

When a Little Knowledge isn't a Dangerous Thing

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ABSTRACT

In this paper we compare two departments of a public administration body carrying out similar work. In one department two sections, telephony and processing, are collocated whereas in the other they are not. We demonstrate the costs of distribution, in particular how the strictly enforced division of labour and limited visibility onto the workflow of the other section causes problems when dealing with normal, natural exceptions. The setting is one of seemingly routine bureaucratic work rather than high-skilled cooperative work, thus the impact of distribution might be considered rather surprising. We argue that a key requirement for any solution is to enable practitioners on the 'shop floor' the freedom to find elegant solutions to problems.

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Public administration, call centres, ethnography, distributed work, collocation

ACM Classification Keywords

H5.3 Information interfaces and presentation, Group and Organization Interfaces, Organizational design

General Terms

Human factors, Design

INTRODUCTION

In this paper we describe the findings of an ethnographic study of two departments within a large European public administration body which handles benefit provision for people who are not working due to unemployment or sickness. We had the opportunity to compare how two groups, telephony and processing, in each department organized their work. The two groups were carrying out similar work in each department, except that in one they were collocated and in the other they were not. All the names of people, systems and so on, have been changed to preserve anonymity.

The overarching argument is one that is familiar, that is that, to quote Sachs [11]

"...the efficiency of work is in fact determined not so much by the logic and sequencing of task flow as by the capabilities of people for troubleshooting vexing problems in complicated situations, which inevitably arise in all workplaces."

However, this study is original as it provides the perfect opportunity to examine these issues empirically through a

systematic comparison of two different departments, with similar work but with different physical ecologies. In UneDept, where telephony and processing are physically separated, hand-offs between the two sections take place almost exclusively through the technology, in keeping with the formal processes. In MediDept, by contrast, telephony and processing are collocated in the same open-plan office, enabling staff to work around the formal processes implemented in the technology to solve the everyday troubles that arise. This paper compares the operation of the two departments, focusing particularly on the implications for work organization when formal processes must be followed as opposed to the situation where local ad hoc solutions can be tried – we are particularly interested in how this relates to the handling of 'normal, natural troubles', exceptions and difficult cases.

This study is timely since advances in ICT, have led to an increasing drive towards distribution and outsourcing. In this process, elements of a business may be separated, modularized and outsourced, often with only the electronic data on systems as the means to mesh together distinct activities. Collocation is seen as unnecessary to getting the work done and may even be considered to promote inefficient interaction or idle 'chatter' [6].

RELATED WORK

The questions raised in this paper are ones at the heart of a large swathe of CHI, CSCW and organisational research; what happens when technology is used to partition and distribute or virtualise work? In the late 1980's networked distributed computer systems were heralded as a means for companies to specialize, make discrete and distribute business functions. With the rise of the outsourcing movement these arguments are still strongly in play nowadays. For example, Malone et al [7] applied Transaction Cost Theory to business computerisation, describing how parts of the business could be virtualised using ICT to make the business more efficient. They argue that since processes can be instantiated and enabled through electronic technology, reducing the need of people to understand what other functions are doing. This work has come in for criticism at a number of levels. Kraut et al. [6] showed that the use of electronic networks does not per se lead to greater efficiency and that social communication is an enabler for the successful use of electronic networks, while curiously stating that *"Coordination through personal relationships may be less efficient, because it*

relies on costly and error-prone human behavior.”. In his critique Schmidt [13] examined how such an approach does not hold for cooperative work because such work is not routine and therefore requires that the actors involved communicate, negotiate and so on. In particular he described the importance of the work to coordinate the work – or articulation work. Although this has been described as invisible work we are keen, as Star [14] was, to push the point that it is not lesser work. A major feature of being able to articulate in these situations is being aware, in some way, of what is going on across the boundary. Awareness is central when we think of distribution because whereas a collocated environment provides a wealth of cues which workers use to coordinate and design their interactions [3] it becomes much harder to provide these at a distance [1,2]. Intriguingly, however, Schmidt drew a distinction between cooperative knowledge work situations and bureaucratic domains like “*public administration*” where he stated “*The Transaction Cost approach has proven to be quite useful for requirements analysis in administrative work domains.*” This study allows us to examine whether this view on bureaucracy holds true.

The impact of distribution on cooperative work has been extensively studied with research comparing the work of distributed and collocated teams [8, 4]. For example, in their classic paper *Distance Matters* the Olsons pull apart the features of work which make it particularly suitable for distribution – notably that the work should be loosely coupled and it is more likely to be successful where workers have considerable common ground. Given that conflict increases when teams are distributed, Hinds [4] demonstrated how shared identity, context and spontaneous interaction can mitigate conflict. What distinguishes our work from this body of research is that rather than considering the work of cooperative teams we examine the case of bureaucratic work which, with its routine nature, would seem to be perfect for distribution and we find that similar problems arise.

METHOD AND FIELD SITES

We conducted an intensive field study (eight person weeks). The primary method was observation – shadowing the workers and listening in to the calls. The observation was supplemented by in-situ interviewing. Data was collected through field notes, photographs, audio recording and collection of artefacts. The analysis was ethnomethodological and the findings we report here were emergent i.e. even the quotes included here were delivered spontaneously within the flow of action and interaction. Thus, for example, the evident conflict between telephony and processing in UneDept was an emergent feature of the environment. The researchers did not set out to investigate conflict and did not ask questions on this.

Of the sites studied, UneDept, handled benefits for the unemployed but actively seeking work (referred to here as

Unemployment Benefit (UB)); MediDept, for those unable to work because of a medical condition (Medical Benefit (MB)). Both departments deal with the processing of new claims, benefit delivery during the claim life and claim termination. We report here on the work and interrelations of two sections within each department – telephony and processing. Processing deals with the administration of claims – ensuring new claims are in order, ensuring ongoing eligibility and dealing with changes in circumstances. Telephony is a call centre for all enquiries about the ongoing claim. Operators in telephony can do some simple processing such as releasing money when there are certain types of blocks (e.g. systems glitches), changing address and bank account details. While the public administration body has customer facing offices (Work Centres) which provide general information and case workers who ensure compliance with the terms of a claim, questions about individual claims must go through telephony. Both telephony and processing use a number of computer systems in their work, some but not all of which are shared between the two groups. Core systems include:

- ‘ClaimSys’: a DOS-based legacy system and the main processing and payment release system. It contains all the claim details and automatically releases payment when specific conditions are completed. Citizens are paid benefit on a fortnightly basis.
- ‘WorkSys’: the system in the Work Centres focused on supporting and recording job search activities. It is accessible to processors and telephony.
- Email is used by all groups, with specific addresses/boxes to direct mail to particular groups.
- Telephony have two additional systems:
 - a) A call logging system (CLS) where they log each call they take: with call length and the citizen’s government identifier (GI) - a unique mixture of numbers and letters that is the citizens key identifier.
 - b) A security system (SecureSys) to verify caller identity and carry out requested changes of address or bank account.

Of particular interest is the different ways in which work is physically organized. In UneDept there is a physical separation, with telephony and processing on different floors. In MediDept, telephony and processing are located in the same open plan office. Communication between Telephony and Processing in UneDept is therefore handled through formal workflows and communication channels:

- 1) E-mail from telephony to processing: processing must respond to the *citizen* in three days.
- 2) Notes on ClaimSys. The notes page on ClaimSys has a limited number of lines: ~15 lines on each of the two pages available. Once full, previous notes must be

deleted so new notes can be added. Notes can be added to other systems including CLS, SecureSys and WorkSys. In WorkSys and ClaimSys the notes serve a communication function – showing key matters and progress in a claim (e.g. any mail received from the citizen is logged in the notes). In comparison CLS and SecureSys are tracking systems for telephony so each consecutive note is about a different citizen and constitutes a record of the agent's work.

- 3) A specific person in telephony for UneDept has the responsibility of chasing up problem cases: where three emails have been sent to processing but the citizen has not received a call back.

MediDept also uses email and notes to communicate, but because they are collocated they can talk to one another and share resources outside of the formal workflows. We will discuss the implications of this for the organisation of the work, continuity and effectiveness of service and the interrelationship between telephony and processors in the two departments. It is important to note that the department's aim in this case is distribution or virtualization, that is to be able to situate telephony anywhere in the country. In this case communication would be limited to the prescribed workflows. There are good organizational reasons for this, including: to enable processors to get on with the work of processing efficiently, without too much interruption; to enable telephony to answer the maximum number of calls (keeping caller waiting time low); and to reduce the opportunities of people giving out incorrect information and acting outside of the job role for which they have been trained. What we hope to demonstrate in this paper is that for work as inter-reliant as that of telephony and processing, when limiting communication to channels with limited interactivity, problems can arise around the smooth and effective handling of exceptional cases. We finish the paper with some design implications for addressing these issues.

FINDINGS

We saw a number of differences between the two departments which we believe are largely if not completely due to the different ecologies of the workplaces.

Collocation and work organisation

Since telephony and processing are in the same open plan office in MediDept, they have an awareness of one another's work processes and constraints, and as a consequence can develop practices to deal with the emergent and routine troubles and exceptions that characterize their workflow. The clearest illustration of this is a local arrangement for handling enquiries about medical certificates. For the first months on medical benefit a valid paper medical certificate is required. Benefits are paid fortnightly and if there is no valid certificate on the day of payment no benefit will be paid until a new one is received. The citizen gets the certificate from their healthcare

professional and then either posts it to the Department or takes them to a Work Centre, to be sent internally or faxed.

During the study period, MediDept was receiving 6-800 certificates a week, and much of their ongoing work was processing them. When medical certificates are received they are input onto ClaimSys and payment can be released. When they are faxed from the Work Centre (providing both pages are received) the fax is taken as temporary proof of certificate. Medical certificates can get lost in transit (by post or fax) or given the large volumes of paper, during processing. Since healthcare professionals should not provide overlapping certificates and given that no benefit is paid if the certificate does not cover payment day, replacement is often an urgent matter. Many of the phone calls to telephony are about medical certificates, specifically whether they have been received or why payments have not been released.

The official procedure for handling medical certificates is that when a call comes in the agent should check for it on ClaimSys. If it is not there they should handover the enquiry to processing via email. What actually happens is that the agent checks first on ClaimSys and if the medical certificate is not there but it is judged that it should be (e.g. it was faxed or it was sent by post more than five days ago) the agent will go and look for it. To facilitate this, a trolley containing the medical certificates awaiting processing has been placed in the aisle between the processors and telephony. If agents cannot find the certificate in this trolley they may check the fax machine or with whomever is inputting the medical certificates. On finding the certificate they give it to processing and reassure the caller that all is well. If the agent cannot find the certificate they may 1) advise the customer to call back 2) ask them fax across a duplicate, or 3) begin a process of further investigation. Only where the medical certificate cannot be found does the citizen need to call back – often after already faxing a duplicate. Searching for the certificates can take a few minutes and therefore runs contrary to management's wishes that agents should take the maximum number of calls.

However, let us consider what would happen if they followed the prescribed process. The processing department would have many more emails per week. The citizen would not receive such timely information and would be likely to call back more, increasing call volumes. It is likely that only after a number of calls would the citizen be asked to get a duplicate, as the steps in the process could not be joined up as they are now. Thus following the process would have a number of negative effects: 1) increased volume of emails to processors 2) increased volumes of calls to telephony 3) greater delay for customers receiving their benefit where a problem has occurred. This simple workaround enables smoother workflow and better service for the citizen. Being in the same office means that each

group has awareness of the activities of the other and can use this to manage their work. In Extract 1 the citizen has received a letter asking for a new medical certificate when she has already sent one in.

Extract 1¹

1. Caller - I got a letter saying please can you send a medical certificate by the 7th of April but it should've been received this morning - I sent one a couple of days ago
2. Operator - They do take about 4 or 5 days you know to come in Mrs C*** um
3. O - Yeah they do I'm afraid. We have had some in today and they haven't been all sorted out yet when did you send it in was it Monday or Tuesday
4. C - er what day is it today
5. *[O and C clarify it was sent on Tuesday night]*
6. O - Tuesday night so. No I mean the chances are we may not have uh you know the earliest we would get it would probably be tomorrow if that um as soon as it has been you know received you know it will be put on and a payment issued to you if you'd like to ring back say about 11 o'clock tomorrow

Here, the operator uses her awareness of both what's happening today and how long the process should typically take, to deal with a citizen's call without leaving her station. She knows that today's post has come in but has not been sorted yet (turn 3), but rather than leave her station to search these she asks the caller to confirm exactly when she sent the certificate in since the caller was rather vague in her initial formulation (turn 1). Together they establish that the caller sent in the certificate on Tuesday night. The operator uses her local knowledge of normal process times and her orientation to correct procedure (i.e. that she should be answering calls) to suggest the caller ring back tomorrow – when the medical certificates are likely to have been sorted if not input into the system (turn 6). This knowledge of the best time to call in is also a product of being collocated. We can see that operators do not just flout rules willy-nilly but rather have come up with a working arrangement which serves the whole workflow and therefore the citizen best, rather than attending only to that part of the workflow within their division of labour. Another crucial feature of the work arrangement in MediDept is that they can work together to ensure that exceptions are more effectively dealt with (Extract 2).

¹ Due to recording restrictions, caller's turns were recorded only by hand and so not all callers turns were recorded.

Extract 2

1. *[Tracey from telephony comes across to processing while Becca is working on mail]:*
2. Tracy - Becca I've got Mr Signori on the phone and he wants to speak to Roy, but he's not
3. Becca - He's been paid Mr Signori
4. *[Tracey tells Becca that Roy says he can't help with the problem but that Mr Signori will speak to Becca also]*
5. Becca - Hello. Do you want to put him (he is put through), alright then, hello Mr Signori how may I help you

This example reveals how MediDept engage in ad hoc collaboration to deal with problem cases. The belief is that Mr Signori's case had been settled (turn 3). However he has called in to say his payment is missing. In UneDept the telephony operator could only send an email to processing. Here she can consult with Roy who processed the case and escalate it to the manager (Becca, turn 5). Becca's subsequent investigations reveal the payment has been sent to the wrong place so she prioritises the problem and deals with the case that day. Solving this problem in UneDept could have taken at least three days, during which time it is likely that Mr Signori would have called in a number of times, as well as delaying his benefit payment.

Distribution and work organisation

In the following extracts we look at the how having to rely extensively on formal workflows and communication channels affects the work of telephony and processing in UneDept. In Extract 3 we can see how the notes page on ClaimSys is used to manage citizen's calls. The caller, having completed a compulsory training programme, is ringing in to see what is happening with their claim. After training the citizen needs to fill in a form at the Work Centre which is then processed in the Department. The caller asserts they have filled in the form and the operator checks with a colleague about what they should do next, which is where we join the call:

Extract 3

1. *[Operator goes over to colleague]* Martin he's done the training form he did it a week late
2. Martin: so he's actually completed the form?
3. O: Yeah
4. M: is it upstairs have they received it
5. O: Um
6. M: is it in the notes
7. O: Well i-it's not, there isn't any notes
8. M: they haven't received the form then [...] *did he actually post it or give it in*

at the Work Centre

9. O: Er um he did it at the Work Centre
10. M: ask him to check with the Work Centre to see when they sent it to us because when they receive it upstairs in changes they always note it, isn't it? [...]But check on WorkSys hopefully there is something there. If the worst comes to the worst just send an email upstairs and ask them to look out for it [...]
11. [O checking on WorkSys reads]: 'end of training form completed' so...
12. M: so do an email upstairs if it was completed send an email upstairs

Given that the forms themselves are not available to them, telephony have to rely on the notes pages of ClaimSys and WorkSys, along with their knowledge of the relevant procedure, to work out what is happening. They start by discussing whether the caller has completed the post-training form. Although the caller has asserted that he has, his word alone is not enough evidence. They establish that the form has not been received 'upstairs' (i.e. in processing) as they would expect receipt to be specifically noted in the system (turns 4-8 and 10). There is however a note on WorkSys which indicates that the form has been completed (turn 13). Thus they have reconstructed that the form was completed but has not yet arrived in processing. Unlike the telephony operator dealing with medical certificates, the operator here can only rely on the presence or absence of digital traces of a document in a workflow system which may or may not be up to date. They cannot determine for sure that the document in question is or is not where it should be. The end result is that the operator has to hand off the enquiry by email (turn 12).

In another example, the caller has been asked to send in information which he claims he has already sent in – around residency entitlement. He is rather angry, but the operator only has the system notes which show that processing have asked for this information. The notes page is a limited resource, for example usually it does not contain rationales. In this case all the operator can do is assure the caller that the processors have good reason for asking for this information again and he must therefore resend it. It should be said here that the Department is not in the business of making sure citizens are happy or providing explanations for everything, but it is in the business of providing benefit to those who are eligible. In this case the system can be said to be working adequately, although it is easy to sympathise with the caller's frustration. Indeed the operator acknowledges this to the ethnographer after the call, along with a clear orientation to the division of labour:

"I do understand his frustration with us because it's quite a lot of detailed information which he has to supply and if he's already supplied it... it's not my real position to ask

why we're asking for it again...in fairness to the processors it might be that the information that they provided to us first of all just wasn't correct."

In many cases there may simply be no (or limited) information to give, and the caller must wait until due process is completed. Certainly there are strong notions of the timeline of a claim, e.g. for new claims, telephony would not even consider sending up an email until at least 4-6 weeks had passed.

A considerable amount of time is spent working out what is going on, what has gone wrong and what needs to be done next. In part this is because of the complexity of the benefit regulations, which change often, as benefit legislation reforms are common. The key system, ClaimSys, was designed >30 years ago to comply with completely different benefit regulations and has been adapted numerous times as the legislation changes. It is no wonder then that it does not work perfectly all the time. Problems can be located in any number of places and considerable work may be required to identify them. Solving exceptions can be time consuming and processors are constantly balancing between processing one exception vs. several straightforward claims.

It is important to understand the work involved in responding to an email. While straightforward problems are often solved rapidly more complex problems can take considerable time. Citizens may call multiple times however, telephony is often not in the best position to answer the queries. The communication systems between telephony and processing are primarily asynchronous, constrained by mode and time to be brief on content and the two sections have different views about what should constitute a note. Notes and emails work well for simple hand-offs, but are less effective in more complex cases.

To further illustrate the difference between MB and UB we can consider the following example from UB: a caller phones telephony from a Work Centre because his bank account has been closed and his benefit payment returned. He asserts that he called on Friday, but was told to wait until Monday (payment day). There are no notes to indicate this. Notes tend only to be taken when some action is performed; however without the note the operator has no evidence of this call. The payment has not yet been shown as returned on ClaimSys, so the caller needs to get a form RC2 filled out, signed by the bank and returned to the Work Centre to prove the account has been closed. This requires two appointments of ten minutes at the Work Centre. On looking at the diary system, the operator sees the first possible appointment is late afternoon (too late for the caller to get his money). Extract 4 begins with the operator telling the caller that it will not be possible to do it today (turn 1), the caller's response (turn 2) prompts the operator into further action. He gets the caller to find a floorwalker – a person whose job it is to assist with general enquiries and

needs (turns 3,4). He explains the situation to the floorwalker (Mary) (turn 6).

Extract 4

1. O: Ok () Right ok well we still need to do this to get your-your one returned yeah urm I'm not going to be able to do it today
2. C - why not?
3. O: Urm unless you can get is there a floorwalker I can have a quick word with
4. O: Yeah could you grab em for us
5. *[Floorwalker comes on the phone]*
6. O: Oh hi Mary it's um James upstairs in JSA telephony. Urm this gentleman on the phone he needs to fill out a RC2 Mr B the problem is I'm having a look at the diary today and cause I need ten minutes and then about an hour gap and then ten minutes again cause he needs to go down take it down to the urm to his...

In the following omitted turns Mary agrees to do the first appointment immediately and they negotiate a provisional time (i.e. without an appointment) for the second that may allow the caller to get his money today. After the call, the operator enters detailed notes in ClaimSys, explicitly noting that no appointment has been made in the diary system, which he explains to the fieldworker:

"I put no appointment made as no space available I've put that agreed by Mary as that's what they've agreed and some people have a tendency to forget they have agreed these things so to avoid any potential problems later"

In this call the two parties from different sections work together outside of the formal process to try to ensure that the customer can get their money on the same day. They do however orientate to the formal systems and processes. Since the appointment cannot be put on the diary system it is explained in the notes. Much later in the day, when sitting with another operator, the fieldworker heard another call from the same caller. Extract 5 Extract begins as the customer explains his problem (turn 1). The operator looks in ClaimSys and sees that a payment has apparently been made (turn 4), the customer asserts his desperate need for the money (turn 5), but it is not at all clear from the system details and the notes what type of payment it is.

Extract 5

1. C - I had to fill a form in because the bank has closed my account. I had to fill it in and they've taken it upstairs to xxxx. I can't get a crisis loan and I can't see why I can't get my money today
2. O: Can you just hold on

3. *[O looks in ClaimSys]*

4. O: right they have made a payment to you today. They have replaced it today er and they have replaced it for 124 pounds eighty?
5. C - can I pick it up today I'm really desperate
6. O: Er can you just hold on I just want to check payment

The operator checks payment type and sees that it looks like a counter cheque (delivered at the Work Centre at a specific time) but there is no note indicating the pick-up time. This leads to a lengthy phone interaction (> six minutes) with the processors as she tries to clarify the situation. The processors tell the operator that the cheque is in finance and she should call them. But now it is too late for finance to release the cheque as the cycle for the day is over! It is clear that although the processors completed the paperwork today they did not do so early enough for finance to release the cheque. The operator is very unhappy about this, stressing the citizen is currently on the phone. The operator returns to the caller to tell him the payment will not be made today, saying to the fieldworker just before "oh god he's going to shout". But, he has hung up. The operator is very concerned saying "That is bad news that is really, really bad" and she puts an exceptionally long note on ClaimSys (five lines) in case he calls back.

Here the formal systems of communication did not work well to expedite this matter. For the caller this involved a series of phone calls and meetings only to find out that he could not get his cheque that day. What made this procedure particularly complex is that it involved a number of parts of the organisation interacting, and clearly shows how continuity of service can break down when this interaction is purely through formal tools. Where the operator was able to speak directly about the matter to the floorwalker in the Work Centre, they were able to organise a workaround that meant that the caller had a good chance of getting their money that day. It seems that processing were unaware of the urgency of the situation and the effort that had gone into trying to arrange things. It is notable that the people in contact with the caller, who make extra efforts to sort the situation out, are not those who complete the work to resolve the situation. We are not saying that the processors do not treat people as individuals, as it is indeed often noticeable that they do. It is more that at times there is not a joined-up connection between customer contact and processing. This is a purposeful division of labour, but in the many exceptional cases it can actually result in extra work and effort.

A common complaint of telephony is that the processors do not provide adequate notes. Both groups usually only make notes when something 'significant' has happened, or some action has been undertaken. Practices also vary between

individuals and it should be remembered that telephony have three places to enter notes: CLS, SecureSys and ClaimSys. For every call they log something in CLS but not always on ClaimSys, however, only the notes in ClaimSys are shared. When making a note in ClaimSys, telephony tend to describe in detail what is happening with a case. In contrast, processors only put in details of significant events or actions. For example, when a form has been sent out or received back or other matters such as “mvd to Dunstable” “mortgage housing 51.74 backdated” and so on. They certainly are unlikely to put that they have phoned the citizen but got no reply or that they started work on the case but put it to one side. This is not because the processors are being negligent, rather they have different orientations. Notes offer a restricted channel and great attention is paid to keeping notes short and concise. It is the processors who must print out the notes page for filing once filled up and decide which notes should stay and which be deleted. It is no wonder that they use the notes only for things they see as consequential or of long term interest. Cases have timelines, with key phases where the citizen is likely to contact the Department. For non-exceptional claims the citizen may call in a couple of times for simple matters. However, in exceptional cases processing can be considerably delayed meaning the citizen contacts the department frequently. In these cases it would be extremely helpful for telephony if they had a detailed understanding of what was happening. Once the delay has been resolved much of the information becomes redundant. The notes as they are currently used often do not provide the support that telephony need.

Collocation and the relationship between processors, telephony and citizens

As well as impacting the ability to organise the work around the whole workflow, whether telephony and processors are collocated or not impacts the working relationship. The staff in the two sections of MediDept are not only collocated but also cover for one another. At busy times some of the processors cover the phones, giving them direct insight into the work of telephony. Supervisors also cover the whole department at certain times (e.g. the end of the day) giving them a view onto the whole case of a citizen, rather than just a small part of it. There was much less apparent tension between the processing and telephony sections in MediDept than in UneDept.

In UneDept being limited to formal communication processes can mean the flow of work across the intra-organisational boundaries is far from smooth. To solve the problems that arise there is a liaison between telephony and processing whose job is to take action where there has been a major breakdown in the workflow. When telephony receive a call from a citizen and three emails have been sent up to processing but the caller has not had a call back then they pass the case on to the liaison by printing out the notes page and claim details page from ClaimSys and putting this into her in-tray – usually with an additional written note

attached. The liaison then contacts the relevant processor to get them to handle this case as a priority – she may also call the citizen. What is particularly interesting about her work is that although this might be viewed as a case where the processors have failed in their work (since they have not responded to the citizen in a timely manner), in reality her job involves lots of persuasion to hand off these calls. She has to work to get processing to take the calls and is aware they do not always view her positively. As she says:

“and sometimes when you have to call supervisors they’re not very helpful cause they feel that you are just being a nuisance contacting them even though they know it’s your job. So that’s not very helpful either. But I’m quite thick skinned so it doesn’t really bother me but. Sometimes you get a bit fed up”

She spends time working out what is going on with the claim, partly so she can direct it to the right team but also for smoother hand-off. She parcels the cases up in particular ways to make her demands seem less burdensome (turn 3, Extract 6). Whilst she may have ten cases to pass off, she typically hands them over in batches of two or three, often with a ‘difficult’ case packaged with a couple of easy cases. Extract 6 gives a flavour of her work. The ClaimSys notes say “passed to rapid. John to resolve add partner. John will ring customer to advise” and an attached post-it says (about the caller) “Very aggressive. Going off his head”.

Extract 6

1. Liaison: apparently it was passed to you yesterday for you to resolve um cause he hasn’t had his call back and he’s being very abusive to the telephony staff down here today and so they had to terminate the call so he does [softer voice] need a call back please
2. Processor: oh yeah I passed it on to somebody
3. L: cause he says nobody’s called him and he’s ready to burst so [gives number] do you want his GI?[gives number]. And while I’m on the line I have another one here this is a <rapid reclaim form> that was done on the 18th of March an email several emails have been sent the last one by xxx on the twenty seventh of April and his GI is [gives number] it’s all in WorkSys and his surname is A***** and he would like a call back please I’ll give you the mobile [gives number]
4. P: what’s his complaint?
5. L: Well his is because he’s done his <rapid reclaim form> since march and he hasn’t he keeps phoning up emails etc someone’s supposed to call him back and nothing happens

6. P: we do call them back
7. L: Mmm so why is mr F back on I don
8. P: I'll check mr F
9. L: Maybe it'd be helpful if the people that phoned back just put it in notes that they actually called back the customer then it's all there for the world to see

The liaison stresses the strain on her staff of dealing with these callers (turns 1 & 3). Although he takes the cases, the processor is not particularly apologetic (turns 2 & 4). When the liaison says "someone's supposed to call him back and nothing happens" (turn 5) which is a complaint that his team is not following the process he objects (turn 6). She acknowledges this it is in a rather noncommittal, but non-confrontational way (turn 7) and clearly suggests that using notes to show call backs would be helpful to telephony (turn 9). This is a request we hear her make a number of times and indeed she says to the fieldworker

"I mean to me it just makes sense if you phone a customer I always put a note in notepad. I'm now going to put a note on on these two that I have phoned him and he says what he's going to do but this this is what you do you waste so much time because you just keep going round and round and round"

The liaison goes on to criticise the way the processors organise their work, in particular that the supervisor should have checked that the work had been completed and the customer called. Whilst this may seem like a valid perspective from the view of telephony it does not take into account how the work is actually managed by the processors given the sheer volume of cases they have and the need to trade-off processing many easy cases vs. few hard cases. Telephony of course hear largely from the difficult cases. Since the processors are somewhat removed from the citizens this enables them to get on with the work of processing the many and meeting their targets rather than responding to incoming calls. There are many more examples we could give both from the liaison and the telephony staff but the general feeling can be summed up by the comment "there's a lack of communication big time". Another person called it 'tribal'. Tension can arise between any of the sections where work passes across the intra-organisational boundaries and it is compounded by the physical separation, just as with the work of distributed teams [4]. Such complaints and tensions were not visible in MediDept, where the staff knew one another, could see the amount of work, overhear one another and resolve workflow problems between them in ad hoc ways.

DISCUSSION

In this paper we have examined how collocation and distribution affect the working practices of two sections engaged in bureaucratic work. Previous research has

focused on cooperative work and the impact of collocation/distribution on it [4,8], but there is often an assumption that more 'routine' work such as processing should be well suited to divisions of labour enacted through technology as proposed by Malone [7,13]. Indeed this is a management viewpoint subscribed to by the department, where the idea is that the data on the system backed up by notes and supplemented by unidirectional email, is enough for intra-organisational coherence. We suggest that the communication channels are *impoverished by design*; not only is it assumed that this will suffice, but it is thought that allowing more communication is inefficient. What is interesting in our findings is that as with cooperative work amongst tightly knit teams [4,8] many of the same benefits come from collocation and the same problems from distribution. Although much of the routine processing work can be adequately undertaken within this division of labour, problems arise when handling exceptional cases. It is important to understand that the exceptional cases are a problematic routine minority of cases that surface in the daily working of the Department. Often they arise due to of the complexity of the benefit regulations and they take up large amounts of time for both processors and telephony.

Pentland [10] described how the available organisational 'moves' represent (and enact) the organisation's structure and its division of labour. In UneDept the staff can, for the most part, only interact through the official workflows. Thus, the work must be completely enacted within the division of labour specified by management. There is apparent logic behind the intent of management, who fear that enabling more communication will disrupt the ability of each section to focus properly on their work. However, when we look at MediDept we see that the fears that free communication is wasteful and inefficient [cf. Kraut, 6] seem unfounded. Instead, in MediDept the workers of both sections respect the division of labour, but have an eye on how procedures enable (or restrict) the flow of work across the intra-organisational boundary. They develop ad hoc solutions only where they are needed for the good of the process as a whole, e.g. for complex cases. That is, they orientate to the sense rather than the letter of the procedures to enable the smooth running of the workflow. A bit more confidence perhaps should be had in workers to self-organise to make the workflow work. As with studies of distributed versus collocated teams, we observed a number of crucial, overlapping differences between the two departments: 1) the ability to develop informal solutions to problems, 2) the ability to understand the work of others enough to get your own work done, and 3) the working relationships between sections. We will take a closer look at these issues with a focus on notes and medical certificates, also drawing out some ideas for design.

Notes

Notes are used as the primary means of communication about a case in UneDept. Arguably they have incidentally

become the key means of communication, although they are not particularly well designed for this, being restricted in amount of characters and lines. Like all communications they are recipient designed. Processors take considerable time to word their notes to try to make them understandable to others, but they tend to be designed with their fellow processors in mind and are often inadequate for telephony. There were tensions between the two sections about what notes should comprise of due to their different orientations. Telephony need to be able to reassure callers that their case is under review and so would like all actions on the case to be noted. In contrast, since they are unaware of the pressure of repeat calls to telephony, processing orientate to the limited fields in the notes page and only make notes of what they see as significant actions. It is not that they pay no attention to the work of telephony it is just that they have only a limited view of what that work consists of. Recipient design is most effective when you have a good idea about the requirements of the recipient. There are good reasons, of space and time, for limiting the amount of notes written but as they are, the notes are not a resource which would seem to be designed to fulfil the requirements of telephony.

It is possible that re-design of notes and their associated practices could improve matters somewhat. For example, more space could be provided for free text; both ephemeral and long lasting notes could be allowed to fit with the rhythms of the case (periods of intense activity and customer-interaction, followed by periods where little case work is carried out); certain conventions for abbreviations and ownership information (name, phone no.) could be promoted; and finally, people could be trained in making notes that fit with the needs of other departments.

Medical Certificates

As a contrast to the notes we can look at the medical certificates in MediDept as a shared resource that works. They reside in processing, but crucially are accessible to telephony due to collocation. The practices of 'go looking' or 'go asking' are not limited to medical certificates but this was a striking example since without the local work around much extra work would be generated. In both departments telephony are the 'public face', whilst processors carry out back office work. The work is highly interdependent and it is important that telephony know what is happening in processing with regards to individual cases, and that situation is better in MediDept. So, what can be done to ameliorate this situation in UneDept given that management is unlikely to be persuaded by the idea of radical collocation [8]? A focus on the work at the intra-organisational boundaries could be beneficial, in particular in making visible the work of each section to the other, rather than deliberately hiding it. If we consider the case of medical certificates, taking into account current practices, it offers us an idea of how resources like case documents might be usefully shared electronically.

In the current set up, using formal channels, medical certificates can only be accessed by telephony through ClaimSys after they have been input onto the system. But, this does not take into account the actual rhythms of the case, where for the citizens there is a just-in-time process of submission and processing to ensure payment. They call in frequently around the time of submitting the certificate when often the certificate is in transit or process. For this reason the informal solution, of making them available for manual search, was developed. Telephony could confirm receipt if they had arrived or quickly flag-up missing certificates. A simple electronic solution for medical certificates would be to have a secure shared online repository between doctors and the department. This would also reduce the work required of the patient/citizen in submitting the certificates. Another solution would be to scan the medical certificates as they arrive either in the Work Centres or the sorting office, with a shared image file-store making them available to both processors and telephony. One can see how the shared image file-store could better coordinate the work of both sections around a number of different case documents for both departments.

Working Relationships

A further interesting feature of the different work arrangements is the effect on mundane office relations. In UneDept, the most ready-to-hand reasons given by staff for problems, errors or lack of response on the other side of the boundary were often negative – 'they don't do things properly'. Given the lack of insight into one another's work, and of shared context, with no means for spontaneous communication this is perhaps not surprising [4]. The contrast with the greater harmony in MediDept was apparent. This suggests that if the ecological separation of the work is to be maintained there is a need to design interfaces and processes that allow a fuller view on the on-going work activities and reasoning with possibilities for richer electronic communication when required. Greater visibility onto one another's work could offer many benefits, including reduced numbers of calls. Whilst it is certainly important that callers can get through to an operator, this is only effective if the operator can adequately resolve their problems. Otherwise they will have to call back, perhaps several times, increasing call volume and caller frustration.

CONCLUSIONS

We hope to have demonstrated within the paper that some freedom for employees to produce sensible solutions to workflow problems and the freedom to communicate and mesh together processes is vital in coordinating work in an efficient manner, particularly for non-routine and problematic cases. In many ways this echoes the argument made by Kjeld Schmidt [13] in response to more extreme versions of Transaction Cost Theory as applied to computerization in companies and sectors, maybe most well known in papers such as Malone et al. [7]. This study adds

to this literature in being able to directly compare two departments doing similar types of work with two different physical ecologies. That it is in a bureaucratic setting helps us to understand this argument can apply equally well in 'routine' administration as in more typically considered cooperative work settings. Making this comparison is important for the community, as there remains a widespread perception that since computer tools enable communication, tracking and workflow, then work like this can be distributed with little cost.

In some ways this seems like a case of a problematic position in computing returning. We would argue that the reason a more extreme separation of business or administrative functions, with only electronic support, may fail is not simply a question of computer power or approach to design. Rather, views that consider human interaction necessarily wasteful and computerised workflows necessarily efficient remain problematic. We do not take an extreme opposite view but instead urge management and designers to realise that keeping the humans in the loop in a regulated manner can have a number of organisational benefits. We have shown that with open channels of communication and influence across boundaries exceptional cases are easier to deal with, and workers can share information and knowledge about each other's work that that better enables its achievement. Finally, we want to focus on knowledge and address the concern that 'a little knowledge is a dangerous thing'. In this setting management worried that if people started working across organisational boundaries they would know enough to think they could advise customers and other workers about other parts of the bureaucratic process but not enough to do so accurately [cf. 6]. It was rarely officially sanctioned. Interestingly, our research showed that workers needed to the understandings to make the processes more effective, but still oriented to the organisational boundaries and their roles within them. Thus in these situations a little knowledge is not a dangerous thing, it is vital to the functioning of the organisation.

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REFERENCES

1. Dourish, P & Belotti, V. (1992). Awareness and Coordination in Shared Workspaces. In proceedings of CSCW '92, pp. 107-114.
2. Erickson, T. & Kellogg, W. (2000). Social Translucence: An Approach to Designing Systems that Support Social Processes. *ACM ToCHI*, Vol 7, No 1, pp. 59-83.
3. Heath, C. & Luff, P. (1991). Collaborative Activity and Technology Design: Task Coordination in London Underground Control Rooms. In proceedings of ECSCW '91, Amsterdam, Netherlands, pp. 65-80.
4. Hinds, P.J. & Mortensen, M. (2005) Understanding conflict in geographically distributed teams: the moderating effects of shared identity, shared context and spontaneous communication. *Organization Science*. 16 (3). 290-307.
5. Klein, M., Dellarocas, C., and Bernstein, A. (2000) Special Issue "Adaptive Workflow Systems". *Journal of CSCW*. No 9 (3-4).
6. Kraut, R., Steinfield, C.Chan, A., Butler, B. & Hoag, A. (1999). Coordination and Virtualization; The Role of electronic Networks and Personal Relationships. *Organization Science*, Vol. 10, no 6, pp. 722-740.
7. Malone, T., Yates, J. & Benjamin, R. (1987). Electronic Markets and Electronic Hierarchies. *Communications of the ACM*, 30 (6) pp. 484-497.
8. Olson, J. S., Covi, L., Rocco, E., Miller, W. J., & Allie, P. (1998). A Room of Your Own: What Would it Take to Help Remote Groups Work as Well as Collocated Groups? *CHI 98* pp. 279 - 280
9. Olson, G. M., & Olson, J. S. (2000). Distance matters. *Human Computer Interaction*, 15, 139-178
10. Pentland, B.T. (1992) Organising moves in software support hot lines. *Administrative Science Quarterly*, 37 pp. 527-548.
11. Sachs, P. (1995). Transforming Work: Collaboration, Learning and Design. *Communications of the ACM*, Vol. 38, No 9, pp. 36-44.
12. Schmidt, K., & Bannon, L (1992): 'Taking CSCW Seriously: Supporting Articulation Work', *Journal of CSCW*, vol. 1, 1992, no. 1-2, pp. 7-40
13. Schmidt, K. (1994). The Organization of Cooperative Work: Beyond the "Leviathan" Conception of the Organization of Cooperative Work. In *Proceedings of CSCW 94*, Chapel Hill, NC, USA, pp. 101-112.
14. Star, S. L. & Strauss, A. (1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. *Journal of CSCW*, No 8, pp. 9-30