reports on IT in health care and elsewhere often rely on highly equivocal information strategies, which on the one hand allows reports to document many difficulties in comparison with initial visions, and of many practical problems, but on the other hand render these experiences anecdotal in comparison with imagined future successes (Jensen and Winthereik 2002, Jensen and Lauritsen 2005).

We proposed that more attention should be paid to the micropolitics of health care practice and organization. Even more importantly, however, is to pay attention to the dynamics between general and abstract visions and actual implementation projects. Attention to this dynamic facilitates analyses of organizational transformation, which work against the disappearance of issues, which often fall in the gap between the domains of the organizational and technical. Technologic can be seen as an effective system for never being confronted with such issues.

The *Report Concerning the Pilot Test of the Medicine Module in the Electronic Patient Record of the Aarhus Region, Autumn 2002* (MEM) offers a detailed qualitative investigation of this phase of testing. However, this adds to the paradoxical quality of the report, because what it documents so thoroughly is the many problems that the pilot tests ran into.

In the autumn of 2002 the medicine module was tested at four wards in order to review its usefulness for clinical work and to gain knowledge about stability, functionality and co-ordination with workflow in the hospital (2). Pilot wards would be encouraged to report errors, suggest improvements, and come up with ideas for how the system could be "rolled out" at other wards. In the curious neutral-but-positive language of the introduction, the "pilot test offered insights into the functionality and structure of the medicine module, which was, generally speaking, satisfying, and it

led to wishes for new functionalities and performance-improvements, discovery of some errors, and considerations concerning the change of work flow in hospitals” (2).

The main text considerably qualifies this evaluation. It consists of twenty pages packed with problems concerning organization, technology, education, practicalities, errors and wishes for improvements, and workflow issues. I remark only on a few selected issues because they were already predicted in the ‘mono-disciplinary’ reports discussed above. The first, although grouped as “technical”, in fact immediately points to the impossibility of maintaining this category as distinct from social and organizational issues:

On November 4th, attempts are made to begin tests anew. A check on the set-up of users shows that while relevant nurses and doctors have been created [in the system], this does not hold for chief physicians and secretaries. The IT-department had not understood the request to have all physicians on haematology created as users, as including *chief* physicians. Another problem that becomes visible is that “roles” (delimiting rights in MEM and EPR) are only set-up for “doctors”, “nurses”, “administrators”, and “porters” (!), but not secretaries. The IT-department suggested the registration of these as “nurses”, which would entail their access to medicine administration in MEM. Secretaries end up without access to MEM (14)

One can sense why a high emphasis on interdisciplinarity, “cultural diversity”, and co-operation was found in the secretaries’ report. It is indeed both sad and funny how secretaries, of all people, are forgotten as users of this new information system. It is also noteworthy that the invisibility of their work is clearly related to its designation as practical and organizational rather than clinical and technical. In any case their disappearance in the workflow of prescribing medicine erases the everydayness of the test, and thus exemplifies how secretaries embody organizational supplementarity; they are vital but usually unseen.

My second example starts out with a problem with log-on time, which the nurse’s report foresaw as a potential source of frustration. This fairly narrow issue unfolds, however, into a series of connected problems in the following excerpt from the diary from the haematological ward, November 8, four days into the test phase:

MEM/EPR runs slower the more patients are entered: creation of one patient took, in one instance 2 minutes and 40 seconds on a PC with 260Mb Ram, after log-in...Prescription of 5 sorts of medicine took 4 1/2 minute...Medicine administration for one patient on a portable computer with 256Mb Ram took 8 1/2 minute altogether ...There is only one common password for all users, and it cannot be changed. Pilot tests are run only in daytime, when the test-responsible or super-user is present, i.e. MEM is not a part of clinical everyday practice. Education cannot practically be carried out, since MEM on the DVH-Installation is unstable and is an older version (35)

Such examples aroused understandable indignation. A doctor expressed it in the following way:

We clinicians do not usually use anything until we are certain it works. This is necessary because of the patients. We usually do not start the airplane before everything is ready, tested, and running. We had been told that it would be somewhat different in connection with IT and the EPR. We had been warned that we would probably have to put together the airplane while in the air. But during this pilot test we haven't even received the parts (6)

Given the criticisms offered in the report, it is not surprising that a number of problems are summed up in conclusion. It refers to a "lack of a clear distribution of responsibilities and tasks", a "lack of procedures for carrying out the task", a "recognition of unforeseen problems or that it takes longer than expected", and "trouble involved in interdisciplinary communication between groups with different specialised languages and norms" (21-2). At the same time the conclusion operates a rather more equivocal distinction, according to which "from the clinicians' point of view the pilot tests of the autumn 2002, offers good insights into parts of the functionality of the MEM, with which there is general satisfaction" (21). In spite of everything else, then, the technological component seems capable of an evaluation, separated from and positive in comparison with organizational aspects. This suggests that "everything else" indeed impeded proper success, but implies also that in a future to come this may change.

This analysis also indicates how many critiques of the limited extent to which organizational issues is taken into account in technical development projects continue to rely on technologic. In the present case we see how the report constructs a counter-discourse, a *technologic in reverse*. This is a discourse, which recognizes that the supplement of organization has been overlooked and focuses analytically on organizational rather than technical issues. Its analyses, however, continued to be based on the presupposition that the technical and the organizational can be seen as two distinct domains. This enables the double evaluation of the present report, in which, on the one hand, the technical can be seen as a success *if separated* from its organizational context, yet, on the other hand, encourages readers to remember that *context is crucial*.

Thus, the authors continue to recommend that more attention is paid to organizational issues, for example by ensuring that "experiences are transmitted" by letting "participants tell the story, through reports, by creating forums and networks, whereby these experiences can be shared, and by ensuring continued clinical participation in the planning of pilot tests and/or implementation of MEM...this could be decisively strengthened by giving these forums and networks official status in the EPR organization and earmark resources [for such purposes]" (22).

Given the many problems described, the report is perhaps surprisingly friendly in its evaluation of the tested system, which it views as a success if considered apart from its organizational environment. I have suggested that this is due to its reliance on technologic-in-reverse. For precisely that reason, the report does show a keen awareness of the importance of organization, although an organization artificially separated from technology. Appreciation of organizational issues, however, did not reach far into the project organization. After publication the MEM-report was taken up at a meeting of the managing project committee, where it was "made note of and filed".

I do not think this indicates a mere lack of willingness to take seriously the analysis made in the MEM-report on behalf of this committee, although it also signals this. The report may have been so quickly disposed of also because few conceptual or material means were available within the project structure for improving on the problems even though they were now visible.

I want to suggest that this lack of certain kinds of resources is related to the way in which the organization functioned from the beginning as a supplement to the technical part of the project; one, where organization was imagined as the neutral “medium” into which the new system would be inserted, or on top of which it would be “rolled out”. The realisation that the “medium” was not, in fact, neutral, made it seem highly complex. But it offered few resources for how to deal with organizational opacity. The attempt to do so – the fourth step of technologic - is described in the following section, which deals with the implementation strategy and activities relating to the implementation of the EPR. This section also begins to outline some analytical means with which to move away from technologic.

6 Implementing the EPR

For nothing is ever repeated exactly, and the most analogous lives, which, thanks to the kinship of persons and similarity of circumstances, we may select in order to represent them as symmetrical, remain in many respects opposite (Proust 1934: Vol. 2, 733)

How to move away from technologic? In the non-humanist idiom advocated by STS-studies, technological projects are seen as hybrid entities, whose lives emerge unpredictably, as different technological, political, economical and cultural elements are associated and pieced together. Although Marcel Proust is talking about human lives and relations, the quote could also point us towards an appreciation of the lives of technical projects; that is, of the contingencies and variations through which such projects emerge.

The following section on the implementation strategy for the second round of pilot-projects, will exemplify two ways in which technical projects exhibit their surprising liveliness. The first stresses that in such projects nothing is ever repeated exactly *as planned*. The second indicates that nothing is ever repeated exactly *from one setting to another* – even within the same overall project. And it will suggest that this evident and everyday fact remains very hard to take seriously because of the logic of supplementarity that guides project understandings of the relationship between “technology” and “organization”. Specifying the implications of these differentiations is one move towards escaping technologic.

In fact, one need not go to non-humanist theory to learn that “nothing is ever repeated exactly.” As we shall see below, one can learn this directly from actors involved in EPR development. In the following, we will see how these people struggle with the question of how to make sense of the dangerous supplement of organization.

6.1 Implementation Strategy and Activities

From the beginning of the project, technological aspects had been economically separated from organizational ones (exemplifying the first step of technologic), such that the former would be paid for with regional funds, whereas the latter would be an issue for the individual hospital. This is not an unusual model, for Danish hospitals are independent institutions, whose organizational activities cannot easily be dictated by the layers of political organization. The situation moulded the structure and emphasis of the project, as it was easy for hospitals to join in on a technological development project at regional expense. Implementing and paying for the transformation of health care practice necessitated by the adoption of new technologies would be an altogether different issue.

The regional office for informatics funded what was called the “IT-villa“ or “the virtual hospital” (DVH), in an old house by Aarhus Regional Hospital. This building had several offices, which housed a number of regional employees. They functioned as secretaries for the various project modules and committees and they had a central co-ordinating function in planning and keeping track of the proliferating project. The virtual hospital also housed a basement of computer servers, where modules and components were tested before being approved for pilot-testing at real hospital wards.

The regional EPR implementation group was based in this environment. From the beginning it was in a curious position, for as it explains:

Hospitals are responsible for the implementation of the EPR, concerning economy as well as planning and practical accomplishment. The task of the regional implementation group is to develop “tools”, which are made available for all hospitals during implementation⁵

These tools, as they were available in January 2004, included a questionnaire to uncover IT-competencies of personnel, a manual for the booking module, an education plan for super-users, a “guiding norm for minimal demands for a PC, in order to run the EPR”, and a number of outlines, forms and suggestions for carrying out workflow analyses. It was up to individual hospitals to decide what, if anything, they wanted to do with this toolbox. A number of hospitals made implementation plans, which were also made available through the homepage.

The implementation strategy of the major regional hospital had four ‘legs’: information, education, organizational change, and technology. The strategy was informed by a conceptual framework known as *Müller’s square*, developed by an engineer from the University of Aalborg, where the only Danish department in health informatics is also located. This was not a coincidence as the implementation manager has a degree from just this department. The idea behind *Müller’s square* is that technological development and implementation is complicated but can nevertheless be guided by simultaneously taking into account each of its four dimensions.

A temporal chart presents how this is to happen up to and after implementation (“M-day”) at the hospital. On the information axis are “newsletters”, followed by a “general orientation”, yet later a “ward orientation” and a few weeks after the introduction an “evaluation”. Education includes “planning courses” (e.g. EPR-

⁵ From http://www.aaa.dk/aaa/index/om-amtet/it_i_amtet/epj/epj-implementering.htm (visited 21/8-03, no longer available)

Organisation: length 1/2 day; work-flow analysis and organizational change: one day; IT-technology, problem identification and problem solving: one day), “basic education in a play-environment”, then a “course for management”, “reminders for all users”, “24-hour hotline” on M-day and subsequent “evaluation”. Organizational changes revolve around “work-flow analyses”, “discussion” of these, followed by “prediction of changes” that will be induced or facilitated by the EPR, such that “improved work flows” can be worked into the ward, preferably prior to implementation, and an “evaluation” fourteen days later. Technology must be “bought”, “prepared” (e.g. the play-environment) and “tested”. On M-day there must be IT-assistance all day; here, too, an evaluation follows.

Read critically there is an ethereal quality to this description; everything seems to go quickly and smoothly: from the one-day course in technical problem solving (even though the project has taken years and everyone knows it is immensely complex) to the half-day course in organizational change.⁶ In the chart, organizational transformation takes little time and work. For example, the course in work flow analysis and the actual carrying out of such analyses are both placed three months prior to M-day; one month later this analysis is to be discussed among super-users and management, then two weeks later it must be clarified how this relates to the EPR, and in the last two weeks before implementation, according to the outline, work flows are simply changed at the wards.

Technicalities are described in the same planning idiom of effortlessness; thus buying technologies, testing them and preparing them, as well as creating users in the system will all be done within a few months. The implementation report from the psychiatric hospital frankly acknowledges that: “the estimated hours of use of resources are based on non-empirical data” (Psychiatric Implementation Report: 10) and one is left with the distinct impression that “non-empirical data” (a euphemism for optimistic guesses) informs the strategy here discussed as well. However, one may also note that in practice things are and will be quite different. Further, it is obvious that the implementation group is keenly aware of this fact.

Delays in relation to the finalisation of certain modules, as well as the less than perfect first pilot test described above, changed plans, so that a secondary pilot phase was to be run prior to the general implementation process. At the hospital this pilot experiment concentrated again on the medicine module. Additional components would be added only slowly as the common implementation envisioned in the implementation plan would be replaced with a gradual and incremental upgrading of pilot tests to more full-scale uses.⁷

This is not in itself too shocking, as pointed out in the truism that “it seems almost automatic that software is never produced on time, never meets specification, and always exceeds its estimated cost.” (cited in MacKenzie 2001: 166). But zooming in on the enigma of organization and its supplementary structure, allows one to grasp a seemingly paradoxical complement to this insight; that no matter how many times

⁶ Jensen and Lauritsen (2005) discuss in detail the distinction of reading with or against the text.

⁷ I have encountered less positive scenarios estimating that several modules will never be integrated into the solution, and that the final product may end up having only a very vague resemblance with the seamless information tool envisioned in reports from 1995 and until now.

this “automatism” is encountered, subsequent technological development practices seem not to learn to estimate the required of money, time, energy or gains any differently. This is a symptom of technologic. Its consequence is to blind us to the hybrid intertwinement between technology and organization.

6.2 Redefining implementation

Given the above-mentioned situation it became necessary as one project worker said: “to redefine implementation a lot”. On the one hand it was necessary to begin the implementation process, because of the high level of political pressure, and because the EPR had been held in prospect as ‘almost ready’ to hospital employees for so long that a number had started to express doubts that it would ever arrive. The official start of the implementation phase aimed to quell such worries through “control of expectation”. In fact, however, the actual testing of the model would not take place immediately, because the module to be implemented was not yet finished when the phase was to start on October 6th, 2003. Implementation was therefore translated to mean “work-flow analysis” for the foreseeable future. Before I comment on workflow analyses, which thus came to figure as the crucial component in pilot-tests and implementation, I briefly note another translation, which happened in the interval between visionary technologic and practical accomplishment. It had to do with IT-training.

According to a guideline provided by the regional implementation group, hospitals ought to offer seven hours of IT-training per employee; this had been estimated as enabling proper use of the medicine module (more hours would need to be added for each additional module). Later on three hours per person were viewed as sufficient and this amount was made “flexible depending on the target group”. Thus doctors would not need to participate in training sections, because it did not match their “culture of learning”. To accommodate this culture a portfolio with educational material would be made available for individual practice and use.

But a rationale for cutting training hours, perhaps as pressing as doctors’ individualism, was expense and logistics, as it would be “mega-expensive” and extremely complicated to meet the regionally developed recommendations. An analysis made by local project workers estimated that with the current educational capacity it would take more than three years to train all hospital personnel in the region in the use of the system. Even this task would constitute only half of the problem; the other half consisting in the limited availability of replacements for personnel who were taking IT-courses.

6.3 Imagining Workflows, Transforming Organizations

Such scarcity in combination with the emphasis on guiding and optimizing work practices led to a focus among implementers on workflow analyses. These were imagined as having the double advantage of being both cheap means of grasping central aspects of health care practices, and effective means of changing them. The idea was simple. Each workflow was described on a separate sheet of paper, first in its “present” form, then as “envisioned”.⁸ Each “flow” was given a name and a group of per-

⁸ There are many variations over the theme here described. The present is from the software developer Systematic. Available from http://www.aaa.dk/aaa/index/om_amtet/administration/sundhedsstaben/sus-soep_sygehuse/epj/epj-implementering/epj-impl-vaerktoejer.htm (visited 21/8-03, no longer available)

sonnel was assigned responsibility. Each “flow” involved a “beginning event”, a set of “actors”, “tools”, “interested parties”, and “pre-requisites”, all of which were described in a few lines of text, along with the central “actions (who, what, where)”. Finally the “result” was summed up at the bottom of the page. While the “present” page offers a decontextualized description of current activities, the “envisioned” page imagines how nice things could look in the future. As always “it is necessary to separate analysis of present and envisioned work flow, to not let the present situation inhibit the possibilities of future work flows”.

In work-practice studies there are well-known arguments pointing both to the gap between clinical self-description and reality (e.g. Forsythe 2001, Suchman 1988) and to the gap between knowing how one would like something to be and actually making it so. As for this second gap, its many manifestations in relation to technological projects has taken up a substantial amount of space in the present text. But the authors and promoters of this thin model of work practice and organizational change are also well acquainted with thick practice.

For example, I learned from these same people how implementation must proceed differently not just from hospital to hospital, but also between wards, since “one does not give medicine in the same way at surgery”, and since wards are recognised as highly variable work spaces. Thus “X is a giant ward, the size of a small regional hospital”, which slavishly follows the method of work-flow analysis advocated by the implementation group. On the other hand “Y” is much smaller and has personnel that has been involved with implementing IT-systems at earlier times; its organizational culture is rather to “make decisions over lunch”.

According to one interviewee, successful implementation therefore involves the capacity to interact with different cultural and disciplinary ways of handling the task at hand. For the implementation group this is a part of the “huge experiment” of implementing an EPR, with its requirements of organizational transformation. Inspired by the discourse of management literature, it was imagined as a way of adding “a layer of loosely coupled systems on top of a traditional hierarchical organizational structure”. Although groping, this formulation may be seen as an attempt to escape the confines of technologic. Yet, the same manager has developed an implementation strategy, according to which this rather monstrous experimental situation is handled through workflow analyses carried out over a few weeks. Translated back into official discourse, the organizational transformation with the EPR could be understood as flowing smoothly from clinical self-description.

7 Letting go of Technologic

In the juxtaposition between local analyses of the practical realities of pilot projects and the general implementation schedule, we can ascertain a replication of the pattern earlier encountered. On the one hand the schedule presents EPR implementation as a perhaps complicated but certainly controllable procedure, which can be planned in the abstract so that its guidelines need merely be followed. On the other hand we see a “huge experiment”, where one “lives in chaos”, and where “loosely coupled systems” meet “traditional hierarchies”. When one focuses on this pattern it is striking how “organization” is viewed as a neutral medium in the abstract, while in practice it confronts involved actors as a highly opaque and somewhat “dangerous” thicket, which it is necessary to try to work one’s way through.

It makes little to sense to blame either project management or implementation group for this situation. As we know, the vision of accomplishing swift organizational re-engineering, which would efficiently and elegantly alleviate an array of problems, is widespread and engrained in a modern technological imagination, deeply informed by technologic (e.g. Hammer 1990). But while no accusation is warranted, commentary, and an outline of consequences, is.

The image of quick and efficient change is one which always survives better on the level of visions and strategies, where the enigma of organization does not have to be scrutinised too closely, than on the level of local practice where it must be. This gives the current argument its critical edge. For moving with the proponents of technologic into the practices that the EPR is supposed to connect with and improve upon, one sees how its simultaneous grandiosity and vagueness which, during envisioning processes, seems so appealing, turns from an asset into a liability. This is the tension encountered as technologic meets health care practice.

The common distribution of tasks, which ensures that technological visions are formulated among politicians and technologists, whereas their materialisation take place in rather different locations, also ensures that very few resources are ever allocated to those issues not immediately captured on the visionary level. Therefore very little practical intellectual effort goes into analysing the complications of technical and organizational transformation, in comparison, for example, with the countless hours used by programmers on technical detail. Little consideration is given to what it takes to simultaneously assemble technical, organizational and economical relations.

Nevertheless the gap between technologic and technical projects in action is sooner or later encountered and, from then on, the costs are predictable: an increase, in comparison with promises and expectations, of time, money, and organizational and professional energy from both project workers and from health personnel that have to suffer frustrations and disappointments. Talk of another "IT-scandal" may then start to surface.

But if such situations tend to take on a scandalous air, it is rarely because people have been doing bad jobs. It is rather because technologic creates an enigma of organization, which renders invisible a great deal of what it *actually* takes to make anything work in health care practice, and offers simplistic conceptual tools for dealing with those aspects that do come into view. The problem, in short, is that the horizon of available expectations is rendered completely unrealistic by its reliance on technologic. This logic is so prevalent, that even as "organization" surfaces as an important issue and starts to interfere with technical matters, the alleviation of this complication is constructed within an idiom of sensible control and execution, such as the 80-20 model and the solution of organizational problems by means of quickly conducted workflow analyses.

According to the analysis carried out here, technologic increasingly brings "organization" to light and attempts to intervene in "it" through managerial initiatives, but the organization it looks for is spectral, and the one it finds is therefore rendered only obliquely visible; consequently it remains obstinately "resistant" to the "new". For this reason, the view presented here remains distinctly unimpressed with the pathos and promises generated through this logic.

Scepticism towards the new does not automatically equal a conservative preference for the old. As Foucault said, the "point is not that everything is bad, but that everything is dangerous" (Rabinow 1984:343). By pointing in various instances to the

“dangers” of the present, Foucault offered no easy solutions, nor did his analyses make him capable of doing so. Rather he confronted those enamoured with progress with problems and headaches: his position led to neither conservatism nor apathy but to a “hyper and pessimistic activism”. In his spirit I offer the following.

In thinking about technical projects and implementation, the organizational (cultural, political etc.) obviously turns out to be important components. Everybody realizes this, as the 80-20 model testifies. Yet, the realization that organization is important seems to solve few problems of its own accord. From the point of view of non-humanist STS studies, the reason is that the analysis through which this realization is brought about continues to rely on technologic, which constitutively separates the technical from the organizational and locates them in different ontological and analytical domains.

The present paper has focused on diagnosing technologic with an occasional nod to its loyal opposition technologic-in-reverse, which concentrates specifically on organizational issues without ever questioning the presupposition that the technical and the social inhabits distinct spheres and work according to different logics. But challenging this ingrained logic of technical projects should also move us forward. I want to end, then, by asking if it might not make a difference to conceive of technical projects as hybrid entities in which the technological and organizational is thoroughly intertwined and co-produced. Obviously, I think the answer is yes. But what, exactly, that difference is, remains to be found out. This would require both re-thinking and experimenting with all “phases” of technical projects, from planning and budgeting to organization, management and implementation. This complex task is one, which I hope others will join.

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