

'Working The Contract'

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ABSTRACT

This paper presents data and analysis from a long term ethnographic study of the design and development of an electronic patient records system in a UK hospital Trust. The project is a public private partnership (PPP) between the Trust and a US based software house (OurComp) contracted to supply, configure and support their customizable-off-the-shelf (COTS) healthcare information system in cooperation with an in-hospital project team. Given this contractual relationship for system delivery and support (increasingly common, and 'standard' in UK healthcare) we focus on the ways in which issues to do with the 'contract' enter into and impinge on everyday design and deployment work as part of the process of delivering dependable systems.

Categories and Subject Descriptors

K.4 COMPUTERS AND SOCIETY: K.4.3 Organizational Impacts: *Computer-supported collaborative work*: K.5 LEGAL ASPECTS OF COMPUTING: Miscellaneous

Keywords

Ethnography, project management, contracts, customizable-off-the-shelf (COTS) healthcare information systems

1. INTRODUCTION: Everyday Issues in Real-World/Real Time-Design

This paper is concerned with documenting some of the everyday work, some of the mundane inter-relationships between users and designers, that goes on around 'the contract' in a technology design and deployment project. Ever since the much heralded 'turn to the social' in systems design the relationship between users and designers has been held to be of crucial importance in both designing and deploying information systems. Research and experience has produced a common ethos in CSCW, HCI and related disciplines; that designers need to understand those they design for, they need to understand their work, and to build systems with users and other stakeholders participating.

Although a proliferation of useful techniques and methods for understanding the user and their work and involving them in design have emerged, it is also crucial to acknowledge the difficulties in understanding exactly who the 'users' of a system might be; gaining fruitful access to and participation from them; and reconciling diverse and

contradictory requirements, (e.g. Grudin, 1991; Poltrock and Grudin, 1994; Coble et al., 1997). Furthermore, these difficulties are particularly apparent in large scale, organizational development projects.

In this paper, however, we take a rather different tack by focusing explicitly on the impact of the 'Contract' on user-designer relations and project work during the design and deployment of a system – in this case an electronic patient record (EPR) system – for, in 'working the contract' new perspectives on users and use emerge. Given our fieldwork experiences we find it is surprising how rarely 'the Contract' appears in reported research on project work and user-designer relations given that our routine observation from this study (and others we have conducted) is that reference to 'the contract' is a persistent and highly visible feature of the design and deployment process. That the contract is salient in this case is perhaps unsurprising considering the particular design arrangement between supplier and customer. However, its use and role is important to understand, as this is a situation that will be repeated across the NHS. The 'contract' - the formal, legal stipulation of work and responsibilities - gets dragged into everyday work, invoked, pointed to, metaphorically waved about, and used in a number of ways. The contract provides a formal framework within which and in reference to which design and user-designer relations get worked out in practice.

Of course we are not the first – nor will we be the last – to be interested in contractual issues in systems design and deployment. Early work on contractual issues (Grudin 1991 Coble et al 1997, Artman 2002) focused on concerns about specifying the interface, methods or processes for interface construction, and the different contexts of software development and the general need for some kind of human factors 'usability' approach. Grudin (1991), for example, emphasises the importance of organisational context and how these impact on relationships between users and developers and concludes: "only by understanding the context can developers accurately identify possibilities for action, the true source of barriers, and appropriate approaches." It is a sentiment with which we would agree (and who wouldn't?) but we believe that the context for design, and development, and user designer relations, has changed significantly in recent years, particularly in the UK, and especially in what might be termed quasi-governmental sectors like health and education, where the government acts as rather more than simply 'just another' stakeholder. In consequence we believe that our interest in and approach to contractual issues is rather different to these earlier studies – reflecting both developments in the complexity and scale of technology and organisational arrangements, the differential status of stakeholders and developments and changes in the attitudes and expectations of users towards technology. Our focus is on the contract as a living document, a constant source of reference and discussion around which work and activities get organised, changed, modified and abandoned.

Despite its massive and bulky presence the contract is not a fixed point that is simply oriented to but is instead the focus for much of the ongoing work of 'co-realisation' Hartswood et al 2002, 2003) in design. Whilst we agree with Artman (2002) that: "the way in which procurement and contractor organisations prioritise, organise and correlate their objectives merits further study" – we don't necessarily agree that problems and differences can be avoided simply by becoming greater versed in usability issues or better at precisely defining concepts such as usability, iteration and prototyping. We are not convinced of the existence of such panaceas – quite the reverse – for our experiences suggest that these contractual issues will continue to plague organisations and individuals and test the limits of people's organisational acumen.

As with any 'plan', the development work and the system actually produced differ from what is stipulated in the contract (cf. Suchman, 1987). The actual project work and the finished system are instead a product of putting the contract into practice. This involves working out how the contract translates into, and relates to, the multifarious activities of development work, and the specifics of the emerging system. As our fieldwork documents, these activities, decisions and appraisals are often fashioned through intense negotiation between the different parties, in contingent and rapidly changing circumstances, in which the contract is a key feature and resource.

In this paper we point to various features of contractual issues in everyday designer and user-designer relations in order to further un-pack the actual practice of design. In so doing we sketch out some neglected issues in project work and management and use our ethnographic observations of how contractual issues feature as part of everyday discourse and negotiation to contribute to the understandings of the issues surrounding real world design and design practice as well as longstanding debates on 'users' and the design process. This study should contribute to understanding how the 'contract' impacts on and is a central part of the cooperative work of design. Secondly, our explication of 'contract work' documents how the contract, and contractual work, requirements, negotiations and knowledge have effects on the 'quality' of an organizational system to support integrated, distributed group work. We suggest this second aspect is of particular import since it points to a range of issues connected to developing a dependable, trustable, workable system. In this sense we believe that 'working the contract' is an essential aspect of the 'co-realisation' or 'co-production' (Hartswood et al 2002, 2003) of a working, deployed system and may well be an essential component in the development of a dependable system. Consequently, the work involved in 'working the contract' is less to do with the legal enforcement of contractual responsibilities and far more to do with classic concerns of ensuring that systems resonate with circumstances of use.

2. Background: NHS Modernization and Computerization

The National Health Service (NHS) in the England is currently undergoing a major period of upheaval, 'modernization' and computerization (a process that has been going on in different guises since the 1980s) (Bloomfield and Vurdubakis, 1997). In this paper we focus on moves to provide comprehensive, integrated computer support through developing and deploying electronic patient records (EPRs) – that all NHS Trusts are required to develop in the next 5-10 year period. These systems are envisaged to enhance medical work not only through better information (accessible at the point of service, more timely,

better quality etc.) but also better support of best practice and decision support, as well as providing the means for integrated working (For commentary on the process, problems and evaluation of current EPR systems see Ellingsen & Monterio, 2000; Hartswood et al., 2001).

Trusts are on a development trajectory that requires them to integrate their services electronically with other care providers in their area. At the same time they are required to provide core sets of data expressed in particular ways for national purposes. Integration is then not just a problem for individual Trusts but one that must be worked out in relation to requirements for regional integration with other services, and national integration. The UK Government has instantiated a program to deliver the systems required to achieve this process - the National Programme for IT (NPFIT). Local NHS Trusts will work in concert with the local service provider (LSP) who will provide a suite of products (not necessarily all their own) which will be configured to the individual Trusts' requirements. The relationship is one of public private partnership (PPP) where the private company is contracted to supply, implement and maintain the Trusts' systems for a given period of time (usually 8-10 years). When the LSP programme was announced certain Trusts that were deemed special cases (i.e. where they had already signed contracts with suppliers and their procurement process was judged to have been sound) were allowed to continue implementing systems outside of the LSP programme but having to conform to national guidelines. This study focuses on just one of these based in the North of England – the 'Trust'. In August 2002, the Trust signed an £8.3 million, nine year, contract with a US software provider to supply, implement and support an EPR system. The system being implemented is a customizable-off-the-shelf (COTS) system, that is being cooperatively configured by the US based supplier (OurComp) and the UK hospital Trust (the 'Trust'). Phase 1 (a core administrative and reporting system, theatres, A & E, radiology and links to legacy laboratory applications) went live in 2006.

Our ethnographic study of the design process began in May 2003. We were provided with access to the design team as they progressed the design, attending meetings of many sorts involving the project team (and particularly the project manager), shadowing, attending testing and so forth and collecting a wealth of material (field notes, tape recordings and various documents). The implementation team – the Trust analysts to which we mainly refer throughout this paper – is made up of an analyst for each of the system areas/modules (e.g. 'theatres, A & E etc.). It is the analysts in the implementation teams that carry out most of the day-to-day systems work – in terms of specifying what the build of the database should be and then carrying it out, demonstrating it to 'users' and then refining, re-building and so forth. Each analyst is part of a wider team comprising a Trust analyst, a OurComp analyst, a team leader (a manager from that area) and various 'users' (medical and administrative staff of various 'jobs' and levels).

Importantly, this is a very similar situation to that which many other Trusts will be experiencing over the next few years and most of the other NHS EPR projects will have a similar configuration of players and technologies involved. An outside (often international) supplier will provide a customizable off-the-shelf (COTS) EPR system to be configured for the particular Trust. This may well be integrated with other specialist legacy applications (particularly for e.g. laboratory work), some of which will have different suppliers. The business of building and configuring the system will be managed in partnership – i.e. a joint project team involving members of the Trust and the

supplier. The design of any system for an individual Trust is likely to encounter limits as to how much the supplier will want to tailor the system for a given client. The contractual issues we indicate are likely therefore to be generalisable across a number of EPR projects, and may well have relevance to COTS systems in general.

We therefore attempt to make some general points about the complexities of contractual relations in design and project work: the issues of multi-national cooperation in development and deployment and how COTS systems get tailored in massive commercial projects. We also point to how issues of project management, usability and integration are influenced by contractual relations. Above all we suggest that our ethnographic account of contracts and contractual relations in commercial development and deployment projects highlights the importance of understanding the impact of contractual issues on designer and user-designer relations in a 'real time, real world' commercial project, where 'time is money' – and a lot of money at that.

3. Designers, Users and Contractual Relations

The contract is a massive document (around 6cm high of A4 paper). Its preparation began during and throughout the 4 year procurement phase and it was 'finalized' in August 2002 when the Trust signed it with the US-based supplier OurComp. It has since gone through a couple of official larger scale 'change contract' revisions and numerous minor alterations. When we originally started the fieldwork the project manager – 'Helen' – pointed it out on her desk, patted it and said in what seemed both a joking and yet truthful, if rueful, manner that it was her "Bible..... and her bedtime reading!"

Although this paper is about contracts it is not about 'the law' regarding contracts, the construction of contracts or executive level contract negotiations, although clearly these too would be interesting topics. Rather, it is about everyday design problems and how 'the contract' or what is assumed to be in 'the contract', or what is involved in meeting the contract, figures in project work. It is also about how alterations in contractual configurations between different suppliers impact the Trust's project team's work. Our interest is in the various manifestations and references to contractual issues and their practical working out and resolution. We focus on some of the everyday conversations and activities that address exactly what needs to be done to meet the terms of the contract – since meeting the contract is an overwhelming, and overwhelmingly practical, concern. In this project a continual feature of the relationship between designers (and designers and users) is the on-going negotiation over where work is, what work is required, and who should undertake it by reference to the contract. Certainly some work specification and allocation is relatively unproblematic. However, problems may occur as the requirement for extra work emerges during the development process (as is common), and it may have to be portioned out. When negotiation occurs both sides have room to manoeuvre and they may trade work activities. During such discussions it is common to invoke the 'contract' and take recourse to its specifics – either as a starting point for negotiations or as a reference point for practical design activities.

4. The Contract in On-going Project Work Management

In this first section we focus on the ways in which the contract is invoked as a means of managing and organizing

work primarily within and between the two sets of designers – the analysts from OurComp and from the Trust. Our examples are all drawn from implementation team meetings, mostly from the discussions amongst the Trust's analysts, before their weekly telephone conference with the OurComp analysts, although some material is from joint OurComp-Trust meetings.

In implementation team meetings, the discussions involving the 'contract' are relatively commonplace because of its importance in specifying and assessing responsibility – who is formally responsible for what, and have they carried out their duties – as illustrated in the following exchanges:

"...you can bet that he went back and checked on the contract right away and he was the one who actually pointed out to me that it was in the contract so he was going to speed this through"

".. why are they talking to us about cost?.. contractually its on OurComp's head"

While a contract is not merely a user requirement document (though a user requirement document may well form part of a contract) the findings of Coble et al. (1997) are relevant here when it comes to issues of setting (and avoiding) responsibility. While their reference to Dilbert's comment on customers as people who "have no idea what they want, but are absolutely sure when they want it and what it should cost" (Adams, 1996) is obviously a joke, there remains some underlying truth in the humour. As they suggest, misunderstandings about items such as responsibility can produce considerable tension and acrimony – especially as new requirements evolve (for whatever reason) during the development phase. Such issues and tensions can threaten the success of the project. Attention to the detail of the contract ensures that the organization, through the project team, effectively 'covers its bases' – or fulfills its obligations – ensuring that any (inevitably costly) breakdowns cannot be attributed to the project team or the organization it represents:

"...we have to be very pro-active and keep emailing your analyst and say what do you want me to work on? what d'you want me to do? .. I'm getting nervous for a variety of reasons .. I'm just not sure what they're going to throw back at me .. just want to make sure we're .. covering our bases as well..." (Helen, Trust project manager)

Of course, the contract, like any plan, cannot lay out in endless detail exactly what it takes to fulfill the contract. Contractual ambiguities regularly arise over the definition of actions such as the nature of 'participation' versus 'direction' in configuration amounts to in terms of activity:

"...this goes back to the issue of .. whose responsibility is it to do certain things with setting up and configuration ... the expectation has always been that well we would participate in configuration... it was on the understanding that they would be directing that configuration"

And this is even explicitly acknowledged to the Trust's chief executive by a senior OurComp analyst at a IM & T (information management and technology) board meeting:

"A & E has now moved to a positive comfort level...the contractual ambiguities had to do with what work our analysts had to do and what work yours had to do...the nature of direction and so on... it's likely that our proposal will recommend setting back the go-live date... in order to get a better system"

Of course, another feature of contracts this quote draws attention to is the way that contractual ambiguities and subsequent wrangling is legitimately implicated as one of the reasons for delaying the project!

While the Project Team may feel that sometimes they end up with more and different work than they read into the contract, in a similar manner the contract offers the Project Leader and Project Team possibilities for finding flexibility within contractual limits (what Bittner, 1965, might term

'organizational acumen') - for finding within the formal contract the means to ensure they get what they want:

"...its important that we are getting the things that we require within the contractual limitations and y'know I understand that we have to work within that but if also within that we need to make sure we are getting what we require"

While the contract constitutes the 'official' documentation for specifying activities and responsibilities the Project Team also use a variety of other means to 'try to get the best deal' as shown in this discussion on a 'media manager' product (for managing images e.g. from radiology) between Helen and Peter:

Peter – "what functionality is required, we seem to be getting a lightweight version but we want as much functionality as possible".

Peter – "We have been given less than we were demonstrated".

Helen – "Let's see if we have a hard copy of what was demonstrated to aid in negotiations".

Here the Project manager (Helen) and a senior analyst (Peter) from the Trust discuss that if they can find a copy of the original demonstration of Media Manager this may aid in asking for more functionality (for the money one assumes). Thus not only the official documentation of the contract is used as a bargaining tool but also 'unofficial' artefacts like a CD-ROM demonstrator can be used for this purpose to gain leverage on the 'good faith' of a supplier.

5. Contracts, Users and Usability

In this EPR project the group of users as considered by the project team is diverse, broadly falling into three categories; patients, medical staff, and administration. Contractually, user groups are involved in specific tasks throughout the project. They were involved in specifying their requirements during procurement. Then during the development phase, these users are involved in specifying and signing off details of their current data sets and procedures, agreeing the new design specification and signing off the design during QA and integration testing. The details of the involvement during development need to be worked out, and the signing-off of data sets, procedures, specifications and products after testing is a contractual requirement.

Contractual issues most apparently impinge on user-designer activities and relations in activities related to 'signing-off', for example, current data sets and procedures, or system releases during testing. A 'sign-off' signifies an official assent by users to a document, data set, procedure or system release which effectively provides contractual protection for designers. The Trust project team is instructed to ensure the (at least 'official') buy-in from the Trust users by getting them to 'sign off' on the stages of the work. Indeed, refusal of an area to sign-off represents a major problem for the project team as this could provide a legitimate reason for users to reject the design. This next excerpt is taken from a discussion between Gail, the Trust patient administration system (PAS) analyst, and Alice (her counterpart at OurComp). It provides an insight into the way the relationship between users and designers is managed. Gail begins by stating that it is of 'crucial importance' to get the administrative system build 'validated by the data management group'. Alice's comments are particularly revealing in that she describes the reason for getting the system signed off as being to 'protect the analyst' (the Trust analyst) from complaints they might receive about aspects of the system during later stages of design.

Gail – "PAS, crucial importance of getting it validated by the data management group."

Alice – "...the importance of buy in."

Gail – "Do I have to fill out a sign off form for each waiting list".

Alice – "No – the reason for sign off is to protect the analyst because without it you can get complaints on procedural changes during testing and go-live... you need to ensure buy in through use of these documents with expert and superusers"

In this next example Barney (a senior Trust analyst) relates his difficulty in meeting his contractual obligations - and 'sign off' - because of problems in getting the information he requires to build the clinic scheduling application for the new system. He previously has acknowledged the diversity of his user group and the need to include 'many different users' in testing. Here he states his design problem - that he does not have the 'correct' information (it is incomplete and in the wrong format) on current process and practice on which to base a new design and he seems unable to access users who can provide him with the information he requires. For him part of the frustration has been that does not know if he is just talking to the wrong person, whether nobody actually has this information, or whether users are deliberately withholding information:

Alice – "We need to make a cut-off date."

Barney – "I could do it, all I need is a correct, full data set....Other jobs got in the way of chasing up the data."

Alice – "There's a real problem of the validation of the data set".

Helen – "There's a problem of change management going on in the Trust right now, particularly in the call centre, there are disputes over how things are currently done and the requirements for modernisation."

Barney – "Well I'm not going to worry about other people not giving me the right information as long as its signed off."

Alice – "But I must stress the importance of buy-in from the most tricky people and areas during QA testing."

When Barney states that it is only a lack of the required information that is stopping him from achieving the design, Alice draws attention to the design (and contractual) problem that this might create in achieving the 'validation of the data set' (sign-off). Clearly, if there is disagreement amongst users about the data set, such that it has been difficult to collect then there may well be problem in getting it signed off. If it is not signed off then there may be problems progressing to the subsequent stages of design. The example also draws attention to the potential difference between sign-off and buy-in – just because the users sign-off the data set does not mean they are happily buying-in to the design, and if they are not happy with an earlier sign-off they may refuse at a later stage.

The next two excerpts deal with issues of usability, the contract, and how contractual and regulatory matters can impinge on usability. The reasons why these examples are interesting contractually is mainly a matter of 'requirements' prioritization. In their contract with the Trust, OurComp has a number of criteria in building the system that they must give most priority to and unfortunately usability is a lesser and harder to 'judge' priority. Both examples come from QA (quality assurance) and Integration testing sessions involving two expert users from accident and emergency (A & E), Brian and Jenny, the project manager, Helen, and a demonstrator (Brad) and senior analyst (Vic) from OurComp:

Jenny – "This is the first time I've seen a clinic, before they've never been working so I'll need to go back and practice it."

Helen – "You need to fit in with the Trust that's why it's like this."

Brian – "But it's a problem that fitting in with the Trust involves more work."

Helen – "This is a Trust wide system, you get the benefits of the information gathering of other people so you need to do this....As a

teaching hospital we need to do research so we need good data...since there are no A & E people on the PAS team I'll now put you on as staff like this is a PAS requirement so it will help you to understand and keep informed of decisions."

The more important priorities than usability are listed as the need to integrate with other areas of the Trust, and that as a teaching hospital (with particular NHS status and requirements) they need to collect particular forms of data. Indeed one of OurComp's over-riding responsibilities is that the system they produce has to meet NHS criteria:

Jenny – "There's one field to fill in but you have to go through 7 screens to get to it."

Brad – "But you can just F7 to get to the field."

Jenny again voices their concern about the amount of time it takes to carry out actions – complains about "having to do x clicks to carry out simple tasks".

Brad – "... that's the way it is"

Vic – "It's required for the A & E CDS..... A & E visits need to be counted as clinics." – Thus mirroring other aspects of hospital work (i.e. so they have a generic form). Vic then explains why other options would not work.

CDS refers to 'Commissioning Data Sets' which are specific sets of data that need to be presented to the NHS. Therefore, contracts impinge on usability by determining that the need to satisfy regulatory demands is prioritized above human factors, a feature that is further compounded by the fact that NHS requirements have continually emerged, changed and developed. That these need to be accommodated relatively late in the design has meant that they sometimes must be accommodated at the expense of usability. Furthermore, as Coble et al (1997) note, there are important, and subtle, differences between meeting specifications and meeting user requirements and the kind of usability problems seen here may well be ignored or turned into a 'training issue' by developers, "faced with technical platform limitations, added cost to change, and schedule constraints" (Coble et al 1997: 174-5)

Our final two examples regarding users and usability are quotes during testing from Christine (the PAS manager, expert user) that demonstrate that not only the 'sign-off' concerns of the analysts can come problematically true:

Christine – "We don't want to sign this off before we go through everything in the proper detail... we are not fully happy about accepting that training will sort out all of these problems... some of them seem like major problems."

... But also that users are aware and concerned when they are being asked to do something that deviates from the phasing as laid out in the contract (you should only carry out QA testing when the build is complete):

Christine - "There's a problem of doing QA'ing when you're QA'ing something but you don't actually know what you'll be getting."

6. Dealing With New Contractual Relations

One of the headaches for the Trust's project team during the project is that they have to deal with a new configuration of contractual relations. Previously, they held individual contracts with each of their legacy suppliers. These systems were not integrated with each other, so there were no problems in trying to manage the relationship between different suppliers. The new EPR application is intended to integrate with a number of legacy applications, however under the terms of the PPP contract, the contract for this no longer directly involves the Trust, and instead is held between the legacy supplier and OurComp. As we can see in the example below (a discussion between Helen, Robert and

Larry from the Trust's project team), this does not mean that the Trust is no longer involved in the relationship between supplier, as they are commonly the first point of call for the legacy supplier. Also evident in the example is the type of confusion these new configurations of contracts cause, as shown by Helen's request for clarification:

Robert – "We got another new contact on the commercial contract side Dave *** who's asked us for a conference call to discuss progress on liaising with OurComp about actually carrying out the data extraction and interfacing....."

Helen – "So who is Dave *** does he work for OurComp"

Larry – "No LabCo."

Robert – "So when we arrange this conference call I've asked I've invited Sue (from OurComp.) to take part and she says she would like to and I've also sent Dave *** copies of Sue's interface specifications because one of the questions he asked was, well, the charges for the interfacing licences depend on the scope of the interfaces so I've sent him copies of the interface specs, so hopefully sometime today we'll all agree on a date and time for this conference call."

Some of the key issues regarding the new contractual relationships surround working out what the new cooperative working relationships should be between the Trust (as both a direct and third party customer) and the suppliers. For example, they need to act as 'introducers' and 'intermediaries' but also need to work out who they need to talk to, to ensure they get the design they want, while making it clear that discussions of money, contracts and licenses does not involve them:

Robert – "I sent Sue (OurComp) an email confirming that we'd like to go for a direct interface for Lab-App and err stressing that the role of treatment information is essential and I put her in touch with Kevin *** and Lillian *** (LabCo) and asked her to keep us informed about progress"

Helen – "there was a bit of a response ... I don't know exactly but it was sort of the idea of that she was a bit concerned that Lillian *** suggested that clinical details would be possible"

Robert – "And then there was the question of HL7 integration of type was she aware that you were taking that one forward and a few days ago we were thinking of having a conference call with eh Dave *** at LabCo and Alan ** I've got down here to discuss charges by LabCo ... for data extraction services and creating licencesah but ah I'm not sure whether"

Helen – "That shouldn't be us we want them dealing directly with OurComp, that's their responsibility I would and really stick to that one with the pathology interfaces because its their responsibility, the only one where we're getting involved is radiology but that's because it's a different one, but really anything to do with cost its not our problem that's their responsibility"

Larry – "Yeah that that summarises that what we were saying before the problem that we've had other than that we've felt the lack of communication between the two groups of suppliers is that why are they talking to us about cost..."

There is a certain amount of tension in the need to be proactive to ensure that OurComp and the legacy suppliers are communicating and that any contracts between the two suppliers meet the hospital's requirements, while it is not strictly the Trust's work. Indeed, as we can see in the following example, ensuring that agreements between suppliers do cater for the Trust's requirements is a serious concern, particularly as direct enforcement through the Trust's contract with OurComp may not be possible:

Bob – "I mean I was discussing with Robert yesterday the fact Sue ** had contacted DataCo and asked DataCo what data to bring acrossnow I spent days ...annotating every field, type of field, length of field what sort of data it was, all the data I wanted to bring across and she just ignored it."

Helen – "Yeh ... as soon as something like that happens to do let me know because I do feed that kind of thing back to Graham (OurComp)

and he does go back to the analysts it is important that we're feeding back to OurComp and its important to remember that we're the customer and they are the supplier and granted its important that's there's give and take as well but y'know we are paying and we're paying a good price for a service here."

7. Discussion: Contractual Relations, Project Management, Dependable Design and Everyday Design Practice

"While the need for a long-term approach may be obvious, it is nevertheless imperiled because of the highly political character of ... problems and proposed ... solutions. It will be very hard to hold off the temptation to seek 'instant solutions' – and hard too to hold off the blandishments of high-tech salesmen – and hold out for a properly researched system: but the need is there." (Ackroyd et al 1992 our emphasis)

How depressing and fateful these words seem. Fateful, because they were written 15 years ago about the introduction of a national computer system – for the police this time. Depressing, because these words and the 'framework' that accompanied them appear to have been consistently ignored. Depressing too because it seems to suggest that CSCW and HCI have failed to get some of their central messages across. The framework included such advice as 'undertaking a proper ethnography of the tasks and activities that are to be supported'; 'systems designed around a specific set of tasks and with quite a narrow focus are more likely to succeed'; 'systems will rarely behave in practice in ways that correspond precisely to their intended design'; 'one of the hardest problems to resolve is the balance between the independent development of systems... and the desirability of consistency, compatibility and interchangeability'. All of which would have been sensible advice for the systems we saw developed and deployed.

So this is not a standard 'implications for design' (Dourish 2006) discussion section and not merely because its depressing reiterating messages for people to ignore but because it is difficult to extract many simple messages from the complexities and subtleties – the sheer mess - of the activities we observed. This section does however contain some standard 'messages' however, for it is an old refrain from researchers using ethnographic studies (like us) that the details of work, achieved as a recognisable social accomplishment and explicated by our studies, can inform the improved design and deployment of systems – and by 'improved' we mean a design that resonates with real world, real time work activity and proves less stressful to the hard-pressed project manager and analysts (for whom, in that telling phrase by the English comic Arthur Smith, 'life is shit, organized by bastards'). In this case we have studied the work of those designing, delivering and deploying a system, and in particular how that work orients to and is influenced by notions of 'the Contract'. Our experience suggests that our ethnographic approach can be particularly useful in providing better understandings of how processes mesh (or not) with one another and the work required (by talk etc.) to bring things into line, illustrating issues of practice to aid stakeholders in sorting out 'contractual' problems (what exactly they are and how serious they are).

This paper has considered some of the difficult issues in what is fundamentally mundane, everyday design and deployment work. It is certainly 'no news' to point to ways in which such work is enmeshed in organizational processes, involve various (ultimately political) alignments and are practically resolved. Our sympathy went out to the various analysts caught in the push and pull of 'the Contract'; understanding, and responding to user requirements which

become increasingly better articulated at precisely the same time as the design needs to become more stable (and closed). It is easy to proclaim that at least some of the difficulties of 'working the contract' in this project could have been avoided by understanding users and their work practices better, by better management of user participation, by better design methods and process, by procuring another system etc. However, this is the real world, real time design and deployment of a complex system, in a setting where design is constrained by budgets, by time-scales, by personnel numbers, by expertise, by knowledge of developing methods and by a welter of organizational features.

One important feature of the 'real world' that we draw attention to and that has changed over the past few years is how in sectors like healthcare it is increasingly common for organizations such as hospitals to contract a software house to implement, customize and support a COTS system for their computing requirements. For the NHS in England and Wales the model for implementing EPR systems is exactly of this kind – involving public private partnerships between hospital Trusts and private software firms. In these types of situations – as opposed to building a system in-house, or a software system purchase and in-house implementation – the contract between the supplier and the Trust becomes a more clearly important feature of everyday project management and design work. As we have documented, the contract, and notions of adherence and deviation to what is stipulated within it, are used as a means for organizing (specifying, ordering, prioritizing, negotiating, trading, accounting for and measuring) work.

7.1 The Contract as an Organizing Device

This paper has presented some empirical findings from an observational research project that has been investigating some of the everyday practicalities of delivering an EPR project within a hospital Trust. We wish to be cautious about suggesting how the problems and particulars of this EPR project translate to other settings, however we would like to make some more general remarks on contracts and project work.

In some fashion the work reported here mirrors systems design projects elsewhere. Project work is complicated and messy, managing a project involves a lot of 'work to get the project to work' (e.g. Brooks, 1995; Bowers, 1994). Work must constantly be done to move things along, keep track of what is going on, inform the 'correct' people of developments, discuss, argue and re-negotiate tasks, roles and responsibilities. When work does not go to plan, project work necessarily becomes a 'satisficing' activity (i.e. finding workable and acceptable compromises). In this paper we point to one of the criteria for such 'satisficing' work – the contract – and suggest that understanding the impact of 'the contract' on everyday work is not simply about legal responsibility or of a growing 'audit culture' in both the public and private sectors (see e.g. Power, 1997) but is essentially, even primarily, about understanding various forms of organizational work. In 'working the contract' the designers and project team show how they have reasoned about the organization in the doing of their activities, demonstrating that they reason in an organizational fashion – ie in a fashion that is warrantably, visibly, accountably in accord with the organization. The emphasis on the contract recognizes certain features of project management that need to be addressed, documenting how and in what ways handling such issues ensures the orderly achievement and delivery of the project.

Planning in project work is a way of managing contractual contingencies, but planning does not rule out the inevitable

'nasty surprises' and plans must be made to work in practice. As Button and Sharrock note (1996; 1998), organizing a project into 'phases' is intended to ensure that tasks are worked on until completed, to achieve for the work a paced sequential progression and provide for the recognition of uncompleted steps. Phasing exhibits some sensitivity to timelines of both the formal contract and practical decision making. Phasing remains a key resource for the on-going practical management of contractual relations within the project – enabling the distribution and coordination of work, allocating responsibilities, keeping track of activities, and measuring work progress against contractual agreements. The project is characterised by on-going negotiations about tasks and responsibilities and substantial on-going effort to coordinate work. Working with and working out contractual relationships between organisations is crucial to progressing the project. This involves cooperatively deciding and revising (in an on-going manner) how contractual requirements should be made manifest as tasks, roles and responsibilities.

7.2 Contracts and Dependable Design

The system whose design and deployment we have documented in this paper is part of a much larger NHS programme - the biggest non-military project in the world, a project that is already two years behind schedule and several billions over budget - and whose political sensitivity can hardly have escaped notice. Suppliers have been sacked or replaced or are seeking to renegotiate their contracts (Thomas 2006). The director general of IT at the NHS has claimed an, "essential dishonesty between the IT industry and the consumer, with the IT industry still trying to claim that there's a scientific basis behind its estimations of the costs involved in outsourcing projects, when practical experience shows that there isn't." (Thomas 2006) Meanwhile doctors and nurses are claiming that the system is failing to produce many of the benefits claimed and indeed, can threaten normal working:

"As many as 3,000 babies and toddlers may have gone without crucial vaccinations because a privatised NHS computer system has failed to monitor which children are due for jabs and whether they have received them. ..., leaving health staff resorting to slips of paper to work out who needs immunising" (Revill 2006)

In these circumstances our particular project, and our particular Trust appeared an oasis of calm and tranquillity.. Nevertheless, the same strains, strains concerned with making a system dependable, trustable and usable can be detected, and it is this aspect, the idea of the contract as a tool for attempting to ensure dependability in a complex socio-technical system, that we think is worth exploring. Achieving sufficient dependability in these systems, and demonstrating this achievement in a rigorous and convincing manner to those who will be using them as part of their everyday work, is of crucial importance. Our study demonstrates that dependability has a number of attributes. When defined as "the ability to deliver service that can justifiably be trusted" (Laprie 1991) these include: availability (readiness for correct service); reliability (continuity of correct service); safety (absence of catastrophic consequences); integrity (absence of improper system state alterations); maintainability (ability to undergo repairs) and more. What emerges in this study of working the contract is that consideration of broader, socio-technical, notions of 'system', makes the ability to achieve a precise or even a workable view of 'dependability', 'service' and 'failure' increasingly difficult. In these circumstances, we may need to broaden our understanding of what dependability means beyond the simple 'absence of failure', particularly if we consider 'quality of service' to develop a

more nuanced notion of 'dependable systems' – since any attempt to address dependability issues must necessarily wrestle with what has been seen as a (if not the) basic HCI concern – what to automate and what to leave to human skill and ingenuity. This dependability can be seen as being the outcome of people's everyday, coordinated, practical actions of which 'working the contract' is just one. So what we document going on in all this contract work is the everyday work involved in getting a system in place and getting a system that works, that is trustable and reliable – it is fundamentally about dependability despite the appearance of mess, chaos and confusion,. And why is this work taking place now and not at or before the contracts stage? Because despite various formal, models for assessing and ensuring dependability, much of the work around dependability lies in the space we document, between design and use – 'where the rubber hits the road' (Anderson 2000)

7.3 Project Management and Contractual 'Acumen'

Clearly the contract, and what lies within it, is not a passive document that unproblematically prescribes a division of tasks and labour for the development and deployment of the system. The contract will have to be worked with during design as its shortcomings become apparent, problems emerge, new requirements come on line and so forth. When discussing the purpose and use of organizational rules Bittner (1965) urges that research should progress from noting that organizational practice does not and cannot be in "strict obedience" with the letter of rules and procedures to instead look "... to the investigation of the limitations of maneuverability within them, to the study of the skill and craftsmanship involved in their use..." In this study we have sought to echo this program but instead of looking at organizational rules we have considered the practical use of the contract – a description of tasks, duties and responsibilities as distributed between a supplier and customer in cooperative partnership. Bittner continues to define organizational acumen as follows:

"Extending to the rule the respect of compliance, while finding in the rule the means for doing whatever need be done, is the gambit that characterizes organizational acumen."

Drawing on this we might consider that a key feature of 'acumen' in project management would be the ability to draw on one's knowledge and skills to masterfully achieve the system one requires within the limits stipulated in the contract. Clearly the details of the contract always require elaboration into actual work, in practice. The ability to skillfully elaborate what the contract should mean in terms of work tasks and their allocation is doubtless a requirement for project managers in these situations. It is also important that project managers should understand the implications on development work of changing contractual relationships. As we saw here, alterations in the contractual relationships between the Trust and legacy suppliers produced through their new contractual relationship with OurComp lead to them being involved in extra coordination work while also losing a degree of control of what the legacy suppliers produced in concert with OurComp.

While it would be wildly disingenuous to suggest that project managers were unaware of the importance of contracts in design projects we believe that our paper may serve to aid them in a reflection on their practice, and may be useful for those involved in similar projects in the NHS and regarding COTS implementations, as clearly acquiring better 'contractual acumen' was an on-going process for the Trust project manager in this project, even though she was knowledgeable and experienced.

Finally, we believe our work directs research to issues not often dealt with, or possibly dealt with rather differently, in the literature previously. In so doing it reiterates some of the perhaps unjustly neglected comments of these early researchers and adds some new but rather complex concerns. The contract is originally 'set' prior to design and therefore can restrict design possibilities, especially the possibility of accommodating new requirements, and as has been discussed before (cf. Poltrock and Grudin, 1994) the greatest impacts of this can be on the system interfaces and usability. It is therefore important to re-iterate to researchers and practitioners that the work of understanding the user, designing with and for them in terms of interfaces, functionality and usability, in the commercial world is often circumscribed or disrupted by other organizational contingencies (cf. Grudin, 1991; Coble et al.1997). In situations where design is a cooperative enterprise between supplier and customer, involving designers on both sides and a variety of users, the contract inevitably plays an important role in the organization and progression of work. In this case, we draw attention to what we believe is a neglected organizational contingency – the contract – especially as it features in projects involving COTS systems. Here, we saw how users invoked the contract - and threatened to not sign-off - at the stage of testing to try and get concessions on the interface design, when this may well have been too late in the design process. This suggests, as researchers before us have argued, that we need to work towards HCI work being more specifically catered for and accommodated into contracts - particularly to address the issue of user requirements emerging throughout a design process - and we need to develop our approaches to be more sensitive to the workings of contracts. It also directs attention to (without necessarily resolving) issues, technical and organizational issues, that are becoming increasingly important in a litigious and audit riven culture and that focus on the careful delineation and understanding of responsibilities in such massive commercial projects.

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9. References

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