Paper documents are often described as 'information rich', in contrast with electronic documents. This ethnographic study examines Lotus NOTES in a sub-section of the Irish civil service, with particular reference to the concurrent use of electronic and paper documents. The sub-section examines disagreements with regard to claims by Irish citizens for particular government benefits. The study describes how meta-information contained in paper case files is perceived as necessary for the work of the organization, thus restricting the use of electronic case files in NOTES as a shared information system. However, this reliance on paper files derives not only from the information rich properties of paper documents, but also from the desire of some workers to protect their occupational status by defining, as necessary for their job, information which is only available in paper documents and which only they can interpret. This dependence on paper documents also reduces the amount of information that can be shared within the organization. This paper suggests that, only if the perceived threat posed by the information system were reduced in some way would user innovations in work practices and greater sharing of information within the organization become possible.

Introduction

Information systems designers have often relied on a 'conduit' metaphor in their work:

People regularly describe most communication technologies in conduit terms, talking of information as 'in' books, files, or databases as if it could just as easily be 'out' of them. We ask or are asked to put ideas 'down on paper', to 'send them along', and so forth. (Reddy, 1979, quoted in Brown and Duguid, 1996)

In this perspective, information is treated as self-contained packets, somewhat similar to the discrete-entity approach that Kling (1987) has described with regard to computer systems, rather than as part of a larger social system. Information systems can then be designed to deal with those packets (records, cases, fields) as units, with clear boundaries and internal integrity, and relations between packets can be diagrammed by work-flow arrows or relational data links. As Boland (1987) points out, it is not that designers reject a view that information is socially constructed, nor the view that data are meaningful only in their organization context. Rather, since such views make the design of information systems difficult, it is easier to use the conduit view, when possible. Since some information can be treated as isolated data units, this conduit view does not always inhibit the design and use of information systems. Airline booking systems, for instance, successfully define airline travel in terms of discrete units of 'seats' which have dimensions of fare structures, flight schedules, seat availabilities, and so on.

The use of information technology to reduce the amount of paper-based information has been an important theme in the development and use of information systems in organizations. The advantages of electronically stored data over paper-based data seem clear: organizations can reduce archiving costs, improve the safety of data, more easily move data from one person to another in the workflow process, more easily recycle data, standardize data input, automate work, and so on (cf. Sprague, 1995). The use of electronic forms and documents as replacements for paper-based forms and documents would seem to be one of those areas where a conduit model would suffice. The information is already represented in written format and can be transformed, relatively transparently and mechanically, into an electronic medium. As pieces of paper become electronic records, electronic forms have the same categories and logic as paper forms, paper-based 'boxes' become electronic 'fields', and so on. The system can be designed with little concern for the social and organizational context of information, and the organization can realize the advantages of the electronic data, while maintaining the categories and general formats of paper information.

Yet an increasing amount of research has shown that the transition from paper documents to electronic documents is rarely smooth nor is the resulting system as
effective as expected. Some of the problems arise from control issues inherent in electronic, as opposed to paper, information systems: who will have access to the information, who will have the right to alter it, and so on. Then there are technical issues: can electronic documents be viewed on screens as easily as paper documents can be read? There are training issues: are new skills required to learn how to type, to use a computer, or to use a particular information system? Are there incentives to encourage workers to learn and exploit the new system? These problems have led designers to look at traditional work practices closely to see why some practices can and cannot be transported into a new system.

These problems suggest that the contextual and socially constructed nature of the data itself must be taken into account when designing an information system, and, without such a perspective, the resulting information system will be inadequate. For instance, there are studies illustrating that work being done with paper documents is difficult to replicate in electronic documents (e.g., Luff et al., 1992). It may be difficult to annotate electronic documents in the same way as paper documents. Such analysis requires fine-grained observation and description of work practices, and it is necessary to take into account the understandings and assumptions of workers. There has been an increase in qualitative studies of information systems, and especially an increase in anthropologically informed ethnographic case-studies (see Harvey and Myers, 1995 for a recent review), just as such research has also become important in computer-supported cooperative work or CSCW (e.g. Suchman, 1987; Hughes et al., 1991; Bentley, et al.; Jordan, 1996).

While the goal of research is often to improve the design and implementation process, ethnographic studies also highlight limitations in the potential of electronic information systems to duplicate or replace existing work practices. For instance, Bowers (1995, p. 195), based on an ethnographic case study, discusses 'some of the issues raised when a paper-document-intensive work site faces the possible automation of its document production practices'. He traces the development of two concurrent document systems, one paper and the other electronic, because the electronic system cannot provide all the organizational and individual benefits already provided by the paper system (see also Rouncefield et al., 1995, for a similar case). Bowers notes that, when users do not use features of a CSCW system, it is not always because such features are unfamiliar or threatening. They may understand the features, but judge them unsuitable for specific work practices in that organization.

This article reports a similar case-study: the use of Lotus NOTES in a relatively small section of the Irish civil service. The section's work is document intensive, and information is available in both paper and electronic formats. Although Lotus NOTES is popular, and is effective in a number of ways, many workers argue that the meta-information in paper documents is so important as to make it unlikely that electronic documents could effectively replace paper. If they are to do their work, they argue, they need the contextual information that exists only in paper-based versions of information. As will be seen, research suggests that workers' beliefs and claims that they need such information may not be founded on insurmountable differences between electronic and paper documents, but also on organizational issues that have little to do with information system design or implementation. Workers' positions, vis-à-vis other workers, partially derives from the expertise required to interpret paper documents. Since electronic documents do not require the same expertise, gained from experience and training, the wider use of electronic documents would undermine worker's claims of special status. As the system currently stands, the use of the information system is limited by the worker's self-imposed need for contextual information.

The unit

In 1991, ethnographic research in the 'Unit', a small, semi-autonomous section within a department of the Irish Civil Service, was undertaken. Senior management was interested, one year after the introduction of Lotus NOTES (a well known commercial groupware program), in an external evaluation of NOTES' impact and effectiveness. A joint research agenda was agreed, and employees were invited, but not required, to cooperate, on the understanding that anonymity and confidentiality of all data would be respected. Management understood that it would receive only a summary report, in which no individuals would be identifiable. Data came from three months of ethnographic participant-observation by a single researcher, involving observation of work practices and social interactions. In addition, a tape-recorded interview, of about an hour's duration, was conducted with all staff members (approximately thirty in total), consisting of open-ended questions. All staff members also completed two structured surveys: one, a survey of the use of different communication modes (face-to-face, electronic mail, telephone) for work and social interaction, and the other, a ranked list of social and work contacts. In addition, logs of e-mail traffic over a period of two months were examined. The survey data and e-mail logs were the basis for social network analysis (Killworth and Bernard, 1974; Bernard, 1988; Wasserman and Galaskiewicz, 1994). The final report
was made available to all members of staff for comment, via a publicly accessible NOTES database. Most of the data for this article comes from the observations of work practice and interviews with workers.

The Unit exists to examine disagreements regarding claims by citizens for various services or benefits. The work is organized in terms of cases; each case is a disputed decision. The Office is composed of about 35 civil servants, who are on different floors of the same building. There is ample opportunity for face-to-face interaction, for both work and social purposes, in a relatively small area. Middle and higher level staff have private offices, while clerical staff share offices (about three to five staff per office). The Unit, like the civil service generally, has a hierarchical structure. There are, roughly, clerks, examiners, and senior examiners. All staff in the Unit are members of the Irish civil service; promotion and pay are determined by service-wide procedures and policies. Although individuals enjoyed their work and were committed to helping citizens obtain their deserved benefits, there were some morale problems. Some members of staff felt that there was not much interest on the part of more senior staff in discussing how best to achieve the goals of the organization, in terms of providing the best service to citizens. Promotion was rare, as the Unit was seen as a relative backwater, and it was as difficult to get transfer to other sections in the civil service as it was to get promotion within the Unit. In addition, the criteria for promotion were unclear, leading to some suspicion that neither productivity nor efficiency would enhance promotion prospects.

Each case is handled by an examiner, who has a number of cases ‘on hand’ at any given time. Clerks take details of disputes, and look for further information, as directed by examiners. Examiners decide what material is necessary for decisions about disputes to be made, which may be obtained by them or delegated to clerks. When a resolution of a case is arrived at, the case is passed to one of the senior examiners who, having looked at it, will pass it on to the Head of the Unit for final approval. The work of the Unit is quasi-judicial in nature, and all members of the Unit are aware that disputed decisions have the potential to be the subject of judicial review, and information that is part of a case file may become evidence in court proceedings.

The Unit is structured vertically, with three separate sections, each dealing with different kinds of cases. For each area, there will be one senior examiner, with about three to five examiners reporting to the senior examiner. Supporting the work of the examiners there will be about three to five clerks. There are general rules regarding procedures for investigation, but each section within the Unit deals with a different type of activity in the parent civil servant department. Each section also acquires the unique expertise needed to understand the rules and procedures relevant to its ‘opposition’ in the parent civil service department. Case work is seen as an individual activity; each examiner works largely on his/her own, and only consults with other examiners, or with the senior examiner in the section, as he or she desires. A case starts first with clerks in the relevant section, who take the initial details and decide whether it falls within the remit of the Unit. It is then passed to an examiner, who may return it to clerical staff with instructions to obtain further information about various issues raised. The case may go back and forth a number of times, until the examiner has enough information to make a determination, at which point it is then passed to the senior examiner in the section. If the senior examiner is satisfied, it will then be passed on to the Head of Unit, for final approval. It may also be returned to the examiner, if either the senior examiner or Head feels further clarification is needed.

The problem

Work was organized around the flow of cases through the Unit, defined by its physical representation: the case file. In the late 1980s, senior management (consisting of the Head of the Unit and the three Senior Examiners) perceived various problems emerging. It was increasingly difficult to keep track of case files. If someone inquired, internally or externally, about the status of a case, the relevant file was not always available. Or, if the file was available, the status of the case was not evident, unless the person specifically involved in the case was involved. It was difficult for Senior Examiners to monitor both the work of examiners and the progress of cases. Storage of closed files, required by the quasi-judicial nature of the Unit, was expensive. At the same time, it was difficult to retrieve completed cases, if anyone wanted to consult the cases again (either to review the case itself, or to see if it was a useful guide for a current case). Finally, there was dissatisfaction with the existing office technology, which comprised of separate e-mail and word processing systems, with a rudimentary accounting system. Although the computers were networked, users had to leave one system to access another, and the systems were underutilized.

Senior management identified a number of key improvements which an information system should provide. Primarily, the IS (information system) was to provide a database of cases, which would permit individual cases to be tracked and atypical cases to be identified. The database should provide management with information on numbers of cases per examiner, length of time to make determinations on cases, and other statistical
measures of efficiency. All aspects of a case were to be available via the information system, including material received from outside the Unit. Cases that would have significance for future cases coming into the Unit were to be highlighted, and the information was to be in a format which made it accessible to all staff, in order to assist them in researching new cases. It was hoped that a new system would include a keyword search facility, and that any specialist information used by the Unit (journals, reports, general office procedure information) would be electronically available through the system. The system was to provide word-processing, spreadsheet facilities, internal and external electronic mail, access to fax from the workstation, appointment scheduling, calendar and phone directory (internal and selected external). The system was to facilitate communication both internally and externally by the provision of an internal bulletin board and by allowing links to be established with other sections of the civil service and external commercial databases. This summary was taken from an internal document, prepared as part of a request for civil service funding to purchase and implement the new information system.

The solution

A small group within the Unit, consisting of an examiner and an assistant, helped by an expert from the information technology support group within the civil service, examined a number of different options. The solution was the introduction of an electronic information system—Lotus NOTES. Marshak (1990) provides an early description, and there have been a wealth of studies of Lotus NOTES in recent years, some of the best known being by Orlikowski (1992, 1996). Although not well known at the time of introduction, NOTES is now seen as a leading groupware or computer supported cooperative work application, although the collaborative work functions were not the features of NOTES most attractive to the Unit. During both the implementation and design processes, staff were involved as much as possible, even to the extent of helping evaluate different information systems. In the case of the Unit, the attraction of Lotus NOTES was its flexibility as a work flow application. There was a desire for a system that duplicated both the existing paper system and the existing work patterns. Other products were examined and discarded because they imposed too rigid a structure on how, when, and to whom, documents would circulate in the Unit. A hierarchical, deterministic information system was not seen as efficient; individual control and choice was deemed paramount, and Lotus NOTES duplicated the individual control over work processes embedded in the paper-based case file system.

The paper-based case file system was maintained when Lotus NOTES was introduced, thus creating two duplicate processes. The duplication was partly for legal reasons, as no one was certain of the legal status of electronic documents, given the quasi-judicial nature of the organization. However, there were also internal political reasons: some senior staff were neither confident of, nor comfortable with, the electronic system. All electronic entries were supposed also to be printed and entered in the paper file; and any paper entries were supposed to be duplicated in the electronic file (some documents received from outside the Office were scanned into the electronic file, but this practice was never applied to all documents). This meant that examiners had the choice between using electronic or paper files, and then duplicating their work in the other mode afterwards. The existence of a dual system makes a study of work practice in the Unit particularly interesting, since the choice between electronic or paper media was not dictated by management—it was a consequence of workers' own evaluation of benefits and costs on a task by task basis.

Implementation

The core database was a case tracking system; the design of this system reflected both management's desire to monitor cases and staff work loads, and the work requirements of other staff. In the design and consultation process actual work processes were not observed; individuals' perceptions of their work were presumed to be accurate representations of the work process (however, core design group were, themselves, experienced in the work of the Unit). The only extent to which beliefs about work were tested against work practices was the phased introduction of NOTES, initially in only one of the three sections and then, after some adjustments, into the other two sections.

During the design process, there were some sensitive decisions to be made by the internal design group. An information system, by virtue of its design, is also a system of social control (Suchman, 1993; Mantovani, 1996, p. 81), and the local designers of the system perceived control of information about one's activities as a political issue. If someone was working on a case, who else would have access to the records on that case?

The lack of observation of work practices led to some inappropriate design decisions. Three years on, reviews of the design of forms and views were taking place, as there has been a realization that practice did not match perceptions. Many views and forms, initially included as a result of participant input, are being removed, since the forms are not actually used. Examiners also report that the structure of the views and fields sometimes seems to slow down work, and so the electronic version of the case is sometimes ignored.
Would others have access only to some information, and, if access was to be restricted, who would know what? Would superiors be able to monitor work? There was some uncertainty, and even fear, over the greater visibility this permitted; after all, with paper files, one couldn’t easily find out what a co-worker (or superior) was or was not doing. If the wrong design decisions were taken, then the system might not be used. In the end, the design group opted for an open system. There were no restricted databases; any member of the Unit would have access to any of the office-wide databases. These decisions were undertaken as much on ideological grounds as any other; the local designers believed that information should be freely and visibly available, and were willing to take some risks over the issue. As it happened, the decisions did not create difficulties, and the open system has not created staff problems (other than reports of some staff looking at semi-private letters that were being written and then stored in a public database reserved for secretarial typing!).

In the view of senior management, the introduction of NOTES was successful, and the primary goals were achieved. Managers could now monitor caseloads, and easily prepare monthly reports. Concerns about safely archiving, and then accessing past cases had been addressed. The Annual Report of the Unit’s activities became much easier to prepare. Though, as will be seen, the goals of enhanced information sharing and communication were not achieved, they were less important to management than the utilization of computer technology to manage case work and case loads. In fact, some senior managers were ambivalent about the electronic communication facilities of Lotus NOTES. They were less interested in electronic discussions about cases than using NOTES as a management accounting tool, and these senior managers did not encourage other staff to use the communication and information sharing facilities of NOTES.

At the time of introduction, there was no perceived need, on the part of most staff, for a new system; employees reported themselves to have been satisfied with the existing system, prior to the introduction of the new system. Yet, all employees were satisfied with improvements brought about by the new system. Those who had to deal with queries from the public were fervent in their appreciation of the new system. Previously, trying to find out the status of a case was time-consuming and frustrating; often, they could offer no satisfactory answer to the query posed. With the new system, instead of trying to find someone else, they had instant access to all cases and could easily provide a satisfactory answer to any query. Clerks were doing less typing of examiner’s reports, although they were inputting more data into electronic files. On the whole, though, they found their work slightly less repetitive and more interesting.

For the middle grade of examiner, Lotus NOTES transformed work practices. Examiners now did a lot of their own word processing and they looked after their own correspondence. Although this was time-consuming, the increased control over work processes (content of work, scheduling of work, as well as greater autonomy and independence vis-à-vis others) has been worth the extra work:

You can control exactly what you’re doing all of the time. You don’t have to part with any of your work to anyone else, to do anything with it – to file it, or type it, or photocopy it, or . . . you just do it all yourself.

There has been a general sense that their work has improved in quality, even if it is difficult to demonstrate a decrease in the amount of time it take to process a case.

One of the greatest benefits, for examiners, was an unexpected one. Once the examiner is finished with the case, it goes to the Senior Examiner, and eventually the Head, for final approval. It may be some time before that decision is made and examiners sometimes receive a phone call, with no advance warning, asking about specific aspects of the case. At that point, the examiner is not likely to remember specific details, and the paper file will be sitting on the superior’s desk. With NOTES, the examiner can now refresh his or her memory by accessing the electronic file, even though the superior has the paper version. Interestingly, this was not always seen as a reciprocal benefit – that is, some senior examiners were lukewarm about being asked, themselves, to look at electronic versions of files when the paper files were still held by examiners.

In the end, the implementation of NOTES in the Unit would seem to be a success, from the perspective of senior managers, examiners, and general staff alike. The program was localized to provide the functionalities that the users wanted and needed. It was accepted and used by staff and met the primary expectations of the managers. It was integrated into work practice, such that workers discovered unexpected benefits to the system which provided an incentive for using the system. Despite little perceived dissatisfaction with the previous system, users professed themselves satisfied with the change, and considered themselves to be doing a better job than previously. In the context of system design, this case provides an example of the effective matching of information system and work practice by first understanding work practices and then customizing a flexible information system so as to accommodate those work practices through worker participation in the design process.
Reading the file

Yet not all the goals of management were met; as will be seen, the information sharing and work collaboration features of Lotus NOTES were infrequently used. If someone wanted assistance or advice on a case, they did not use the collaborative tools available, via Lotus NOTES, to discuss the electronic file — they took the paper file with them to the other person’s office. Electronic mail, customized so as to facilitate comments on particular cases, was rarely used; in so far as examiners discussed cases, it was done face-to-face or over the telephone. In observations of work practice, examiners usually worked from the paper file, entered new information into the electronic file, and then printed a hard copy version for the paper file. To some extent, this was due to a limitation of the software, since examiners could not flick from page to page easily or quickly with on-screen data. In release 3 of NOTES, one saw only a summary line for each document in a file. To ‘browse’ a case meant opening each document in turn, which was cumbersome and time consuming. One respondent commented that he would lose track of NOTES entries longer than a page: ‘[I] can’t hold it, and can’t flick back . . .’ Files composed of paper documents are more efficiently browsed. One respondent noted, while holding a file in his hand:

... all of this could be imaged ... but, I’ve been wading through it here this afternoon, and I’d hate to be trying to go through that ... trying to link one thing to another, flicking back through it, I know where I’m going with it, you know . . .

It is the physical characteristics of the pages, the way the artefacts fit together, or can be examined individually, that examiners found essential to their work.

Workflow in the Unit is case-driven, and this remains paper-driven. Effective responsibility, or ‘ownership’, for a case rests with the holder of the physical file, regardless of who is noted as responsible in the electronic file. The process by which the case moves through the Unit is marked by the physical passage of the paper file. To discharge responsibility for a case, one passes on the paper file. To claim responsibility, one possesses the paper file. Although it is possible to transfer responsibility for a case from one person to another by changing a field in the electronic file, responsibility does not, in practice, transfer until the paper file arrives on the other person’s desk: ‘The physical file still has to go ... Certainly my experience of it is that people are more inclined to deal with the physical file.’ One examiner discussed a case in which she asked for comments from a superior:

*An examination of e-mail logs over 12 weeks showed an average of 2.5 e-mail messages per person per week. The majority of e-mail messages were confined to a group of eight junior members of the Unit, who used e-mail for social purposes.

I have asked him to advise me what to do next ... He hasn’t come back to me — but if he does and says ‘what have you been doing’, I can say that I sent him a message ... Yesterday, in fact, I sent him the file, as well. I’ve still heard nothing, but I’m covered.

She later emphasized that the file was sent to ‘... emphasize that this was his problem, not mine, and if the file was sitting there, it could still be mine.’

The paper-based case file embodies both the case and the individual who has brought the case. When talking to an examiner, if I asked how many cases he or she had on hand, they would gesture to the stack of paper files scattered on their desk to indicate their work load. In discussing cases, one respondent said that the only loyalty she has was ‘to people on her desk’, gesturing to the files. For her, the files were the people. Examiners work in isolation, and obtain job satisfaction from solving the problem. There is emotional investment in particular cases, which may take months to resolve. For many examiners, the paper file is the physical talisman of that investment of time and emotional energy.

Examiners argued that paper files were necessary, in order to do their work, and the attachment to the paper file was more than needing better or larger screens. (It must be emphasized that these comments do not come from people eager to minimize their use or dependence on NOTES; almost all examiners were very positive about Lotus NOTES in other ways, and used NOTES both competently and happily.) A case, by definition, is a dispute between two parties, and examiners are trying to arrive at ‘the truth’, which is somewhere between two different versions of events. Examiners used the paper file to imagine or visualize the conflict between appellant and the relevant section or body, and make decisions about what was ‘really’ happening in a disputed reality. In order to do this, examiners looked for meta-information, and derived contextual meaning from file attributes — how the papers were ordered, what kinds of paper were used, were comments typed or scribbled, notes in margin, and so on. In this way, they deduced the ‘hidden’ story of narrative, which is vital to their work. During interviews, examiners would often hold up a file, to explain how the actual appearance of the file, and the order of papers in that file, gave them insight into what had been happening in a case. As one examiner said:

there are certain kinds of cases where it is only by going through file ... being able to flick back and see the pattern of what has gone wrong. ... Over the years, you get to know how a ... file is even put together. You’d know if something was missing off it.
Examiners found it difficult to visualize information about a case from the electronic files. Paper files were seen as documents which, layer by layer, had a history, while entries in electronic files had been stripped of their uniqueness. Electronic entries look the same and forms look the same; there is no sense of history in how the papers are ordered, there are not even scribbles in the margin. Information entered into the NOTES database is too ‘clean’, it has been sanitized and emptied of significance; the end product may be available, but there is no means by which the process can be reconstructed. Even when examiners used both the electronic and paper files together, the paper file still took priority. As one examiner said, holding the paper file in his hand, ‘...this would be my guiding star.’

The approach of the examiners to the text, whether electronic or paper, was to try to use the documentary evidence to recreate the motives of the creators of the documents. This is in accordance with hermeneutic theory, which suggests that a distance is created between the text (which takes a life of its own) and the authors of a text (Lee, 1994, p. 149). In the case of the Unit, this distance is what the examiners sought to overcome. This is similar to what Ngwenyama and Lee (1997, p. 155), in summarizing Habermas, categorize as communicative action, in so far as the goal is to evaluate ‘validity’ claims:

the process of enacting coherent meaning from the ‘text’ is a critical reflection cycle in which the reader/listener tests the validity claims of clarity, completeness, contextuality, and truthfulness associated with this type of action.

This process primarily involves the interrogation of textual data, much as a solicitor/lawyer reviews evidence for a case, looking for evidence of falsity and lack of completeness, as opposed to truthfulness and completeness.

Thus, the basis for the preference for paper documents seems clear. It is not a desire to avoid technology; the evidence clearly shows that Lotus NOTES has been embraced by workers. Nor is it due to technical inadequacy, in terms of the design of the information system. Although people find it easier to manipulate paper than electronic documents, and can do so effectively and efficiently, this was not the only objection raised to electronic documents. The preference can, it seems, be explained by reiterating the views of examiners: paper documents are ‘richer’ than their electronic equivalents, and workers are using the system best suited for the tasks at hand.

This ‘information-rich’ interpretation is in accord with other studies of paper-based information systems. For instance, in studies of doctors using medical records, researchers have noted the importance of meta-information, such as the discoloration of some sheets of paper, used to deduce that some sheets are older. Even the thickness of the file and the characteristics of the papers in the file are informative:

A new note can start with the date stamped in red. The distance between two red stamps...is thus an indication of the complexity of that consultation. For a patient with a chronic disease, regular consultations are often made for control purposes. Short distances between the red marks means that the progress of the patient was uneventful, whereas a long distance between the two red stamps indicates trouble. (Nygren and Henriksson, 1992, pp. 6-7)

Doctors use the characteristics of the physical storage media of the information, as well as the information stored in the media itself, an interpreting medical records.

Examiners in the Unit would agree with the doctors: paper documents are ‘revealing’ because it is difficult to conceal the order of entry, the style of entry of data, and so on. In contrast, such variation is minimized with electronic documents, not so much by intent as by necessity. Inevitably, word processed documents look much the same, regardless of the author, and the appearance of different sections of documents are dictated by the information system rather than the author. Electronic files are bereft of the tell-tale give-aways that assist examiners in their work, they are less complete and not as rich a source of evidence. The paper documents are important as physical artefacts, whose physical characteristics betray clues that experienced examiners can read. They are also important psychologically to examiners, since they become proxies for the individuals whose cases are being looked after. Thus, a first interpretation of the data suggests that paper documents are an essential resource for work in the Unit. It would seem that, since paper-based case files cannot be shared as easily as electronic case files, there is limited scope for using NOTES as a vehicle for sharing information about cases or collaborating in case work, and this explains the lack of such practices in the Unit. If management wanted to increase the use of NOTES to share information, then, as a response to this explanation, it would have to redesign the electronic system to provide the ‘affordances’ of paper documents (cf. Rouncefield, et al., 1995), or accept that, for the purposes of examiner’s work, paper documents can never be replaced by electronic documents and so limitations in information sharing are inevitable.

Defending professional practice

Although the preceding explanation accords with the views of examiners who emphasize the ‘richness’ of
paper documents, the utility of categorizing media as ‘rich’ or ‘poor’ is currently under debate (Ngwenyama and Lee, 1997). Can a medium be classified as ‘rich’ without regard to the individuals using it and their perceptions of it? Markus (1994) has argued that, in some circumstances and for some people, electronic mail can be a ‘rich’ medium; ‘richness’ derives from users and their shared information context, not the intrinsic properties of the media. Does a definition of paper documents as ‘rich’ provide organizational or social benefits for examiners? Examiners’ belief that paper files are ‘richer’ than electronic files, and that such rich information is necessary for work, may not derive solely from the properties of paper data; their belief may also derive from the advantages such a definition provides them in the workplace. If the social context of information use is examined, different questions emerge, with different implications for increasing the use of NOTES.

Although examiners’ accounts of their reasons for using paper documents are persuasive, there are examples of other work practices in the Unit which also have the consequence of minimizing information sharing, suggesting that examiners’ accounts are not the complete explanation. For instance, examiners brought the paper file into another office for consultation, even though the electronic case file could be used for collaborative discussion or annotation. The paper remains the reference point for responsibility in the Unit, and the person who held the paper file was, in practice, responsible for the case, even though the same allocation of responsibility could be achieved electronically. More significant was the limited use of public databases to share information or experience, despite the benefits to all members of the Unit from such sharing. Examiners, in the process of dealings with cases, learn about the individuals and procedures of the civil service sections they examine. They are in a semi-adversarial relationship with these sections, and examiners reported that the experience and knowledge they gained from previous cases helped them deal with cases both more efficiently and also more effectively. They knew who to contact, they knew what procedures were actually followed in a case (as distinct from ‘official’ procedures), and so on. They also learned how to interpret the language on the documents they received. As Brown and Duguid (1996) note:

Documents are ... used to patrol and control. ... [D]ocuments can patrol community boundaries rather than cross them. Strange formats, unexplained generic conventions, jargon, abbreviations, allusions, as well as private languages are all examples of ways in which documents keep people out as much as bring them in.

The documents which examiners look at are not necessarily made with the intention of misleading outsiders, but the notation systems are most meaningful to the community sharing a common strategy of interpretation. Examiners learn the system of practice in the particular section they deal with, otherwise they could not interpret the documents; this was a knowledge that all examiners agreed was crucial. However, this information was never entered into any public database. If someone left the Unit, their replacement had to go through a long process of ‘reading into’ their new job, to learn the people and the language of the section they must now deal with. Management was aware of the benefits of documenting such knowledge so that it would be available to new staff, and was aware of the cost, to the Unit, of losing the expertise which departing staff was taking with them, but had no procedures to ensure such documentation.

Both examiners and management agree on the need to make expertise and experience available to others in the Unit, and there are a number of ways in which NOTES could be used to achieve this. Electronic case files could be annotated, and the annotations would be visible to all. A procedure existed so that significant cases, with implications for other cases, could easily be electronically tagged, and a summary available in a public database. There existed other public databases, where useful advice or information could be made available to others in the Unit. In addition, there were distribution lists which would have enabled people with specific interests to be notified about new or useful ideas or experiences. These were all facilities that were both present in Lotus NOTES and had been implemented, in an easy to use fashion, in the Unit’s localization of NOTES. Yet none of these possibilities were exploited by examiners or other workers, to any great extent. These lacks were not a consequence of user’s poor grasp of NOTES; when a discussion database was established as part of a review of the fundamental structure of the Unit, contributions to the discussion list came from all members of the Unit.” In addition, the use of electronic files by examiners to discuss cases over the phone with Senior Examiners has already been described. Both examples demonstrate that the minimal use of NOTES to share information was due to a lack of interest, not a lack of ability.

Up to this point, examiners’ definition of work as requiring information ‘rich’ paper documents has been accepted; the limited use of NOTES to share information about cases was an unfortunate but inevitable consequence of depending on paper case files. Yet, there

*This review was part of a general process within the Irish civil service and was imposed from without, rather as a felt need by senior management in the Unit.
are clearly many practices that could encourage sharing of information and knowledge in the Unit which are not used, and whose non-use cannot be explained in terms of 'rich' paper documents. The dependence on paper documents does not prevent the creation and use of discussion lists for exchanging information. Nor do the superior characteristics of paper files preclude the use of electronic files for collaboration between examiners. There are, of course, individual reasons which may be advanced to explain individual practices; for instance, it may be easier for two people to sit around a table looking at a set of paper documents, than to try to collaborate using the electronic versions of the documents. It may be faster to ask someone, in person, if they knew of a similar case than to search through an electronic list of precedents. Yet, there are also situations in which an electronic system provides complementary advantages, even if the electronic system cannot replace the paper system. If the other person is not available at the moment, an annotated note on the electronic file could be better than no discussion at all. A search through the precedents' database is more efficient than asking only the one or two people who are immediately available for consultation, and missing the other people who may have the relevant knowledge. There are many examples of individual practices which all have the same consequence: the private control of information. This suggests that the desire to maintain private control of information is a general principle at work. There is sufficient technological expertise on the part of users, and sufficient design sophistication in Lotus NOTES, to make information more generally available; when such information sharing does not take place, perhaps this shows that individuals prefer restricting the availability of information in the Unit, and use paper documents as another means by which this can be done.

There is ethnographic evidence suggesting that examiners may wish to restrict information. NOTES has undermined the monopoly which examiners held on certain kinds of knowledge. With open access to files, receptionists and junior staff can answer questions from clients and observe, from the files, what constitutes appropriate action. This has led to a more responsive organization, with greater job satisfaction on the part of those dealing with the public. Receptionists are now more 'professional' in that they are able to answer queries effectively. However, when examiners were overworked, a significant amount of responsibility devolved on junior staff. Examiners asked junior staff to follow up particular aspects of a case, and often expected them to decide how to proceed on a case. In practice, the distinction between junior and middle level staff became blurred. Junior staff had direct access to information about organizational activities, and participated in procedures and decision making processes, all of which made them part of the knowledge system. Some clerical staff suggested, in interviews, that they could do the job as well as examiners: 'one of the lads in there, C . . . , would be as good as an awful lot of people in dealing with cases . . . '. This blurring can lead to problems. If junior staff can, through observation, learn to do the examiner's job, why should they not have the responsibility and pay of an examiner?

The stories recounted by examiners about the benefits of paper files acquire a new significance in this context. When examiners give special privilege to paper over electronic files by elaborating on the expertise and experience necessary to interpret paper files, they also exclude clerical staff from acquiring knowledge and expertise about case work. The greater the dependence on paper files, the less scope there is for clerical staff to learn how examiners work. In contrast, the greater the documentation of the decision-making processes in the NOTES databases, the easier it is for clerical staff to learn to duplicate examiners' work processes. At issue is whether the work of an examiner is something that others could mimic or replicate, through observation, or something that needs special skills and knowledge, and this is being contested. The preceding quote suggests that junior staff believed that anyone could learn the work of an examiner. In contrast, one examiner was explicitly dismissive of this view, suggesting that it was academic qualifications and credentials that provided the knowledge and experience necessary to carry out the job. The examiner was concerned that the job of examiner was becoming viewed by junior staff, as a set of skills, that anyone could acquire through observation, rather than through training and experience. It is notable that the delegation of work to junior staff, which led to clerical staff acquiring both experience and expertise, was a temporary phenomenon, associated with a group of examiners who were, at the time, over-extended. In a visit to the Unit a year later, task separation between examiners and clerical staff had been re-established.

In the context of personal control of expertise, the minimal use of NOTES to share expertise and experience within the Unit becomes less puzzling. One examiner noted that people were quite 'custodial', sharing knowledge only on a 'need to know' basis. There are many reasons for maintaining control over information in this way. Information may be part of an organization's reward process (Orlikowski, 1992); sharing decreases the chances of promotion and prestige. However, this was not a feature of the Unit, since promotion and pay were determined by general civil service procedures. Another reason could be a desire not to document personal views, in case one could be held accountable, in the future, if someone used that information and found it unhelpful or misleading. It could
also be a desire to avoid public scrutiny of one’s informal observations. This may well be a partial explanation for examiners’ disinclination to document their knowledge, and is similar to observations made by Bowers (1995) about a work group in the UK civil service. Staff in the Unit were certainly aware that including personal opinions in a NOTES database could be risky; this was the reason why, in the design of the NOTES database, it was decided not to include personal comments about clients in case notes. It was felt that a personal opinion would become enshrined as ‘fact’, detached from the personality of the staff member and the circumstances of the particular interaction that gave rise to that opinion. If one person, on a bad day, had an unpleasant interaction with a client, it would be unfair that that was recorded in the file, thus conditioning future interactions with that client. It was also feared that if personal opinions were entered in files, such entries would be difficult to justify to a judge or jury, if the case came to court. However, just as the information ‘rich’ characteristics of paper case files explain only some work practices, so also an unwillingness to subject personal views to future accountability is only a partial explanation. It is not sufficient to explain the other restrictions on knowledge exchange in office discussion lists, which neither become part of client files, nor affect promotion prospects.

A more likely reason for this desire to control knowledge, of which information ‘rich’ paper-based case files are one manifestation, is poor staff morale in the Unit, with little sense of a common commitment to collective goals of the Unit. As noted, promotion was rare, and, in so far as there was promotion, the criteria for promotion were unclear, leading to suspicions of personal influence. There was very little sense, on the part of examiners, that senior management would welcome or reward examiner’s input into determining how to best achieve the Unit’s goals. There was little discernible reward, in terms of prestige or promotion, for documenting one’s knowledge for the benefit of others in the Unit. If anything, it seemed likely that personal opinions could become the basis for criticism, either by peers or superiors. More importantly, why lessen one’s claims to special experience and knowledge, when one has so few other benefits in one’s job? By and large, the rewards available to examiners are the intrinsic satisfaction of helping claimants and the prestige of demonstrating their own expertise in the process of helping the claimants. As noted, examiners work in isolation, and there is an emotional investment in particular cases, which may take months to solve. Small wonder that examiners might become ‘custodial’ about information.

Examiners not only demonstrate their expertise by their interpretation of paper files, a dependence on paper files also maintains a monopoly over the knowledge and expertise, in consequence of which, no one else can make the same interpretations of the ‘real’ story that they make. Their definition of work simultaneously sustains their status (potentially under threat from junior staff) and also prevents potential rivals as well as superiors from gaining any ‘ammunition’ since little information is available in electronic, and thus public, form. This is not to say that examiners are wrong when they assert that paper-based case records provide information not available in electronic format; it is to say that there are additional reasons for such assertions. If senior management in the Unit want to encourage the use of NOTES for collaborative work, or as a repository for individual experiences, then the structure of the organization needs to be changed. In a changed structure, examiners might find ways to make electronic case records useful, in ways different from the usefulness of paper-based case files.

Conclusion

This study has examined the use of Lotus NOTES in a relatively small, document-intensive, organization. In response to problems which senior management perceived as emerging with existing strategies for dealing with information, NOTES was installed as the office information system. Although NOTES became an integral part of the work process, and fulfilled many of the goals which senior management had set, NOTES has not provided the information sharing and knowledge storage functions which senior management had originally expected would take place. It is the paper file, rather than its electronic duplicate, that remains the ‘document of record’. It is clear, both from observation of work practices and interviews with workers, that work requires interpreting documentary information in paper files, and the information in the electronic version of a case file is inadequate for the work carried out in the organization. Examiners suggested that the limited use of electronic files was due to the ‘information rich’ characteristics of paper documents, and their need, in order to do their work, of this rich information. As a consequence of this minimal use of electronic case files, there was little scope for using NOTES as a collaborative work system or as a repository for organizational knowledge.

Ethnographic research has suggested additional benefits of paper documents, but also additional reasons for the minimal use of electronic case files. A consequence of the dependence on paper documents has been a limited use of NOTES to share information within the Unit. What appears to be a one-way casual relationship may be two-way and mutually reinforcing: limiting the distribution of information is important, and the con-
continued dependence on paper files is a means by which such limitation is achieved. This interpretation does not dispute that paper documents provide benefits, but users' conceptualization of paper documents as both information rich, and necessary for their work, is also conditioned by the negative impact which the use of electronic files would have on their status, vis-à-vis other workers. The minimal use of electronic documents fits into a general pattern of maintaining individual control over information in the Unit, demonstrated by a range of work practices. All these practices minimize the use of NOTES for collaborative work, and reduce the use of NOTES as a repository of organizational expertise and knowledge.

The case provides another example of why, in a transition from paper to electronic forms, data cannot be seen as isolated units, to be moved from one point to another. Not only is the human and organizational context of information use important, but users have to be seen as active agents in the way they incorporate, modify, or reject both information and information systems. The limited use of Lotus NOTES is neither a consequence of design faults, to be remedied by changes in hardware or software, nor of implementation faults, to be remedied by involving staff to a greater extent. Research has shown many reasons why paper documents are likely to remain important for the effective work of examiners. In addition, however, the 'information rich' properties of paper-based case files are partly a construction of examiners, deriving from the organizational implications of paper versus electronic documents. Paper documents are also 'rich' because this is how examiners have defined their work, in the face of a potential threat to their status by electronic information systems.

This article is not suggesting that electronic files are 'really' superior to paper files or that examiners are avoiding the use of a new and better information system. It seems clear that paper documents are more useful than electronic documents for a variety of purposes, but this is not the complete explanation for the minimal use of NOTES to exchange and store information. Despite the benefits of paper documents, Lotus NOTES could provide complementary benefits for examiners, and it is not used for these purposes. This suggests a more complex relationship between work and electronic versus paper documents than initially suggested by the 'information rich' view of paper documents. Management could take examiners' expressed need for paper documents at face value, and attempt to provide the 'affordances' of paper documents in an electronic environment. For instance, NOTES could be changed so as to display scanned images of paper documents, or to permit 'informal' annotations on an electronic document that do not become part of the archived file. This research suggests that such strategies will not necessarily enhance the use of NOTES. In response to such strategies, workers could respond by redefining 'work' so as to find new reasons why efficient and effective work requires paper documents, and thus continue to maintain private control of information. The benefits of paper documents for workers, in terms of occupational status and position, have to be taken into account in trying to achieve greater use of the electronic information system. If managers want to provide the benefits of electronic information systems, they must address the organizational factors which militate against the use of the system.' In this case, the perceived need to defend occupational boundaries discourages the use of electronic information to provide greater benefit for both the organization and its clients. Only changes in the structure of the organization would reduce this perceived need to defend occupational boundaries. If these changes were made, professional practices would become more flexible and one might then find examiners more inventive in their use of electronic case files as a complement to paper files. The organization would then obtain greater benefits from the information sharing and storage functionalities that are part of Lotus NOTES. However, it would appear that, in this organization at least, the managers have not yet had either the will or the resources to make the changes that are necessary.

'Such an analysis is in accord with many theories of work, such as socio-technical systems and contingency theories of organizations which have a long tradition, since the Tavistock school (e.g. Woodward, 1959; Trist, 1981), and continuing with recent use of sociological concepts such as structuration theory (e.g. Orlikowski et al., 1996), to name just a few.

Acknowledgements

This article has benefited from the comments from the two anonymous referees and editors for this special issue.

It was also feared that if personal opinions were entered in files, such entries would be difficult to justify to a judge or jury, if the case came to court.

References


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