

Work, Technology and the Small Office

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Despite a widespread belief that there would be a revolution in office work in the 1980s, there is now greater realism in the design community, and society at large, about the economic benefits we can expect from new technologies, and the speed of change.¹ Most academic discussion of these issues has been based upon case studies of working practices conducted during the design of advanced systems intended to support specialised tasks such as air traffic control, or the coordination of signalling and passenger information in control rooms on the London Underground (Harper et al 1991, Heath and Luff 1992). Research on ordinary offices has mainly focused on the issue of de-skilling, and this literature includes C. Wright Mills' (1956) vivid, morally driven account of the expansion of offices in post-war America, and a series of studies by left-wing writers about the effect of word-processors on secretarial work in the 1980s (for example, Barker and Downing 1980 and Murphree 1986).² There have, however, been few detailed ethnographic studies of how people work in ordinary offices (although see Suchman and Wynn 1984).

This paper will examine how technology is changing the nature of work in three small businesses located in a medium-sized town in the South East of England: a letting agency, a recruitment agency, and a firm of estate agents. The letting agents have not adopted the new computer packages which are widely used in this industry, because they believe they can work more effectively without them. The recruitment agents have recently been taken over by a large company which wants them to computerise their records, although they prefer traditional methods of working. The estate agents have enthusiastically embraced new technology, but still rely on paper-based systems to maintain records, and organise their work.

The paper begins by contrasting the dream, which has informed the work of computer designers, and senior management in many companies since the 1960s, about the 'office of

the future', or 'paperless office', with the reality one finds in most offices. It then explains the methodological basis for this study of three small offices, which employs ethnomethodological techniques to address how people use technology as part of their everyday work. The next part of the paper looks at some aspects of work in the three settings. It then describes how the three offices responded differently to new technology, what computers cannot do in these workplaces, and the problems caused by system failures. It concludes with some observations about the need to ground sociological observations about technology and social change in studies of what is happening in real offices, and suggests some avenues for further research.

Whatever happened to the office of the future?

The 'office of the future', or 'paperless office' is a concept invented by big technology corporations, like Rank Xerox or IDM, during the 1970s (Smith and Alexander 1988), and heavily promoted by government during the 1980s, when policymakers believed that they could create the conditions for long-term economic growth, by investing in new technology (Kraut 1987, Mumford 1986). The first stage was the replacement of type-writers by word-processors, which some commentators believed would lead to a massive reduction in the number of secretaries employed in organisations.³ It soon became clear that productivity gains were marginal, partly because most secretaries spend only ten percent of the day working on documents (Iacono and Kling 1996).

However, by the mid-1980s, many believed that three other developments would revolutionise the office. The first was 'groupware' -the range of computer software packages that allow professionals to obtain and manage information through their terminals (Forester 1990, chapter 7). The most widely-

¹ I would like to acknowledge the help of the Rank: Xerox Research Laboratory in Cambridge for funding this research (as part of their 'Emerging Office Environment Project'), and the help of the businesses mentioned in the paper.

² For a review of this literature, see Webster (1991).

³ There had been a similar revolution in America during the 1950s, when computerised pay-roll, and data-processing systems were introduced into large companies, and industries like banking and insurance. Despite fears of redundancies, white-collar employment steadily rose during this period.

used packages to date have been spreadsheets, which have replaced the central departments which used to distribute financial information in many companies. The second was the internet, which enables people to communicate within large organisations using electronic mail, or access the world wide web, and also makes possible teleworking, or other kinds of 'virtual organisation'. The technical and commercial problems in establishing networked terminals persisted into the late 1980s, but there is now a networked terminal on every desk in most offices.

There are again doubts whether these developments have greatly improved productivity, or transformed organisational structures, and traditional ways of working. Politicians have become enthusiastic about teleworking as a way of promoting family life, and reducing environmental problems; but most companies feel that it would reduce productivity, and only a small proportion of the population works from home (Huws 1993, Stanworth 1998). Large numbers of jobs have disappeared in white collar industries, but this usually follows mergers, and re-structuring designed to remove unnecessary tiers of management, rather than investment in new technology (Kling 1996a, Morton 1991). The world wide web may yet have a dramatic effect on how people obtain some services (like insurance and banking), but has not yet changed the nature of work in most offices.

Technological utopians continue to believe that other advances are imminent which will lead to a radical change in the organisation of work (Kling 1996b). It is assumed that the 'paperless' digital office, in which paper records are scanned into computers, will replace the filing cabinets, and paper-strewn desks one finds in most work settings. Scanners are already being used in large companies, and office equipment sold which combines the copier and scanner. Journalists and futurologists are already writing about the social transformation round the corner when everyone can access information remotely, including the contents of digital files, and communicate with computers by speech using voice-recognition software (Lloyd 1990).

In marked contrast to how these developments are presented by the marketing departments of large corporations who sell new devices to the public, in newspapers, and in the utopian and dystopian visions of novelists and

film directors, the computer-scientists who are most familiar with new technologies remain cautious about the transformative properties of computer systems. A series of studies conducted while new systems are being designed have found that technological improvements, while they might appear to have advantages, are not necessarily superior, and are often less effective than paper-based systems in managing the work (see, for example, Bowers, Button and Sharrock 1995, Harper, Randall and Rouncefield 2000).

Studying the Small Office

My reason for studying small high street offices was partly dictated by funding,⁴ S but also because it seemed sensible to begin looking at office work through simple ready-to hand examples. Why, after all, spend time travelling to exotic locations such as the headquarters of the International Monetary Fund, when one can find examples of how people use technology in your local high street? In terms of research design, I concentrated on finding three or four small businesses in different industries dealing with similar problems (which became visible during the course of fieldwork). I asked companies to allow me to spend a day in their office, and then tried to extend this access for as long as they were prepared to tolerate. This enabled me to spend two days in the recruitment agency, and four days in the other two businesses.⁵ Asking any kind of question in these offices was usually disruptive, in the sense that people were continually involved in, and focused on, their work. Nevertheless, it was possible to obtain a good understanding of office routines, and procedures, by observing people at work, and asking them to explain particular systems and documents when an opportunity arose during the day.

Mark Rouncefield, John Hughes, Tom Rodden and Stephen Viller describe their (1994) four day study of a small office concerned with taking conference bookings as a 'short and dirty

⁴ My project was funded by a large corporation which wants to develop new products for the small and home office.

⁵ I approached in total 22 estate agents, 22 recruitment agents, and two letting agents (all based in one town in South East England), to obtain access to three small businesses, which indicates the difficulties facing a researcher who wishes to conduct this type of observational study. The main reasons for refusing entry were lack of time, lack of space, fear that the study would be disruptive, and concerns about confidentiality.

ethnography', in contrast to the standards of sociologists working in the traditions of symbolic interactionism and ethnomethodology, and anthropologists, who often spend a long time in the field. In fact, this study is very informative, and illustrates that one does not require long periods of time to understand the basic processes in an office.⁶ One would, admittedly, require much longer to understand the tacit skills and knowledge used at work, but even here a few days in an office makes it possible to develop a preliminary analysis, through observing a wide range of situations.

Work in the three offices - an overview

If you visit the high street of any town, certainly in the prosperous South East of England, you will see a range of businesses that provide professional services, located between, or above the shops and restaurants. In Hightown, where I conducted this study, there are twenty estate agents, a similar number of recruitment agents, two letting agents, ten insurance brokers, and several firms of accountants, solicitors and surveyors. Some of these are part of large chains, but many are small partner-owned businesses which employ between one and ten people.

I gained access to three of these businesses: a letting agency; a recruitment agency; and a firm of estate agents. The letting agency ('Gordons') was a high street firm of eight people, owned by a husband and wife partnership. It was founded eight years ago, and the business moved to this office four years ago from smaller premises. It let about 600 properties, and the number of new lets was continuing to rise. The estate agents ('The Furness Graham Partnership') was one of three branches of a business which was founded six years ago (although the partners had been working in the industry for twenty years). It was the largest and most profitable agency in Hightown, with one hundred properties on its books, and business was growing. The recruitment agents ('Unit 7') were a three person office specialising in administrative and secretarial staff which was set up a year ago when a large American company, specialising in IT recruitment bought a small business in a

neighbouring town. They took over the client list but offered one member of this office, an American woman in her fifties (who had a good record of bringing in business) the chance to set up a new branch. In the previous year, she had built up a client list of a few hundred companies, mainly through cold calling, and establishing a relationship over time. The company fired the first two staff she employed after six months, because they were not bringing in business. She was training two replacements (both women in their thirties, who used to work in the leisure industry) with the aim of working part-time.

The basic nature of work in these industries has probably not changed substantially for two hundred years. Letting agents advertise and manage tenancies for landlords. Recruitment agents find workers for companies, and jobs for candidates. Estate agents value and advertise properties, and act as intermediary between vendor and purchaser during the transaction. I will now describe some aspects of this work under the following general themes: spatial organisation; tacit knowledge; office systems; and professionalism.

Spatial organisation

A defining feature of the small office is that it is small (although a large organisation can also be understood as a collection of small offices). The estate agents and letting agency employed, respectively, ten and eight people (although they each took on additional part-time staff over the weekend). The recruitment agents consisted of three people. The smallness comes from the fact that people work in face-to-face contact, and can often hear and see everyone else in the office. This allows information to be shared quickly, either through casual conversation, or simply over-hearing other people at work (see Heath and Luff 1996, Harper and Hughes 1993, Suchman 1996). It also allows files, and other documentary records, such as shared diaries to be located quickly, and passed around the office. Smallness has other uses. It allows managers to over-look other peoples' work, deal with queries, motivate and support employees, and notice problems and gaps.⁷ Finally, smallness

⁶ For an ethnographic study based on spending a long period of time observing one office procedure (in this case, dealing with callers at a reception), see Zimmerman (1971). This shows, in detail, the interpretive work involved in applying the rule of 'first come, first served'.

⁷ Researchers interested in surveillance and authority relationships have not so far investigated work in small offices. My impression was that employees were continually under surveillance, so the argument that introducing new technology will have sinister consequences seems misplaced. In terms of authority relationships, these all appeared to be democratic

makes it possible to create and sustain the team spirit necessary to generate sales.

Tacit knowledge

Tacit knowledge has been a central theme in ethnomethodological studies of work. It consists of the taken-for-granted commonsense and communicative skills, but also the specialised knowledge one acquires through becoming a member of an occupational group. This can include speaking a particular argot or 'small language' (see Rose 1993), knowing how equipment works in a particular laboratory (Lynch et al 1993), and sharing a set of typifications, and moral relevances (Sudnow 1965).

This kind of knowledge is difficult to study, and it can be argued that it requires sustained fieldwork to understand how routine work gets done in any occupational setting. One task that trainees learnt over a year in the estate agents and letting agency was how to value properties. This involved developing knowledge of the state of the market, comparable properties, and an understanding of different areas. This knowledge was shared among a team of people, but also required exercising judgement in each new case. This kind of judgement was also exercised when the recruitment agents selected people from their list of candidates to send for interview at a particular company. The factors taken into account included both the technical skills of candidates (their speed at typing, and experience with different packages), but also assessments of their personality ('quiet' or 'outgoing'), dress-sense ('rough-looking', 'really well turned out, career-aspirations, distance they would be prepared to travel, preferred salary, and sociability. A key criteria, which was used to match people to offices was whether a candidate was considered 'glammy' or 'unglammy'. The test of the agency's skill was whether companies thought that they were getting a good service (in which they only had to interview a few candidates), and gave them repeat business.

Office systems

workplaces. The quality of work in the letting agents and recruitment agents was maintained by managers who monitored the work, and also trained new employees. The estate agents were run as a self-managing team. Everyone appeared to be highly motivated, either because they had a stake in the partnership, or received a monthly bonus if the business was doing well.

These businesses can be understood in ethnomethodological terms as self-organising settings, in which work was co-ordinated through a number of procedures, routines and systems. These had evolved over time, through discussion in a series of office meetings, in response to problems created during the growth of the business. Compliance was treated as a moral matter: it required continuous care and effort to make the systems work.

Systems comprised both a set of informal understandings (which would be written down in work-flow charts, or company handbooks in larger organisations), but also shared methods of organising work. They allowed people to track tasks, make work accountable, and store information, and included the following:

Shared diaries and message books

The estate agents used a shared diary to record appointments, and allocate tasks in an early morning meeting. They also kept a shared message book (which could record up to eighty telephone calls on a busy day). Both books were colour-coded, so that agents could see at a glance what calls they had to return, and whether there would be sufficient cover in the office.

Checklists

Work in the letting agency was organised through a series of checklists. Before any property was let, a series of tasks had to be completed, including getting the landlord and tenant to sign various forms, and obtaining a deposit. Agents consulted a clipboard to see outstanding tasks, and cover-sheets on the files (known in the office as 'yellows') performed a similar function. A recurring problem for the office manager was that tasks were sometimes over-looked, due to the increasing volume of work. One proposed solution was a master check list to be kept inside the file, and consulted before any property was let.

Files

Paper files were maintained to store information in all these businesses, but they also had a similar function to checklists. One estate agent arranged offer forms, attached to files, on his desk as a challenge to his professional skills in negotiating an agreement (when the file could be returned to the cabinet). Files relating to new lets were kept in a plastic stacker, so that everyone could see outstanding work. They also

acted as a visible reminder of how the firm was doing: everyone received a bonus once they reached thirty new lets each month.

Tracking devices

Almost every member of these offices maintained a personal list of tasks which they ticked off during the day. There were also systems which made it possible for staff to keep track of work. Each estate agent had a ring-binder (called a 'pending sales file') which contained four page forms about each property where an offer had been accepted. Agents spent a lot of each day leafing through their own ring-binder, and identifying what action was required-to progress the transaction.

Similarly, routine work in the recruitment agents revolved around going through boxes of filing cards. Each agent had three sets of boxes relating to candidates, jobs and prospects. They were very familiar with these cards, and went through them at least once a day. This enabled them to identify companies and candidates they needed to telephone (to establish a relationship, or maintain contact) and possible matches between candidates and new jobs.

Professionalism

Professions have higher status (and charge higher fees) than ordinary occupations, by restricting entry to those trained in a body of technical knowledge, and regulating their members through an ethical code administered by a professional association (Becker 1970, Hughes 1971). One can, however, find elements of these traits outside the true professions. Here, being professional refers to an attitude towards work in which one aspires to provide a good service, and a desire to present an image of trustworthiness, and competence, to clients.

It may be that any researcher who approaches businesses with a request to spend time in their offices will end up studying happy work-places in which people are organised and conscientious about their work. Disorganised firms, which rip-off customers, and engage in shady practices are unlikely to welcome the sociologist. Certainly, all these businesses believed that they provided a better service than competitors, and that these were often unethical or incompetent in their dealings with clients. Examples of unethical behaviour included misrepresenting properties (by estate agents), and sending curricula vitae to companies without first checking with clients (by recruitment agents trying to gain an edge

over other agencies representing the same candidate). Incompetence simply meant not providing a good, personalised service. There were, for example, 'cowboy' estate agents, which put properties on the market, but did not assist in the difficulties that often arose between offer and completion. Similarly, there were recruitment agencies which employed 'young kids' who were asked to meet unrealistic targets without proper training.⁸

People working in these businesses came across as competent, polite, and well turned out professionals in their dealings with clients. The recruitment agents prided themselves on the friendliness of the office. The estate agents projected an image of being softly-spoken, serious professionals, which contrasts with the stereotype of the 'smarmy' or 'flash' agent one finds in the media. They spent a large part of the day smoothing out difficulties on the telephone between purchasers and vendors, after a sale had been agreed, by patiently acting as a go-between, and passing information up and down the chain.

Responses to new technology

Although often portrayed as a uniform process, computerisation is best understood as a whole range of responses to technological advances and economic pressures. These offices were all computerised, in the sense that they used word-processing packages to produce letters and documents. Twenty years ago, similar businesses would have used electric typewriters before the availability of cheap word-processors, and then the personal computer in the early 1980s. All the businesses had also paid consultants to design web-sites, and were responding to a growing number of e-mail inquiries from customers. They differed, however, in their response to the software packages which were being marketed in these industries as a means of increasing productivity, and adding value to the service provided to clients. The estate agents embraced this new technology, as a means of increasing profits. The letting and recruitment agents were, respectively, cautious and hostile towards new ways of working. They believed that computerisation led to a reduced level of service.

⁸ These businesses provided a poor service to their customers. However, it was still possible to make money, and even prosper, despite being inefficient or unethical, given favourable market conditions.

Embracing New Technology

The estate agents had made a decision, when they bought back their business from a building society after the last recession, to become the most technologically advanced firm in Hightown. They had invested in a software package which enabled them to send targeted mailings to 2000 prospective purchasers once a week. They also used digital cameras which allowed properties to be put on their website the same day, and used this as a selling point when they valued properties for prospective vendors. The objective was both to convey the impression to clients that they were a technologically go-ahead firm, but also to be more efficient than competitors, by freeing up time that could be used in smoothing out difficulties between vendor and purchaser. It was claimed that most estate agents expected one in three transactions to fail, whereas they had reduced this to one in ten. They believed that the success of the firm resulted from using technology intelligently, in a way that improved the service offered to clients, and increased profits.

This is evident from the following extract from an interview with the partner in this business who was responsible for buying new technology:

P: The skill is knowing what part of the Dew technology that's out there is actually going to enhance your productivity and business performance and therefore be reflected in the bottom line. You shouldn't go after it just for its technical brilliance. It's how you can interpret it in your business to increase your productivity and efficiency.

MT: Can you give me an example?

P: The technology is developing at such a vast rate, the kit that you bought last year can be obsolete now. We were waiting for digital technology to come in on cameras, as we went from having an SLR camera where you would go out with your Kodak film, take the picture, take it down to Snappy Snaps, they would develop it, you would go back the next day. Well, in the old days you used to send them away, it would take a fortnight. Then it was one hour turnaround, you'd come back, see the picture, say I want a hundred copies of that, go back down there, they'd have to print them, and then you'd have to have double-sided tape and stick them on the details, which is what a lot of agents still do. With digital, you just load it on, print it off, and you're there.

MT: How do you know what is available?

P: You'd keep researching, keep looking what's

around the corner, as to what product and technology we can purchase that can give us an advantage over our competitors. So we go to trade shows, and seminars and presentations. It's usually me that does that, then I come back and talk it through with my colleagues. They say why should we spend money on that, and if I convince them it's a good idea, we'll go for it. Sometimes, we take on things that we think might enhance our business, but they don't work out. There was an internet site called SCOOT that came out that we looked at that we didn't go to, there was a thing called Home Touch Television, where you would have monitors in the window that people would touch on a screen at night, you could have a TV screen that was glued to your window, and when people would look in a window they would see that, and instead of clicking on a mouse, they would put their finger on buttons.

There were three companies -it was called Touch TV, Touch to View and ...

MT: Was it too expensive?

P: We thought it was a good idea and we wanted to go with it, but in the end, we felt that the kind of people that would be walking up and down B Street, when we are shut on a Saturday night, would probably not be the kind of clientele [we wanted]. Whilst the technology was great, the actual idea of what they were doing was clever, but the people who would be using it. ... As I say, the sort of people walking up B St. at 11 o'clock on a Saturday night would not be looking for a half a million pound house in Gates. They'd be probably out of their brain and with a donner kebab in their hand, which is not the kind of punter that we were after.

This interviewee described the relationship between professional skills and technology in the following terms:

"Anybody can go down and buy the hardware which is cheap, they can buy the software which is relatively cheap, but you know you can give a Fenda stratacaster to a hundred guitarists but they are not all going to end up like Eric Clapton. You still need the skills and professional judgement. These are only tools, as a means to an end. We're going from ten navvies with shovels digging a ditch, to one bloke in a JCB. That's the way I look at it. Technology is allowing us to dig that ditch with less staff, less overheads, more efficiently, and quicker and better."

This business was continually on the lookout for ways to improve the quality of service, and remain ahead of competitors, either by investigating printer/copiers which could

produce better quality photographs, investing in a more expensive web-site, and researching new products. The partners believed that any business which failed to invest in new technology would 'go the way of the dinosaurs'.

Resisting new technology

The letting and recruitment agents had a very different attitude towards technology. They viewed it as something that was being forced on them, and might result in a lower standard of service to clients. The pressures experienced by the letting agents included the growing size of the business, but also the need to supply information to the Inland Revenue, which would be much easier to extract from a computer database. They had examined a number of packages, but felt that none could match the system of check-lists that guaranteed the quality of their work. They were also doubtful about the value of 'matching' packages as a technological aid, given that matching could be done quickly and effectively by ascertaining the needs of prospective tenants, and suggesting properties on their list. They had made a costly mistake in the early days of the business in purchasing an accounts package that turned out to be inappropriate, and still operated a manual system of bookkeeping that was cost-effective, despite the fact that all rental statements were produced by hand.

The recruitment agents were even more dubious about the benefits of computerisation. The American company which had purchased the business a year ago wanted them to keep records digitally so that they could share information with other offices. However, they resented the time it would take in entering data into the system (possibly an hour in addition to each hour spent interviewing clients). Matching software might be appropriate in IT recruitment where all companies required were the right technical skills, and personality was unimportant. For secretarial and administrative recruitment, however, matching by typing speed or experience with particular packages resulted in long lists of potential candidates. The manager believed that it made good commercial sense to send a few suitable candidates for interview, rather than adopting the 'spray and pray' approach used by other agencies.

What Computers Can't Do

These objections to computerisation are worth looking at in greater detail, since they go to the

heart of why there has not been a revolution in office work, despite massive investment in new technology. The limits of computers are obvious to people working in offices, even if journalists and government ministers wax lyrical about their transformative powers. This can be illustrated by considering two examples: the work of matching companies and candidates in the recruitment agency; and the continuing role of paper-based systems for the technologically go-ahead estate agents.

The work of 'matching'

Why did the recruitment agents prefer using boxes of filing cards, rather than a system of sharing the same information through a computer? One reason was simply that it took less time collecting information about candidates in this way. All the interviewer had to do was attach the client's curriculum vitae to the back of a card, and make a few handwritten comments which would bring the client to mind whenever the agent consulted the card. Cards also had physical properties that made them easy to work with. It was possible to leaf through cards, pass them around the office, or place them in an upright position in the box as a reminder to return to them later. Details of telephone calls to candidates or companies, and candidates sent for interview at particular jobs, could be written on the back of cards while an agent was on the telephone without disrupting the flow of work.

A sense of how work in this office was accomplished economically, using cards as a memory-jogging device, through sharing information that could not be easily formulated in so many words, can be seen in the following extract from my field notes:

Mary and Jenna are going through their boxes, looking at the CV s attached to the back of cards.

M: [Leaves a telephone message for one candidate to phone] It may be right up her alley. [Looks at more cards] :1 feel young girls would want to move on and be in a place with someone of their own age. What about MJ? .. No, she'd not want to go there. She wants somewhere with good prospects, and a really good company. How about FD?

J: Maybe

M: [] She's quite intelligent, and has done lots of study. She's academically minded.

J: I think she wants ...I don't know if it would be glam enough.

M: SK is absolutely brilliant, but we're talking

16K..What about JM one of J's candidates]?

J: What?

M: She's dynamic... What's the latest on JM?
She was after this job. They said they're doing it today. I mean they're lawyers.
Shall we give her a call?

B: Yes, [you do it] you know all about it.

M: [telephones JM] Hi, Unit 7, Mary speaking.
Do you have any news from your lawyers?
OK•I will tell you something about what has come in [leafs through company box and candidate box while speaking to her]. I'll tell you something about them. It's []. They need what I know you have, a bit of book-keeping experience, which I know you do have. They will need to spend some time updating the sales and purchasing ledgers. The phones are very busy, and you will be doing all the order processing... It's not a glam building. You need to go through the workplace, to get to the office. It's not for your Channel suits [laughs]. As I said, you'll be working for two brothers. They spend a lot of time out. They need a person who wants to spend a lot of time on their own...
OK, OK It's fine. I wanted you to say that not me [Continues looking through the candidates box]. OK, when are you seeing them? [Writes note about this conversation on the back of the card]. She doesn't want it. Give them SB, she'd sort them out.

Although these agents recognised the inevitability of the need to pool information about jobs in different branches of the parent company, they wanted to retain a personal way of working that was only possible in a small business. Computerisation was viewed as the imposition of a system that would result in less customer satisfaction, and less professional fulfilment than working with boxes of cards.

The persistence of paper-based records

The estate agents had computerised, and were looking to improve their productivity by technological means. They still, however, kept their records in paper files, and used paper systems like ring-binders, message books and diaries to organise their work.⁹ I have heard possibly apocryphal stories about offices where computers sit on desks, conveying an impression of technological efficiency to the public, which are never used. In this office, the data-base of property details formed an integral part of the work. However, agents employed

only a few of the tools available in this package to organise their work.

One reason for this was simply that there was no time to introduce new ways of working, when perfectly good systems already existed like a traditional diary. In the language of the entrepreneur, there would be insufficient marginal return on the cost of establishing a new system (which like paper-based systems requires a moral order to ensure that people use the system correctly). Research suggests that computers are not good at allowing people to do simple things, like coordinating their activities through a shared diary, keeping track of work by leafing through ring-binders, seeing outstanding tasks at a glance, or passing notes around an office.

The difficulty of establishing a truly paperless office is also evident from the manner in which agents gave information about properties to clients. All information, including colour photographs, was recorded digitally on the system, which made possible a weekly targeted mailing, and allowed agents to access information in the first few seconds of answering a telephone call. The technology allowed them to appear competent and professional, and was also used as a selling point in marketing the firm. Nevertheless, when a client came into the office, it was usual practice to obtain particulars of sale from paper files. This is because the estate agents, like the recruitment agents, did not want to lose eye contact by fiddling around behind a screen.

Problems with computers

A further reason for maintaining paper-based records is that the computer systems in these offices regularly crashed, or developed minor faults. The mass publicity surrounding the 'millennium bug' conceals a mundane reality in which computer systems constantly develop minor and major faults, and require expensive servicing. The minor problems experienced by these businesses included difficulties in sending e-mails, and the fact that it could take a long time opening or closing files. Major problems were system 'crashes'. The letting agents were used to these happening on a regular basis, although it only took five minutes to re-boot. Another branch of the estate agents experienced a system failure that lasted three days.

The recruitment agents had been taken over by a large company with its own IT department, which responded to problems quickly. Most

⁹ See Harper and Sellen (1995) for discussion of why people prefer working with paper in offices.

small businesses have to fend for themselves, since there is usually no after-sales support provided by distributors or manufacturers. The estate agents employed a computer consultant. The partners in the letting agents relied on the son of a friend who was doing a computing degree. In each setting, managing the technical problems created by the computer (including periodic crashes of the entire system) had become part of day-to-day work.

Conclusion

This paper has been unashamedly descriptive in providing an account of some aspects of work and technology in three small offices; this is because I believe, in common with symbolic interactionists, ethnomethodologists, and others working in the field of computer supported cooperative work, that one cannot address theoretical questions about technology, de-skilling, entrepreneurship, authority relations, the surveillance society, professionalism or social change, without conducting observational studies in ordinary work-places (see Button 1993, Engestrom and Middleton 1996, Star 1996). Perhaps the most striking finding of work-place studies, especially when compared to the futuristic predictions of popular science writers, journalists and government ministers, is that there are no simple technological solutions to improving economic productivity. Ethnographic accounts about the introduction of new technology in large organisations have shown how traditional, craft ways of working cannot easily be replaced by new computer systems. Putting a computer in every office will not, by itself, improve either business performance, just as putting a computer in every classroom will not raise levels of educational achievement.

This study of three small offices supports this finding. The letting and recruitment agents believed that computerisation would result in a lower level of service, and even the technologically-progressive estate agents used new technology selectively, and valued traditional professional skills. The secret in running a successful small business is not simply investing in the latest technology, but having a professional attitude towards work, and knowing what technology is right for your business.

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