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Knowledge, culture and community: limitations of place in the information society

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Knowledge, culture and community: limitations of place in the Information Society

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ABSTRACT

Knowledge is a fundamental aspect of the Information Society. The growth of 'knowledge management' in organisations is indicative of knowledge's new commodity value. Equally fundamental, in the Information Society, is the sharing of knowledge between people in different locations. Yet, increasing discussion of 'tacit knowledge', as well as knowledge management, indicates a realisation that both the management and transfer of knowledge is a complex issue. Knowledge is embedded in social and cultural structures that may be place-dependent, and not easily replicated electronically. Culture, practice, and community are concepts which can usefully describe these structures in which knowledge is embedded. These structures must be successfully created and maintained electronically, if the Information Society vision of making distance irrelevant is to be fulfilled. In this paper, knowledge 'work' in organisations, especially organisations in a geographically peripheral society such as Ireland, will be discussed, exploring the embedded nature of knowledge in structures of place and space. Particular attention will be paid to the use of Lotus Notes, the premier groupware or CSCW system, as a means of sharing knowledge.

Introduction

There has been discussion, almost to the point of boredom, of new information and communication technologies (ICTs) annihilating time and space, permitting information to be communicated between distances and with minimal delays or costs. Yet, ICTs annihilating space is not all that new: the telegraph, telephone, radio, and television have all done, on both a one-to-one and one-to-many basis. Time has also been under threat, for some time, as communication costs drop, communication speeds increase, new technology provides an ever stronger sense of personal 'presence', and the cost of accessing these technologies reduces. Up to now, however, communication has remained tied to a particular place or location, because technologies have linked places rather than people. Telephones, computers, and televisions are all tied to particular locations, regardless of the person using the technology. Now, however, place is now also less 'secure'. Email is sent and received in such a way that neither sender nor receiver are tied to a particular place, or even identified as linked to any location. Mobile phones, as compared with land lines, link individuals rather than locations, finishing a process began with remote access answering machines. It is now no longer necessary, or sometimes even possible, to know where a person is, when communicating with them.

However impressive these new technologies are, it may prove easier to annihilate space than place. The extent to which place provides an important context for information to be meaningful is a common focus of study. Some studies observe the relative weakening of 'place' as the context in social interaction and investigate the impact of this weakening, while other studies chart the re-creation of 'place' in cyberspace. This problem of place, context, and meaning has particular implications in the new global economy of dispersed work and knowledge management. Organisations with dispersed offices need to co-ordinate activities and promote communication

among workers who may be based in a variety of physical locations. Much of the recent technology investment in business is intended to improve both communication and co-ordination amongst workers, and many studies have examined the way technology can encourage, or inhibit, such communication and co-ordination.

Computer supported cooperative work

The current economic environment requires flexible organisations and individual responsibility. Groupware suits this matrix style organisational structure, by providing a technical support for flexible and adaptive organisations. Groupware is a generic term for information systems designed to facilitate the exchange of information among individuals, and is understood by managers in the context of office automation system, enabling tasks to be carried out more quickly and efficiently. For organisations which have invested in computers to enhance productivity, it has been a logical next investment. Information about organisational processes or products are valuable resources which need to be disseminated, so that the organisation as a whole can benefit.

There has been a significant amount of research to improve the effectiveness of groupware products, and this general area is known as computer supported cooperative work (CSCW). Much of this research has emphasised individuals' work practices, and the difficulties of duplicating those work practices with electronic systems (e.g., Hughes, Randall, Shapiro 1991, Suchman 1987). Such research takes, as its starting point, normal work practices and the different understandings which people have of these work practices. Often, such studies illustrate the difficulties of mirroring work in any CSCW system, as well as documenting staff's responses to inappropriate information systems. These problems often relate to aspects of work that are difficult to support electronically, such as non-verbal communication aspect of work exchanges or the non-work activities that create the trust and mutual understanding that underpins work.

Often, work practices are studied prior to the introduction of a new system, so that the system can be designed to support or 'improve' those practices. Alternatively, studies take place after the introduction of a new system, to see how work practices have altered or been redefined and to evaluate the effectiveness of the new system. Less frequent are studies in which it has been possible to compare, synchronously, non-CSCW work practices with CSCW enabled work practices. Often, one can, at best, look at the introduction of a new system and examine 'peripheral' practices that are not the direct targets of a new system, but might or might not be incorporated into that system. Synchronous studies of organisations in which workers are permitted to use either 'traditional' as well as CSCW practices, are of great interest since they illustrate individuals making decisions when both options are equally available to them.

Thus, it is of particular relevance to examine an organisation in which a CSCW system was introduced into a core business area, but was available as an option, rather than as a required work practice, even in that core area. For instance, an organisation which introduced an electronic system to manage work, but which maintained the previous paper system, so that workers used a dual system, duplicating work between systems. Since staff would have free choice which system to use as their primary system, their choice between electronic or paper media would be a consequence of their own evaluation of benefits and costs of each media, on a case by case basis. The choices they made, and the reasons given for those choices, would be of relevance because of the freedom which users had in making those choices. The information such a study provides is of particular relevance, given recent studies in CSCW which emphasise the limits of such electronic systems to enable cooperative work (e.g., Bowers 1995, Ciborra 1996, Rouncefield, Viller, Hughes 1995).

The Section

In 1991, the use of a groupware product, Lotus NOTES, in a small, semi-autonomous section within a department of the Irish Civil Service was studied (see Komito 1998b for further details). Lotus/IBM NOTES, as a product, is a flat database; but one into which a variety of information (text, graphics, sound, scanned documents, links to other files) can be "stuck", and which provides shared and secure access to information through client-server, distributed databases. In addition to common access to documents for collaborative work, there is an integrated electronic mail system, and the potential for bulletin board style electronic discussion lists, as well as distribution lists. Though marketed as 'groupware', NOTES, like intranets, provides access to documents and other information through a uniform, and easy to use, interface. It is especially suitable for systems in which a large number of documents need to be classified and then accessed using different criteria, and where those documents need to contain free-form, variable length, as well as fixed-length, data fields. It also incorporates security procedures to control different levels of access to information in the databases.

Management in the Section was interested, one year after the introduction of Lotus NOTES, in an evaluation of NOTES' impact and effectiveness in improving communication, co-ordination, and control of both knowledge and records within the Section. A joint research agenda was agreed, and data came from three months of ethnographic participant-observation, involving observation of work practices and social interactions. Interviews of about one hour duration were conducted with each staff member. Staff members also completed two surveys: one a survey of work and social interaction with other workers via face to face, electronic mail, and telephone, and the other, a ranked list of social and work contacts. In addition, logs of email traffic over a two month period were examined. Survey data and email logs were the basis for social network analysis (Killworth and Bernard 1974, Bernard 1988, Wasserman and Galaskiewicz 1994).

The Section exists to examine disagreements between citizens and other sections of the Department regarding claims by citizens for various services or benefits. The work is organised in terms of cases; each case is a disputed decision. The Section is composed of about thirty-five civil servants, who are on three 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; there are about three to five clerical staff in large open offices. The Section, like the civil service generally, has a hierarchical structure. There are, roughly, clerks, examiners, and senior examiners. Each case is handled by an examiner, who may have 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 the Head of the Section for final approval.

The Section is structured vertically, with three separate sub-groups, 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, whose work is largely determined by requests from examiners for further information. There are general rules regarding procedures for investigation, but 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 sub-section, as he or she desires.

The existing system of paper files was been maintained, in addition to the electronic NOTES system. The Section thus operates two concurrent systems, one paper based and the other

electronic. Individuals can use either system, as long as the results are duplicated in the other. Thus electronic entries are printed and entered in the paper file, and paper entries are either scanned or otherwise input into the electronic system.

All staff have access to (and are competent to use) electronic mail, as well as the telephone and face-to-face interactions for both work related and social discussions. In addition to the traditional, hard-copy bulletin boards, electronic bulletin boards are available for notices, and electronic discussion lists exist as a potential complement to tea-break and lunch-time discussions. Finally, there are general 'knowledge based' bulletin boards, where ideas, suggestions and so on about the work of the Section, or specific sub-sections, can be posted and discussed.

Electronic mail and social networks

In the initial enthusiasm for electronic mail, it was suggested that electronic mail would reduce organisational hierarchy and cut across boundaries within organisations (Sproull, Kiesler 1991). While conscious of the restrictions of the medium (a lack of non-verbal information, and a tendency to disassociate the messages from the people sending them), there was the hope that increasing the 'richness' of the medium would also increase its effectiveness, as a complement, or perhaps replacement, for face to face communication. In more recent times, the different modes of communication as seen as complementary: there are some things best suited for face to face communication, while other tasks can be effectively carried out via electronic mail.

In the case of the Section, electronic mail, the telephone, and face to face contact are available to all members of the Section. Employees in the Section were asked to list people with whom they communicated, for both work and social activities, and to also list the means by which they communicated with these people (phone, email, or face to face). The pattern of work communication was hierarchical, going up and down within sub-group in the Section, but rarely across sub-group boundaries. Social communication, on the other hand, was horizontal, linking people of equivalent work status, regardless of which sub-group they were in. This pattern of communication was replicated in phone, face-to face, and electronic mail communication. Instead of electronic mail being a counterweight to traditional hierarchies, electronic mail in this organisation tended to reinforce, rather than circumvent, other communication patterns within the organisation. The extent to which electronic mail followed pre-existing communication patterns suggests that people emailed those with whom they already had a 'context'.

It may be argued that people were simply contacting those they needed to contact for their work, and it doesn't matter whether it is via email or phone. Yet, the preferred mode of contact (as stated in interviews and survey responses, as well as demonstrated by email logs) was face to face or phone; electronic mail was not seen to be as effective. This is not self-evident, since electronic mail has advantages over face to face contact in some contexts - it is not intrusive, it can be used to control and restrict the content of communication, it constitutes a record of contact, and so on. It might be expected that people would use one versus another mode of communication, based on the particular situation. Yet, in the Section, email was not just secondary, it was virtually non-existent. An examination of email logs over 12 weeks showed an average of only 2.5 email messages per person per week. Even that small amount is deceptive. Out of about 30 staff in the Section, one accounted for twenty percent of all email messages sent, and three other members of staff received, between them, 50 percent of his messages. Eight pairs of staff were responsible for nearly 30 percent of messages.¹ The majority of email messages were confined to a group of eight junior members of the Section. This group existed as a small social clique, with shared understandings and contexts, and short one line messages were both a way to enhance that in-group membership, and also were more easily understood because of that in-group membership.

The email was used for social purposes (jokes about other staff, arranging to meet for lunch) and not work.

In terms of work, face to face contact and the telephone were seen as so superior that, not only was it the preferred mode of contact, but, if the people were not available, they did not then use email as a backup, they simply waited until the people were available. Email was not simply an inferior but acceptable alternative to face to face contact; it was unsuitable and was avoided. Work related communication, it was thought, required face to face communication, or, at worst, phone communication.

There may be good organisational reasons for avoiding the use of electronic mail -- for instance, a fear of documenting informal discussions. If that is the reason, this suggests important limitations to the use of new technologies to support dispersed work groups. In addition to a minimal use of electronic mail, the collaborative function of Notes was also under-utilised. For instance, it was rare that people would simultaneously look at the same electronic file and converse, either via telephone or electronic mail. If a case was to be discussed, one person came over to another, bringing the paper version of the file with him or her. Nor were the public discussion databases utilised. While there was a database for documents or comments of general office interest, people would consult it rarely, if at all. There was little evidence of any attempt to store information that other examiners might find useful, such as procedures, individual characteristics of persons in sections under investigation or so on. Thus, any new member of staff would have to 'read into' his or her new job and slowly accumulate the expertise and experience that the previous incumbent took with them with they left.

Technological impediments to shared knowledge

The minimal use of electronic mail and electronic discussion lists raises the issue of sharing knowledge within the Section. Ethnographic observation and interviews indicated that relatively little information was shared amongst members of the Section, and, in so far as information was shared, it was done on a personal, one to one basis. This is an obvious impediment to making information available to all members of a dispersed work group, and so warrants further investigation.

There could be a variety technical reasons for not sharing information via Lotus/IBM NOTES within an organisation: staff may not have received sufficient training to feel comfortable using the software, the screens may not of sufficient size or clarity, or the interface may be poorly designed, making the program inappropriate for current work practices. These are the types of problems which are solved by examining work practices and improving the information system so that it will support existing, or newly introduced, practices. In the case of the Section, however, such technological obstacles were only partially relevant. Staff were comfortable using the software, and were delighted with some aspects of it (especially the control it gives them over their own work schedules). However, they did find that it was more difficult to 'browse' an electronic file composed of multiple 'pages' than a paper file. One member of staff commented that he would lose track of NOTES entries longer than a page:

[I] can't hold it, and can't flick back...

He then said, 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 ...

Thus, some technological improvements would be necessary, if staff were to depend on electronic documents.

Yet, these particular problems would not prevent staff from using discussion lists to share ideas or information, and such discussion lists were also rarely used. There was clear evidence that the minimal use of discussion lists was not related to training or interface issues: when the Section was undergoing a review of organisational structures, staff were invited to participate in an electronic discussion using a public database. It was possible to make anonymous, as well as attributed, comments. The database was widely used by staff, with anonymous contributions outweighing attributed ones. The minimal use of public databases to share information in other contexts was the result of disinclination, not inability.

In addition to technical or training obstacles, there could be work related obstacles to the electronic sharing of information. The work of the Section revolves around "the case" - the complaint made by a member of the public regarding services provided by another section. 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 depended on the paper file to imagine or visualise the conflict between appellant and the relevant section or body, and to 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 or narrative, which was 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 visualise information about a case from the electronic files. Paper files were seen as documents which, layer by layer, had a history, while electronic files had been stripped of their uniqueness. In electronic files, all entries look the same and all 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"; there is no way to compare different entries and the examiner is denied contextual information. Electronic data is sanitised and emptied of significance; the end product may be available, but there is no means by which the process can be deduced. In terms of the 'information-rich' debate: paper documents are 'richer' in information content than their electronic equivalents, and workers are using the system best suited for the tasks at hand. If one wants to discuss a case with another member of staff, both would want to see the paper file, which means that the members of staff have to be in the same place, and probably at the same time, in order to collaborate. In the physical file was crucial for work, this implies limitations to utility of an electronic system to make information available to dispersed work groups, since physical documents have to be located in a single physical space.

Knowledge management

In the case of the Section, regardless of technological improvements so as to provide greater 'richness' for electronic documents, there remains the twin problems of an inability as well as unwillingness to make information 'publicly' available electronically (public within the context of the Section, that is). In terms of inability, it is the context which the physical documents provide, which makes the information in files meaningful for staff in this Section. Regardless of the

technological improvements, the physical embodiments of information remain crucial to their effective work. There may be contextual information that simply cannot be embodied by, or encoded into, an electronic system, but which may be none the less necessary, if information is to be meaningful.

In addition, the disinclination to share information using public discussion lists (e.g., by providing hints, ideas, or suggestions to others) also suggests an unwillingness to share information. The unwillingness may derive from a fear regarding the danger of context-free information. Staff preferred to maintain knowledge in their heads rather than impart it to an electronic system and lose control of it. If knowledge that resides in people's heads, based on their own experiences, is encoded into an electronic system, can individuals still maintain the control over who has access to it, and how that information is interpreted by others?

A specific example illustrates this issue. When Lotus/IBM NOTES was being adapted for the Section, it was suggested that 'difficult' individuals should be flagged as such in the case database. This would warn others in the Section, so that anyone dealing with queries from that person regarding their case would be especially 'careful'. The suggestion was abandoned, for two reasons. First, there was a concern that, if a court ever had to adjudicate on a case, the use of such notations would be difficult to defend. A second, more interesting reason, was a perception such labels were inappropriate in a public database, derived, as it was, from one staff member's interaction on one particular occasion. That is to say, it was felt that detaching the interaction from the particular context of the event would transform a personal opinion into a formal judgement. It was better, it was thought, for people to make their feelings and experiences known, informally, so that others would know the full context of who made the judgement, why, and in what context, and could then decide, for themselves, how to interpret the information.

Research also suggested another reason for not making information widely available: a desire to preserve one's own status by restricting the ability to make decisions. By virtue of the electronic information system, junior staff have direct access to information about organisational activities, and participating in procedures and decision making processes makes them part of the knowledge system. Examiners asked junior staff to follow up particular aspects of a case, and often expected them to decide how to proceed on a case. Especially when examiners were overworked, a significant amount of responsibility might devolve on junior staff. In practice, the distinction between expertise and experience of junior and middle level staff was becoming blurred. 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...". But, when there appears to be little mystery as to how 'experts' do their job, how is the lower status position of junior staff to be justified? After all, if junior staff can do the examiner's job, why shouldn't they have the responsibility and pay of an examiner? At least one examiner also commented on this perception that junior staff could do their job; the person emphasised the importance of training and experience, rather than just reading about cases in files. Perhaps there was good reason, as one examiner noted, for people to be quite "custodial", with sharing of knowledge on a "need to know" basis: they wish to protect themselves by protecting their knowledge. In such a situation, it is unlikely that any distributed knowledge system will succeed, and that, despite the claims of new technology making place irrelevant, people will not wish to lose control of their knowledge and experience (see Komito 1998b for a more detailed discussion).

Culture and knowledge

This discussion of Lotus NOTES has illustrated both technological and organisational impediments to sharing information via new technology. These are common problems, and ones

which software designers and organisational change consultants are often employed to deal with. Thus, it has been implicit in the preceding discussion, that the overt objections which examiners raise to the sharing of information are not the 'real' reasons. Whatever they say, examiners 'really' want to maintain their control over information and thus safeguard their position in the organisation. Since the electronic system would threaten this control, they find reasons for not using it. While such an interpretation of their practice may be valid, it is also possible that their overt objections have validity. That is to say, their experience actually cannot be replicated electronically, this experience is necessary to do their job, and it is difficult, if not impossible to make such experience available in an electronic format. This suggests that is a problem of tacit knowledge, knowledge which is difficult to articulate and perhaps impossible to explicate.

The problem of tacit knowledge is part of the wider issue, central to many organisations, of knowledge management. In its superficial form, knowledge management means using technology to keep track of the current versions of numerous company documents (sales reports, technical solutions to previous problems, and so on). In a less superficial form, knowledge management means documenting the experience, ideas, and so on that individuals acquire in the course of their work, so that this experience is available to others in the organisation. In an organisation that is physically located in a single place, knowledge management is less likely to arise as an issue, since people can share information on a face to face basis. It is when people are working in different locations, or at different times, that electronic systems must be need to provide what face to face contacts previously provided. If, however, people are either unwilling or unable to making such information available in electronic information systems, then the use of information systems to support distant work will be limited to the sharing task-based queries or the sharing of data, but not the sharing of knowledge.

The evidence from this study is indicative, rather than conclusive, suggesting limitations to the sharing of knowledge. When given a choice, staff use phones or face to face contact, and avoid email. They use paper documents rather than electronic documents. They share tips and shortcuts on a personal basis, rather than formalising them in a public database. Perhaps there are particular reasons for each example of not using NOTES, which can be rectified by improved interface in one case, or changed organisational reward structure in another case, or more sophisticated software in a third case. Yet, there is an overall theme here. Time after time, they do not simply regard the electronic system as second best alternative, but as a non-viable alternative. Yet, this is not an office composed of technophobes; staff are able to use the technology and, in terms of day to day work practices, consider the Lotus/IBM NOTES to have improved their efficiency and effectiveness. They would not return to the non-electronic days, and do not worry that their jobs may be eliminated by the technology. Yet, they still do not use the technology to share knowledge, but only for relatively narrowly defined and restricted task based activities.

Perhaps this apparent limitation to the sharing of knowledge is not necessarily all that surprising. Organisational knowledge really means the experiences that people share in an organisation, the ways of doing things, and this depends on the trust that develops among workers, especially the trust of how others will use any information given to them. This begins to sound very much like a culture or a community: a group of people who know that information is framed by all members in the same way, and thus interpreted and used in the same way, and a group of people whose shared experiences has created trust. This is sharing of both cognitive and affective information. Sharing such knowledge among a dispersed group of people is depends not on creating a virtual organisation, but a virtual community or culture.

Is it possible to create and sustain a common culture or community without common place? The extent to which culture and community is based on place, and so difficult to replicate in a virtual

environment, is hotly debated (see Jones 1997, Loader 1997, Komito 1998a). There have been long debates about attempts to explicate, and then replicate, the cultural knowledge of a proximate community (Hughes, Randall, Shapiro 1991, Suchman 1987, Tyler 1969, and Werner, Schoepfle 1987, are examples from both cognitive anthropology and ethnomethodology); the problems encountered in these attempts would make one cautious about the prospects for virtual groups. In which case, attempts to share knowledge that has been extracted from the context of place is also likely to be less than satisfactory. While there is much that new technologies can do to render time, space, and even place, unnecessary, limitations still remain. Knowledge and experience may remain tied to time and place, regardless of technological advances.

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¹ This is particularly striking since, with thirty-two members of staff, there are over one thousand possible pairs of email correspondents. Yet eight pairs were responsible for nearly 30 percent of email traffic, and those pairs included just seven people out of thirty-two.