Working with "Constant Interruption": CSCW and the Small Office

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ABSTRACT

Ethnographic studies of CSCW have often seemed to involve the investigation of relatively large-scale and highly specific systems, consequently ignoring the small office within which many people spend much of their working lives and which is a major site for the introduction and implementation of IT. This paper is concerned with a "quick and dirty" ethnographic study of a small office that was considering the introduction of greater levels of IT. Generic features of office work are outlined: the process of work in a small office and its recurrent features, notably the massive volume of paperwork; the importance of local knowledge in the accomplishment of work; and the phenomenon of "constant interruption." This paper suggests that despite the obvious contrasts with work settings analysed in other ethnographic studies, similar features of cooperative work can be observed in the small office. It further suggests that the issues of cooperation and the sociality of work cannot be ignored even in small-scale system design.

KEYWORDS: Cooperative systems, information sharing, observational studies of work, systems development.

INTRODUCTION

The ethnographic study reported in this paper arose out of a request by the office manager of a small office to look at the office's work patterns with a view to informing work redesign incorporating information technology (IT).[1] What

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[1] Interestingly, which sociological studies of office work have tended to be seen as contributions to the deskilling debates and gendered work, this case was prompted by a view which saw IT as potentially enskilling. See, for example, [22] and [8].

had prompted this was, not untypically of small *and* large offices, the seemingly endless proliferation of paper and the immense amount of time involved in processing paper which seemed to "get in the way of" what the staff regarded as their main job, namely, "dealing with customers." Although PCs were readily available, networked, and frequently used, it was felt that realising their potential more fully would release staff time so that staff members could concentrate on the work which was not only more rewarding but also the work which they felt was the point of their jobs. The staff were receptive to the idea that IT would enable them to cooperate more effectively, to direct their activities into more productive channels, and generally to allow them to reorganise the work more efficiently.

The study is relevant to CSCW in a number of ways. First, it adds to our understanding of the cooperative character of work, the interdependencies of work activities, and the incorporation of technology within these. Although the critiques of Office Automation methodology [21, 15, 19, 20] are well taken, these are not arguments against any office automation, even in the small. What such critiques do suggest, and in keeping with one of the main tenets of CSCW, is that automation needs to be seen in the context of socially organised cooperative work activities. Arising from this is the importance of understanding the "real world" conditions of work rather than having design rely on idealisations which tend to ignore the circumstances, the contingencies, the mix of skills, the local knowledge, and more, which are ineradicable ingredients of "real world" work. This is not an argument for leaving things as they are. It is an argument for thinking about system design in terms of those who will, in the "real world" circumstances of use, have to realise that design as an instrument of their work [4].

Second, the above considerations bring to the fore important issues having to do with the implementation of system technologies into a variety of settings. As commentators such as Grudin [9] have remarked, by and large designers lack the appropriate set of intuitions about the nature of work. This not only means that they tend to ignore the kind of issues just mentioned, but they also tend

to ignore matters to do with implementation and adoption as not being their concern. Small offices such as the case reported on here are widespread and the target of "shrink-wrap" system manufacturers. The already fast pace of the "take up" of such systems is likely to increase. While we have no argument against such innovations, what is perhaps underappreciated are the costs of interweaving such systems into already established work practices. We suspect, although the evidence for this is anecdotal, that such costs (i.e., in learning the systems, the frustrations involved in getting them to do precisely what is required) will result in the familiar situation of maintaining two concurrent systems, the manual and the electronic, without realising the full potentialities of the latter.[1]

Third, the study is intended to contribute to a longer term project which focuses on the design of CSCW systems that, while offering the advantages of electronic processing, also retain some of the affordances of paper documents, particularly sharedness and awareness.[2]

In our examination, we contribute to the above themes by reflecting on the character of the relationship between the work of the office, how the current system is organised as a cooperative environment in which information is shared, and what the "costs" of moving to an IT system might be. It was no part of our remit to produce actual design solutions.

THE SETTING
The Training Centre Office (TCO) is part of a complex which is made up of a Management Training Centre and a hotel. The whole complex is administered as a partnership between a university and a hotel company. The TCO is responsible for coordinating and managing training sessions and conferences booked both through the University and external clients and runs an internal division of labour which reflects the different sources of the business. The hotel side is looked after by staff belonging to the hotel company and the TCO by staff employed by the University. Not surprisingly, much of the work involves serving as a liaison between these two responsibilities.

The TCO has a manager and three other employees who book the facilities, collate information, and disseminate information to the various units in the complex. They are also involved in providing clerical services, such as typing and photocopying, promotional work, and even attending to the physical layout of the facilities and its resources.

Computer facilities in the office include PCs, the use of which is confined primarily to word processing and the production of templates for letters and memos. Although other packages are available, such as accounts programmes, these are not used, primarily because the staff have little time to become familiar with them.[3]

The TCO is a typical small office. Despite some obvious individual and idiosyncratic features, it contains many of the items which would be recognisable to anyone used to working in a small office. It is a medium sized room with access to a front desk in the training centre where customers request services. Three secretaries work in the office, each with a PC linked through a network. In addition to a photocopier and a fax machine, other equipment includes a Hotel Bookings terminal, which is used to check the availability and take-up of accommodation. A filing cabinet contains information about external clients, and card indexes and files above and around the desks contain the paperwork used in the work. Another cabinet, the Date File, contains future bookings. Yet another, the Move Forward File, acts as both a reminder of work to be done and an indicator of the progress of a booking. Finally, on the table near the Hotel Bookings terminal rests the Diary, or "Bible" as it is referred to, which is an outline of confirmed and provisional bookings, along with customer requirements for the present and future weeks. (Figure 1 is a plan diagram of the office layout.)

A key feature of the work is the need to attend to details. This is reflected in the paper work, which includes information about accommodation requirements, conference needs, meals, cleaning, and so on. At the same time, the staff need to respond to client requests which, it is constantly· stressed, are a major part of their responsibilities. The work, accordingly, can be described as balancing "computer work," "paper work," and "people work."

METHODOLOGY
This is a fieldwork study which is characterisable as "quick and dirty" ethnography [11] and is a function of the limited time available for fieldwork. Nevertheless, we hoped to identify, even from a relatively short period of time, the nature of the problem, and to deteremine whether the optimism felt about IT was realiztic. In addition, and more generally, we felt that the study could provide us with a

[3]We suspect that this is not an uncommon feature of small and large scale offices. The lack of time for staff to familiarise themselves with systems has also been noted in connection with one of the intended functions of a Crime Reporting Bureau for the police. Officers were expected to use the system to familiarise themselves with incidents that had taken place in their localities. Because of the emergency driven nature of their work, few officers had the time to exploit the system in this way [1].
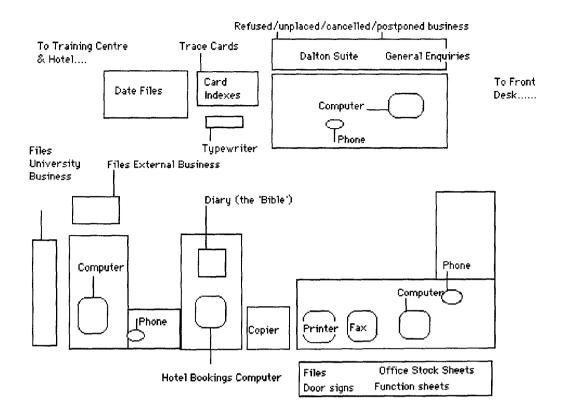
Refused/unplaced/cancelled/postponed business

To Training Centre   Trace Cards
& Hotel....   Dalton Suite   General Enquiries

                      Date Files   Card
                                        Indexes   Computer____⊂⊃   To Front
                                                                                 Desk......
                                        Typewriter   ⊂⊃
Files   Phone
University   Files External Business
Business

                                    Diary (the 'Bible')

                                                                        Phone

            Computer

                                                                Computer
                        Phone   Printer Fax
                                        Copier

Hotel Bookings Computer   Files   Office Stock Sheets
                               Door signs   Function sheets

Figure 1. The Training Centre Office Layout

useful opportunity to extend our experience of different work settings.[1]

With its emphasis on the social character of work and its concern with the tacit skills and knowledge incorporated in everyday work, the focus of ethnography is very much on potential users of a system and how they accomplish their work. Further, a small scale study of this kind has a number of advantages, including the fact that it is relatively easy to see the entirety of the work setting and its activities. This makes it possible to avoid the nagging suspicion, common to larger studies, that the "action" is elsewhere. And, as indicated earlier, a considerable amount of clerical work is still done (and will be for the foreseeable future) in relatively small offices .

The fieldwork encompassed four days and was designed to include both "quiet" and "busy" days. It included observation of a staff meeting when the coming week's business was discussed; it also included spending some time with each of the workers and getting them to describe the work they were doing, examining how coordination was done, and tracking the process of document production and distribution. Informal interviews were conducted in order to clarify issues that had arisen during the fieldwork.

EXPECTATIONS OF STAFF

As indicated earlier, the objectives of the study were shaped by the hope that a more effective use of IT might achieve a better balance between the various elements of the work, particularly in terms of what was seen as excessively demanding paper work. In addition (and again this was stressed by the group) any IT innovations had to have a positive impact on the staff. In other words, a division of labour which meant, for example, that one person was sitting at a terminal all day, was to be avoided if possible. Currently, one member of the staff coordinated University business, another coordinated external business, and the third was involved in both spheres; the aspiration, however, was to train staff to an equivalent level so that they could deal with any business and, in this way, not only make the work more interesting and rewarding but also build some flexibility into its organisation. IT, it was hoped, might help achieve these aims. The objective of the study was expressed by the manager of the TCO as follows:

I'm interested in the implications of introducing more automated systems, without affecting too much what we are doing presently...in people's feelings

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[1]These have included entrepreneurial work, air traffic control, police work, banking, and software engineering.

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*about change. Changes will happen...
otherwise we will just be on a
treadmill...I want to make the changes
but make them as painless as
possible...I'm anxious that I don't
impose something on people that won't
work because the people don't want it to
work.*

Although these sentiments were expressed by the TCO manager, it became clear that they were echoed by the other staff. Changes needed to be made and, for a mix of personal and organisational reasons, they were anxious that such changes would not only make the work more efficient but also more rewarding. They wanted to make the TCO more proactive rather than reactive; to reduce the number of repetitive work tasks; to facilitate task completion so that they were more able to feel that they had "got the job done" or were "up to date with their work"; and, not least, to reduce the stress levels associated with having to constantly react to everyday contingencies. The aim as seen by the TCO manager was to achieve a proactive customer culture that anticipates needs, "gets it right first time," and does not treat customers as "a problem":

*A proactive customer environment means
that we should ring them up a couple of
days before they arrive and ask how we
can help them further...we should identify
"quiet times" and think of ways to attract
more business...at the moment about the
most proactive we get is me sitting down
and looking at these function sheets.*

As far as TCO staff were concerned, IT could advance the "proactive customer culture" by enabling them to spend more time with customers. The objective was not to use IT to reduce staff, but to enable them to improve their performance in an area which they saw as essential to their work. Expressed in commercial terms, this meant, "If you provide the customer with unexpected benefits, then they come back." This idea of being proactive rather than reactive was a feature of all the staff comments about the expected benefits that IT could bring. By releasing extra time and improving output, IT would enable them to "crack on."

THE WORK PROCESS

As we have said, a division of labour separated the work into University and External Business. A secretary was allocated to coordinate each of these while the third was split between the two. However, the work activities were essentially similar except in terms of the kind of response the staff felt that each type of business required. The working belief was that External Business required a more "flowery" approach in terms of written responses, telephone manner, and the like, whereas University business was more "straightforward" and "down to earth"--a distinction that was not always realised in practise.

Again as indicated earlier, the stated ambition was to train the secretaries so that each could do the others' work which, most noticeably when it came to routine paper work and telephone calls, happened for much of the time. Nevertheless, the division of labour between the respective origins of the business and the amount of work that this involved gave such a prominence to each staff member's responsibilities that such "helping out" was not always as smoothly and "professionally" done as they wanted it to be. By taking responsibility for each side of the business, the member of the staff responsible for each side was able to get a sense of the flow of work from the timescale of needed actions from the paper work that appeared on her desk, from the Post-it notes on Enquiry Forms, and even from the handwriting on different pieces of paper work. The work activities were organised around an "egological principle" [2] in which the horizons of relevance of each member of the staff were shaped by their respective responsibilities. This is practically exhibited in flows of information, tasks to do, things to check, and coordination between the two sides of the business, all of which tended to be specific to the workaday experience of each member of staff.

Much of the work, seen as a collection of information processing activities, consisted of responding to enquiries and dealing with their implications for the TCO and the Hotel. Below we set out an "idealised" version of this process as recounted to and observed by the fieldworker.

Dealing With Enquiries: The Idealised Version. The processing of enquiries ideally took the form of the standard procedure represented below.

Enquiry comes--secretary answers phone
"Hello, Training Centre Speaking. How may I help you?"

**Takes either pink Enquiry Sheet
(Conference/Meetings) or blue Dalton Suite
sheet (Weddings)**

Takes details - name, address, group, phone number, details of requirements, etc.

Checks accommodation by using Hotel Terminal

Checks TC rooms by consulting Diary. Decides whether sufficient rooms are free, whether it is possible to move groups around if necessary.

Checks, using Trace Card, what rates have been quoted in the past. This may require consulting External Business file.

If just an Enquiry
Send another memo, ring back, put into Move Forward file or Lost Business file.
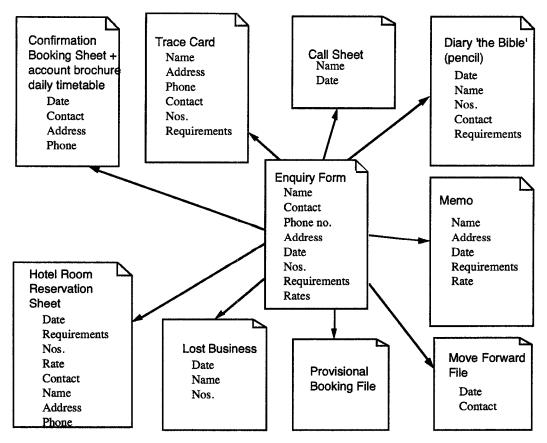
Confirmation
Booking Sheet +
account brochure
daily timetable
Date
Contact
Address
Phone

Trace Card
Name
Address
Phone
Contact
Nos.
Requirements

Call Sheet
Name
Date

Diary 'the Bible'
(pencil)
Date
Name
Nos.
Contact
Requirements

Enquiry Form
Name
Contact
Phone no.
Address
Date
Nos.
Requirements
Rates

Memo
Name
Address
Date
Requirements
Rate

Hotel Room
Reservation
Sheet
Date
Requirements
Nos.
Rate
Contact
Name
Address
Phone

Lost Business
Date
Name
Nos.

Provisional
Booking File

Move Forward
File
Date
Contact

Figure 2. Schematic of information replicated from Enquiry Form

If a Booking
Fills out Room Reservation form. Sends to Hotel Reception.

Uses Computer
Calls up template of Provisional Booking Memo. Completes details, sends to client with confirmation booking form taken from files.

Enters Details in Provisional Booking File
Enters in details of booking in above and into Move Forward File which is looked at daily by all 3 staff. Entered into Diary, Call Sheet, and Trace Sheet, which are used by Hotel for marketing and sales analysis.

The central document in the process is the original Enquiry Form (since this is the source of the information which is entered on the other forms). Much incidental information is not, however, entered on the forms but is part of the staff's "local knowledge." Some of this is handwritten on the forms. Figure 2 illustrates in schematic form the information which is entered onto each Enquiry Form, and subsequently replicated, by hand, onto the other related documents.

The next set of processes follow the return of the confirmation booking form. The Daily Timetable, or Function Sheet, becomes the central document in the next chain of the paper work. The information contained on the original Enquiry Form is copied onto a Function Sheet and, once again, various subsets of this information are transcribed onto other forms and sheets, as represented schematically in Figure 3.

Confirmation Booking Form initiates a memo and daily timetable, accommodation requirements form, and an accounts sheet. If there is no confirmation, a Cancellation and Lost Business form is completed.

When the Function Sheet is sent back, the Diary is completed, in ink, and a copy of the Function Sheet isput in the Date files at the appropriate date.

The **Business Summary Sheet,** also occasionally referred to as the "Bible" in the office, is drawn up one to two weeks in advance from the Diary and Function Sheets which have been placed in the Date File. Copies are sent to all departments and this dictates the work of those departments during the relevant weeks.

The Function Sheets are used for drawing up instructions to caterers and cleaners, and for room arrangements, coffee times, door signs, etc.

At the **Weekly Staff Meeting** the function sheets are gone through, the bookings for next week are looked at, and any relevant information about the group, its likely requirements, and so on, is passed on by the member of staff who is responsible for that business.

The above is a brief outline of the standard procedure for dealing with enquiries and generating the necessary paper work in order to organise the various services that need to be put in place. However, and as we have indicated, this was rarely carried through as a smooth, step-by-step operation.

The chief characteristic of the paperwork in the TCO seemed to be that of relentless repetition, much of it completed by hand. Most forms contained large amounts of information that were principally, sometimes solely, derived from other forms, and many forms shared essentially similar information derived either from the original Enquiry Sheet or the Function Sheet (Daily Timetable), making much of the paperwork a prime candidate for automation.

Accordingly, if we tease out a model, using this version of the "idealised process" of what staff members see IT as achieving, it would involve putting in place a combination of technology and work arrangements that would enable them to achieve a better balance between what they see "they should be doing," that is, looking after customers, responding to customers, marketing, and so on; and the necessary administrative tasks that support the business. They want, to put it briefly, to reorganise in order to make what are now characterised as "interruptions" their proper business, while the routine work would be facilitated by IT.

There are fairly obvious solutions to the kind of problems the staff have identified, particularly those to do with the growth of paperwork which is consuming much of their time in filling in forms, duplicating the information across other forms, filing it, organising it, scheduling it, and so on. The work activities, not only of TCO, but also of the hotel staff who service TCO functions, are directed and organised by the various forms and sheets which form the bulk of the paperwork of the office. It would be relatively easy to envisage a relational database system which could facilitate the distribution of the information in relevant ways with fewer inputs of information. For example, a response to an enquiry could at first fill in an electronic form which then would automatically distribute information
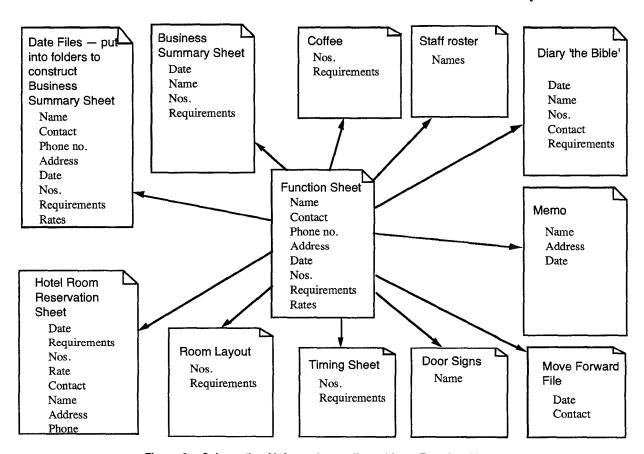

Figure 3. Schematic of information replicated from Function Sheet

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(such as name, organisation, requirements, status, etc.) to other forms. Nor would it be too difficult to design the system to distribute the relevant information at appropriate times, prompting for missing information or reminding the user about tasks that need to be completed.

However, beguiling as such an innovation might seem, matters are less straightforward if we look closely at the complex relationship between the "idealised version" of the plan of work and the actual work. What we want to suggest is that the shift to the kind of system we have briefly sketched would not necessarily bring about the kind of benefits the staff hope for--at least not immediately. Changes like this are commonplace, and people will develop new working practices by adapting and adjusting to innovations; in keeping with the CSCW injunction that system design is work redesign, however, understanding what such adjustments might mean (since most of them are unanticipated) is important. One of the rationales of ethnographic studies of work in CSCW is an attempt to bring out the often subtle, often hidden, often unforeseen, features of the sociality of work which have mixed bearings on the effectiveness of system innovations.

In the following section we wish to consider how this "idealised model" just sketched is instantiated in the practical understandings and practises of the staff of TCO. In particular, the discussion highlights issues to do with the following:

- the dominance of paper

- the ecology of sharing and awareness

- local knowledge

These features, we suggest, sustain the current pattern of collaborative work and information sharing as a set of everyday, practical activities.

Getting the Paperwork Done; Working with Interruptions. A noticeable feature of the work in the office was the "constant interruption"; an aspect most commented on by both the manager and her staff. Indeed, during the fieldwork, the processing of information rarely flowed in an uninterrupted manner. This conclusion was constantly confirmed by comments of the staff. Some "interruptions" were roughly predictable by day of the week or time of day (noted in comments such as "You don't aim to get much done in the first hour to an hour and a half"). Predictable interruptions interfered less with the work because a set of finely differentiated expectations had developed about the likely time taken to complete a task, or whether it could be completed without interruption. The frequency of interruptions was typically high in the morning and lower later in the day when "we can get some work done." "Interruptions" commonly took the form of the Front Desk bell being used by customers making enquiries about rooms, facilities, additional requirements, etc., the telephone with future bookings and enquiries, unexpected

arrivals in the office, and particular enquiries from colleagues about the work they were currently performing.

What is interesting about this characterisation of the kind of events just illustrated as "interruptions" (and, to repeat, this was the characterisation frequently used by the staff themselves) is that they consist precisely of events that prompted the original enthusiasm for IT. That is, the "interruptions" comprised those aspects of the work which the staff said they most enjoyed, namely, contact with customers, and that the work so "interrupted" was the work they least enjoyed and considered a burden, namely, the paper work. In addition, and another irony, the "interruptions" were very often events which initiated the paperwork in the first place, such as enquiries about bookings and other arrangements.

Both the volume and importance of paperwork was generally recognised: "looking at the timetable is complicated...the only way is to make less paperwork...we never get on top of it...but paperwork is crucial...and you make mistakes...". This ambiguity concerning the paperwork and its frustrating volume was recognised by all the staff of the TCO. That is, "interruptions" are the problem they are, despite the fact that they are events which the staff feel that they should "really be dealing with", because the administration, and the paperwork that this involves, have come to dominate work time.[1] As the quotation from one of the staff cited a moment ago indicates, it is not as if the paperwork is redundant to the work. It creates irritations, frustrations, and, at times, not a little panic, but as the work is currently organised and supported; it is essential.

"Doing work" in the TCO was primarily seen in terms of the production and processing of paperwork (i.e., forms, diaries, schedules, records, etc.). Even selling, which was clearly enjoyable to the staff, and an activity they were interested in developing, was manifested in and through the production of paper, such as the Confirmation Booking Form. It was the paper which visibly and tangibly not only recorded the work but also gave it a direction because the organisation of the paper was also the organisation of the work. The step-by-step movement of information from sheet to sheet was a "modal transformation" [18] whereby one set of information was turned into another set of information with different but intentional procedural relevances for the actions of others, such as cleaning rooms, arranging their layouts, determining numbers for coffee, and so on. In other words, the production of the various documents is an instantiation of the interdependencies of many of the work activities within the complex not only for the work of the TCO but for other hotel employees. Because the TCO serves as a "clearing house" for much of

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[1]This was, of course, one of the impulses behind the Office Automation trend and the objective of the 'paperless office'. See, for example, [23], [6]

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the business of the complex, the business must be organised into the activities of various hotel employees. The major medium for this coordination was the paper work.

To facilitate this coordination, the organisation of documents (see Figures 2, 3) was not only in terms of the functions they served, but also related to the flow of events and "things to be done." However, servicing this organisation of paper meant that staff time was always at a premium and time, as we have seen, was always at a premium.

The ecology of coordination and awareness. Many of these features are also visible in the arrangement of the office space. The paperwork fills the office with files, filing cabinets, and card index systems, and so on. Much of what constitutes "doing work" involves movement around the office, taking forms from one file to another, opening files, and amending or copying details of different forms. The spatial organisation of paperwork (where files are, which files contain which forms, etc.) constitutes a working "map" which enables the work to get done. This ecology of the office provides, to those who know it, the "at-a-glance" availability of what people are doing, what stage they are at, how quickly they are getting the work done, and so on.

Typical of many offices, its ecology is a standardised one for those who work it. Even though it may differ in some respects from other offices, the point is that its layout provides a sense of the organisation of the work, and its documentary representations, which are sustained, reproduced, and used in the course of the work. Not only does this allow the staff to know where to look for particular documents, but also how to reconstruct missing or incomplete information from other sources, and where else to look for the missing paper. This enables the office workers to overcome the eventuality that, in a paper-based system, paper will get lost, misplaced, misappropriated, or somehow become unavailable when it is required. This occurred most frequently in the TCO in the case of Trace Cards, which constitute a record of previous business with the client. These are also used by the hotel's Sales Manager, and frequently "go missing" as a consequence: "Trace cards are sometimes not available...our business/sales manager may take them...like that (client)... I know damn well we've got one but it's not there...". Part of "learning the job," therefore, involves learning not just office procedures but, as part of this, the spatial organisation of the office: the location, likely whereabouts, and relative importance of different items of paperwork.

The ecology of the office is a socially constituted arrangement which facilitates the coordination and awareness of the work. For those who know the office, its arrangement offers affordances for seeing "at-a-glance"

where someone is in the course of work activities.[1] This is not just a matter of seeing in general how the work is going, what more needs to be done, and so on, but also is a means of coping with the type of interruptions referred to earlier in the course of "doing something else." The "present" state of the office space, the accumulation of paper documents on a desk, attached Post-it notes, jottings, memos, and the like, are examples of "territorial markings" which staff use to mark where they, and others, are in the course of the work, how the "day's work is going," and so on. An important feature of this "marking" are those affordances arising from paper. Not only are piles of paper visible but because of the paper-driven character of the work, there is a commonplace relationship between, for example, the placement of an amount of paper on a desk and the amount of work done or yet to be done. Similarly, "interruption" from the current processing of documents can be fairly easily handled. Working on a pile of forms can often simply be done as a sequence working from the top through the pile. This means that, given an "interruption," going back to the work is an "obvious" procedure: "begin where you left off with the document at the top of the pile."

The ecology of the office is also a moral order in that, given the division of labour which is also a division of responsibilities, "missing items," "forms not yet done," "delayed," or "work not completed" can be seen as "someone's responsibility." This is not necessarily an occasion for blame, although it may be, but can be an occasion for "seeing who needs help in getting the work done," when "pulling together" is needed.

To conclude: the ecology is a public place using the arrangements of its "objects" to facilitate the shared awareness of the flow of the work and, at the same time, affording a means of coordinating the division of labour through the paper records which it organises. However, these arrangements depend for their operation on "local knowledge."

Local Knowledge. The kind of features we are drawing attention to are all features of the essential local knowledge which enables the work to be done in and through the system. It is this local knowledge which enables the staff to sustain and reproduce the ecology of the office, the work processes which it sustains, and the mutual dependencies that enable the division of labour to have the appearance of coordinating work. Such local knowledge is not only knowledge "in general" but is knowledge of the particularities of the work. Although much of the paperwork deals with standardised formats, and many of the work processes are routine, the particularities of customers, and their requests, are noted in recollections by staff of

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[1] See Gibson [7] for an examination of the notion of affordances. However, we agree with Sharrock and Anderson [3] that such affordances are not so much cognitive in origin as socially constructed

where files have gone, Post-it notes, war stories, strange names, and the multifarious ways in which experienced workers display their knowledge of the work and its organisation. The display of local knowledge was a regularly observed feature of work in the TCO, manifested in the use and discussion of Post-it notes on Function Sheets, for example, and in the detail of conversations and bookings, as these extracts from the field notes illustrate: (i.e., "I just know off the top of my head what I've told him."), in decision making about the progression of bookings and confirmation ("I know her, I've used her before and I thought she'd confirm." "They're regular users ... I know he's going to confirm but I can't get him to put anything in writing...he can't get his manager to give him 100% yes...its more like 80%."), in the extent to which customers need to be chased to confirm bookings or timetables ("It depends on how well we know the customer ... its trying to be helpful without badgering them."), and in details of conference bookings, facilities, and room requirements ("I know because I took it its in my writing..he usually comes in at 15 [where the number attending is listed at 20, but the staff member thinks the number is wrong]." "She doesn't use that because I know she's a regular." "I've got him down for lunch but he always departs" "Because I know what she had and where she was last year ... I went straight to her file" (writes 'do not move' onto room booking on diary file).

The point we want to make about this local knowledge is not that it is an adjunct to the system of record keeping, or to the work activities, but that it is an integral feature of them. It is, briefly, understanding how it works, what its faults might be, what its inadequacies are, how they might be got round, what the flow of work is like day by day, what the frustrations of the system are, and more. Having local knowledge is knowing, that is, how to use the system as an ordinary, taken-for-granted, commonplace organisation of work activities.

IMPLICATIONS FOR CSCW DESIGN

Although the study is based on a "quick and dirty" ethnography of a small office and, in this respect, is by no means a dramatic site for CSCW research, we suggest that there are still important lessons for CSCW. Whilst acknowledging the limitations of this study and the obviously mundane or routine character of small office work, we should not ignore the apparent "typicality" of this setting for many workers and the consequent importance of any lessons learned. Similarly, without being too grandiose, whilst both this study, and the office concerned can be characterised as "small"; the problems identified may not be. Rather they may well be generic to the whole issue of the implementation of IT. In this concluding section we review some of these lessons by highlighting the following related issues: the sociality of work, the support of coordination and awareness, and implementation strategies.

The Sociality of Work. It is a well-established principle of CSCW that system design needs to be informed by studies of the sociality of work, although there is still much research yet to be done in elucidating just what this involves. What is perhaps clearer is that "idealised versions" of work activities--and the example we have used earlier is merely a sketch of what many of the methods used in design are capable of achieving--tend to neglect the "real world" conditions under which work is done. Such factors can have a considerable impact on the effectiveness of a system. However, our point is not just to repeat this frequently-voiced complaint within CSCW, but to stress that the sociality of work is not simply an additional element to be factored into a design model; it needs to be considered from the outset as the lens through which work activities are described.

What we have tried to illustrate in this small-scale study is how the procedural plan for processing enquiries and dealing with the work is carried through and reproduced by the collaborative activities of the staff. However, this is not done as an "idealised version," but as a process done in spite of unavoidable "interruptions" that occur as part and parcel of a normal day. As we have suggested, there is an irony here in that these very "interruptions" are among the events the staff want to have more time for. Nonetheless, carrying through the procedures, preparing for, and initiating the work is their overriding concern and what consumes most of their day.

Understanding the subtleties of the relationship between "real world" work and plans and procedures is an important part of understanding the sociality of work. That is, although it is more than possible to describe an idealised version of the flow of work, the order and speed with which paperwork is generated and dispatched in this idealised version is rarely realised in practice but is stretched and accommodated as workers go about their jobs--and it is largely this process of adaptation and accommodation that enables the work to get done. Consequently, the efficient implementation of technology to support the work process --that is, technology that is designed to improve or enhance rather than merely monitor work--whilst encapsulating this idealised work process, may also need to allow for the variegated ways in which people, quite successfully, accomplish their tasks.

The Support of Coordination and Awareness. CSCW did not invent the issue of coordination in work activities. These have been prevalent features of work for millennia. Despite this, however, it is remarkable how little is understood about how such coordination and awareness is achieved as a routine and commonplace activity in work settings. This is an issue which harks back to many of those bound up with the idea of the sociality of work. What we want to emphasise here are the ways in which the current organisation of the office, its ecological arrangements, along with the activities which sustain it and

which constitute the bulk of the work, are used in coordination and awareness. In the earlier discussion, we identified some elements of the "local knowledge" which configure the paperwork as a system of work organisation. Much of the work is routine and repetitive--a feature which the staff felt had gone too far--but it is, we would suggest, a routine which "gears them into" the work itself [5]. They become, as it were, part of the system, and in making the system work, they drive the work. "Knowing the system" means knowing not only what forms to fill in and when, but what the forms mean in terms of the practical details of the work, what needs to be done, when it needs to be done, who and what to check on, who to ask if things are not clear, and more. This is not simply a matter of initiating various work processes but, essential to this, knowing where one is within the processes, what yet needs to be done, what has been done, who is to do it, etc., as an overwhelmingly practical concern of a day's work. What the manual system does is exemplify a set of routine ways of doing the work and specifying what items need to be consistently reproduced in the same manner. Although there is an irreducible sense in which the work is done by an individual, the sense of the work for those within the office is that the work is done by individuals-in-a-team and it is sustaining this which the currently organised routines provide for despite the voiced frustrations of the staff.

A central component in the coordination of work activities is paperwork; acting as a spatial and temporal marker of the progression of work and generating or advancing various aspects of the work process. Paperwork, by its sheer volume, is one of the most visible features of the modern office. In highlighting features such as the "at handedness" of paper and the ecology of the manual system of paperwork as integral to the detailed organisation of the multifarious work activities which take place in the complex, we are suggesting that the manual system is not just a technological arrangement which, as it were, "stands outside" the work, but is an essential feature of the work's character and to its "doing" and, as part of this, providing for coordination and awareness. While the movement towards the "paperless office" may remain a (unrealisable and unrealistic) dream, any introduction of electronic systems needs to take account of, and incorporate, those aspects of paperwork that facilitate the work process. Electronic systems (and in many respects this is their intention) are capable of destroying those features which currently support coordination and awareness—IT is not a simple solution to the problem of paperwork.

One other aspect, highlighted by this study, and likely to be a regularly observed feature of life in many offices, is that of "constant interruption." Interruptions, because of their very "unpredictability"—that is, the fact of interruptions may be predictable but the precise nature of the interruption is unlikely to be—are difficult, if not impossible to incorporate into an idealised model of the work process.It is for this reason that they are disruptive to the flow and

progression of work, even when, as in this study, the "interruptions" are regarded as the "real work." Paperwork, by its "at handedness" enables workers to cope with disruption by physically marking the point of their return. Paradoxically, paperwork, by its sheer volume, also serves to make interruptions more disruptive to the work process. If, as we suspect, interruptions are a regular feature of office life, IT implementations of the work process need to be sensitive to this "act" of office life—most obviously, for example, by ensuring that screens do not go down and that information is not "lost" whilst workers are engaged on the telephone.[1]

We would suggest that sensitivity to these issues is important even where "simple" IT solutions are available, as in this case where there are no resources for a "full-blown" CSCW system design. However, studies such as this could well inform the choice of a suite of "shrink wrap" software (bearing in mind that, at the same time, the current organisation of the work would need review).

Implementation Strategies
Although it was no part of our remit to come up with design solutions, what is interesting in this case is that the staff concerned were more than amenable to IT solutions to what they felt were major frustrations inherent in the current organisation of work. While this in no way amounted to a requirements specification, they were more than able to see what benefits it might bring. For example, and as we have seen, Trace Cards were regarded as an area which might benefit from computerisation, partly because they were not always available since they were also used by the Hotel Manager. A further benefit was seen in terms of speed of processing and coping with the "constant interruptions":

> If the computer could fill in basic
> information...we could crack on..

> A lot of the paperwork could be
> computerised...like the Trace Card...if Lee
> has them down there [in the hotel] we
> can't give a quote...if they were
> computerised and we could all access it
> that would save a lot of time

In general, the staff in TCO had what Webster [21] refers to as an "optimistic" view of more office automation. While not approximating to a vision of work in which "elegant young secretaries sit in air conditioned splendour among pot plants, smiling into visual display units" [21], there was a strong belief that IT would free them to do more satisfying and responsible work and, if this could be achieved, reconfigure the currently ironic connection between "interruptions" and "routine paperwork."

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[1]As we have found in another study, this time in a bank, where this actually happened as the screen's default mode!

The staff were not, however, uncritically optimistic. They were worried about the time it would take to convert from a manual record system to an electronic one. Somewhat surprisingly, no one expressed any fears about deskilling, or that one of the consequences of increased computerisation would be a working life of continuous keyboarding, or that it might eliminate "non-productive pores" in the working day [21].

In view of this willingness on the part of the staff, there is every chance that IT solutions of the kind we suggested earlier would prove acceptable and usable within the office, and within a reasonable time frame; acknowledging, however, that whilst small work settings such as the TCO have been the targets for developers of generic or shrink-wrapped products, the adoption of such systems will obviously involve the users in far less "hand holding" than would rightly be required of a bespoke system developer and consequently training issues become particularly important. However, what this small study perhaps enables us to see is that the shift from a manual system to even a modest electronic one is not merely a shift in technologies but also involves a change in the understandings, practises, and conceptions which are intimately bound up with the apparatus of the manual system.

In making this point, we are not advancing an argument against incorporating IT along the lines earlier suggested. What we *are* suggesting is that doing so will involve a reconfiguration, as it were, of the "local knowledge," which is essential to the working of the current system. While there are some obvious, but too often neglected, things to say about the importance of training in this connection, it is also important to recognise that embedding a system into work activities, achieving a level of routineness, and generating relevant "local knowledge" are all likely to take time. In another area, namely air traffic control, we argued that although automated systems were very good at taking over routine tasks, in doing so they have the potential of inhibiting what we referred to as "gearing" the user into the work [5]. In other words, even routine tasks can have the important function of integrating the user into the flow of activities. Although the importance of factors such as this is variable with respect to domains, after all air traffic control is not office work. The point we want to make here is that the adoption of some element of IT is never simply a matter of switching on a PC the first thing in the morning as opposed to reaching for a pencil. It will also involve changes and adjustments in the kind of subtleties of the sociality of work we have been discussing.

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