



Graeme Currie and
Maire Kerrin

*Nottingham University Business School and
City University*

The Limits of a Technological Fix to Knowledge Management Epistemological, Political and Cultural Issues in the Case of Intranet Implementation

Abstract *Our paper examines issues of epistemology, power and culture with respect to their impact upon the use of information and communication technology (ICT) to manage knowledge within an organization. Utilizing an empirical case study of a global pharmaceutical company, in which the implementation of an intranet failed to meet aspirations of the Chief Executive that employees freely share knowledge, we encourage academics and practitioners to reflect more critically upon the limits to technology in pursuit of knowledge management. Our study illustrates that 'technical fixes' to knowledge management issues merely harden existing practices and routines, rather than open up new directions. In particular, broader organizational issues of power and culture may mean that employees are unwilling or unable to share knowledge and, beyond the epistemological problem, this is likely to further inhibit the contribution of ICT to the management of knowledge. Key Words: culture; epistemology; intranet; knowledge management; power*

Introduction

Our paper examines issues of epistemology, power and culture with respect to their impact upon the use of information and communication technology (ICT) to manage knowledge within an organization. Utilizing an empirical case study of a global pharmaceutical company, in which the implementation of an intranet failed to meet aspirations of the Chief Executive that employees freely share knowledge, we encourage academics and practitioners to reflect more critically upon the limits to technology in pursuit of knowledge management. Our paper contributes to

recent calls for academics to return to some of the earlier critiques, which highlight epistemological, political and cultural issues surrounding the notion of knowledge management (Swan and Scarbrough, 2001). More specifically, our paper contributes to the need for more critically informed, empirically based research to examine the introduction of formalized knowledge management systems which are ICT based (Hull, 2000).

ICT and Knowledge Management

Epistemology

An assumption that knowledge is an object, and can be codified and distributed, underpins the linked fields of computer science and information systems. These fields form one of the crucial components of knowledge management (Chumer et al., 2000). As a result, the growth of knowledge management has been closely tied to ICT. The focus of the ICT perspective has been on the development and implementation of knowledge bases, knowledge webs and knowledge exchanges. Many organizations have moved towards a central repository of some form, such as a Lotus Notes database, or a series of internal web sites—an intranet (Ruggles 1998). The ‘dream’ of executive management in utilizing ICT is that ‘when one person learns something, everyone else in the company knows it’ (KPMG, 1999 in Chumer et al., 2000: xviii).

The epistemology that underpins many attempts to manage knowledge through ICT is that of an ‘information processing’ epistemology (Roos and von Krogh, 1996). Within this epistemology, knowledge and information are viewed as synonymous and the emphasis is upon how knowledge-as-information is best stored, retrieved, transmitted and shared (e.g. Gates, 1999; Lehner, 1990; Terrett, 1998). Any initial discussion about what knowledge is, compared to data or information, is glossed over. ‘The logic seems to be . . . “we don’t know what knowledge is but it seems to solve problems in a functional way, so let’s use it anyway”’ (Alvesson and Karreman, 2001: 999). Following this, it is assumed that ‘knowledge is a valuable “thing” in its own right that can be abstracted, captured, shared around and managed’ (Swan and Scarbrough, 2001: 914).

The information-processing epistemology reflects a Cartesian tradition which, first, emphasizes the role of the individual, rather than the group, insisting that learning takes place in an individual’s head. Second, it privileges explicit over tacit knowledge—that is, it views explicit and tacit knowledge as two variations of one kind of knowledge, not separate, distinct forms of knowledge (Cook and Brown, 1999). From this point of view, it is possible to convert tacit knowledge to explicit knowledge—that is, codify it—for the purposes of representation through ICT (Hansen et al., 1999; Nonaka, 1994). However, such epistemological assumptions are misplaced. Even within the computer science and information systems fields, particularly from a human–computer interaction perspective, it is increasingly recognized that most current software tools for knowledge management have more to do with new ways of storing and communicating information than with actual ways in which people create, acquire and use knowledge (Milton et al., 1999). Using ICT, rather than a solution to knowledge management, may represent ‘the great trap in knowledge management’ (McDermott, 1999: 104).

A major trap is epistemological assumptions about knowledge as an objective, portable and manageable commodity (Swan and Scarbrough, 2001). 'It is no coincidence that these technologies are referred to as information technology, since they deal primarily with information, rather than with knowledge' (Milton et al., 1999). The limited role of ICT in knowledge management, it is argued, is related to the fundamental character of knowledge (Hislop, 2001; Tsoukas and Vladimirou, 2001). So, foremost, 'managing knowledge becomes an epistemological issue' (Roos and von Krogh, 1996: 334).

Debate about the epistemology of knowledge focuses upon a number of issues—knowledge as a 'flow' and not a 'stock' (e.g. Fahey and Prusak, 1998); that knowledge is embedded in practice (e.g. McDermott, 1999); that knowledge is context-specific (e.g. Tsoukas, 1996); that knowledge is tacit (e.g. Polanyi, 1966); that the creation of new knowledge is closely connected to action (e.g. McDermott, 1999); the importance of community as an arena in which knowledge is created (e.g. Lave and Wenger, 1991); and distinctions between know-what and know-how (e.g. Brown and Duguid, 1998). These issues are interlinked, some overlap, and there is a high degree of convergence in discussion of characteristics of knowledge from the epistemological perspective other than that of information processing. Useful to bring the debate together is consideration of an epistemology of possession and an epistemology of practice (Cook and Brown, 1999). We do not wish to attribute a false coherence to the literature that discusses the nature of knowledge. Nevertheless, distinctions between the narrow epistemology of information processing and the epistemologies of possession and practice provide a useful heuristic device to discuss the characteristics of knowledge and knowing, compared to, for example, information, with respect to their implications for ICT.

Borrowing from the epistemological perspective of American Pragmatist philosophers (Dewey, 1934; Hickman, 1990; Rorty, 1982), in general an epistemology of possession focuses upon what is known—that is, the knowledge possessed by an individual or a group. This includes tacit knowledge, which is significantly different from explicit knowledge. An epistemology of practice takes ways of knowing as its focus and concerns itself with the action of individuals and groups. Knowledge and knowing are not competing, but complementary and mutually enabling. 'The source of new knowledge and knowing lies in the use of knowledge as a tool of knowing within situated interaction with the social and physical world . . . the generative dance' (Cook and Brown, 1999). Understanding the generative dance (how to recognize, support and harness it) is essential, Cook and Brown claim, to understand knowledge management.

In terms of its implications for the development and implementation of ICT to manage knowledge, there are two important issues raised. The first is that we cannot convert tacit to explicit knowledge. As a result, we cannot articulate what we know (McDermott, 1999). Only explicit knowledge can be represented, for example, on an intranet, yet explicit knowledge alone cannot enable all the necessary epistemic work for the creation of new knowledge (Cook and Brown, 1999). Instead, knowledge is less a 'stock' to be represented on an intranet and more a 'flow' (Brown and Duguid, 1998). The implication is that it can never be effectively shared through a technology that involves a static repository, such as an intranet, because, as static information, it can never convey the richness of the context in which the knowledge was applied (Hayes and Walsham, 2000;

McDermott, 1999; MacKinlay, 2000, 2002). In fact, one may go as far to argue that there is no such thing as fully explicit knowledge and that all knowledge is either tacit or rooted in tacit knowledge (Polanyi, 1966). Further, codification of tacit knowledge, if possible, may compromise the very tacit knowledge it was designed to capture (Button et al., 1995). If so, to what extent can any knowledge be shared electronically? Hull (2000), for example, reports limited use of ICT in an organization in which practitioners felt that much of the knowledge gained within one project was highly specific or contextual to that project and for aspects of that knowledge to be applicable to other projects, it had to be carefully re-contextualized.

Second, if knowledge is deeply embedded within and inseparable from the practices and activities that people undertake, it cannot exist independently of human agents, as knowledge/knowing involves the active agency of people making decisions in light of the specific circumstances that they find themselves in. It is inseparable from reflection and dialogue between individuals about their experiences (Alvesson and Kärreman, 2001; Cook and Brown, 1999; Tsoukas and Vladimirou, 2001). This means that knowledge/knowing is then socially constructed regarding both its production and its interpretation (Leonard and Sensiper 1998; McAdam and McCreedy 2000). Further, it is culturally embedded. 'Members of a group must share an interpretation as to what a rule means before they apply it' (Tsoukas and Vladimirou, 2001: 980). Development of knowledge requires active, direct communication between individuals in the process of 'doing', often within 'communities of practice'² (Brown and Duguid, 1991; Lave and Wenger 1991; Wenger, 1998, 2000). ICT alone will not provide the necessary conversations and relationships for the diffusion and creation of new knowledge. 'Resources for learning do not simply lie in information but in the practices that allows people to make sense of that information and the practitioners who know how to use that information' (van Baalen and Moratis, 2001: 89). Management of knowledge may therefore imply more the sensitive management of social relations and less the management of corporate digital information (Kreiner, 1999; Larsen, 1986; Tsoukas, 1998). Brown and Duguid (1991), in reflecting upon the importance of social relations, suggest organizations might better invest in a communal coffee machine or water cooler, since it is around such sites as these that informal but highly important knowledge diffusion occurs.

In sum, 'while the knowledge revolution is inspired by information systems, it requires human systems to realize it . . . if all we do is increase the circulation of information (via ICT) we have only addressed one of the components of knowledge' (McDermott, 1999: 116). Some argue that ICT can facilitate the necessary development of human systems 'to form webs of personal relationships in cyberspace' (Rheingold, 1993: 5) as well as to increase the circulation of information. Rather than just a large electronic library, it can connect people so they can think together (McDermott, 1999) and encourage horizontal 'conversations' across organizational boundaries (Boland and Schultze, 1996; Hayes, 2001).

There are numerous illustrations for claims that it is possible through ICT for the knowledge provider and knowledge user to work together, utilizing aspects of groupware—for example, shared collaborative environments such as chat rooms—to contextualize the query (Kristoffersen and Ljungberg 1998; MacKinlay, 2002; van Baalen and Moratis, 2001). MacKinlay (2002) illustrates this through a case

study of the development of an 'electronic café' in a pharmaceutical company. This was a set of linked web sites based upon the stories of individuals involved in drug development programmes. 'Café patrons were encouraged to tarry: to meander through sites, to engage in conversation' (MacKinlay, 2002: 84). However, he is not necessarily optimistic about its future. In particular, he notes that management pressures to exploit the efficiency and innovation potential of the virtual community may result in participation of employees in the café to fall off as managerial scrutiny increases. His study suggests that even if epistemological problems are overcome, and this is by no means evident, the exercise of power by employees, located in a wider tension between labour and capital, may still render ICT ineffective for the purpose of knowledge sharing. It is to investigation of this that we now turn.

Relations between Labour and Capital in Pursuit of Knowledge Management

Popularizers of knowledge management (Drucker, 1993; Senge, 1990) may seek to establish new forms of authority and expertise about knowledge without any reflection upon knowledge and power. However, the link between knowledge and power is an important one (Alvesson, 1993; Foucault, 1977; MacKinlay, 2000, 2002; Willmott, 1995). Writers that take a relational view of knowledge—that it is provisional and context-bound—view knowledge and power as inseparable. From this viewpoint, organizations lay claim to knowledge rather than possess it (Alvesson, 1993; Willmott, 1995). Willmott (2000), for example, portrays attempts to manage knowledge as a conflict between labour and capital. This draws our attention to the location of knowledge management within a wider pattern of changes in contemporary capitalism, the demands of which mean that productivity is becoming dependent on the application and development of new knowledge and on the contribution of specialized knowledge workers (Blackler, 1995; Drucker, 1993).

Some present a utopian vision for knowledge management in which boundaries are re-drawn between executive management and employees to emancipate the latter (Boot et al., 1994; McAdam and McCreedy, 2000). 'The word knowledge has some virtues, as it tends to go against hierarchy and authority based on formal position' (Alvesson and Karreman, 2001: 1014). Counter to this, others cast knowledge management in managerialist terms as a way of controlling knowledge workers and allowing executive managers to maintain their hegemony over others (Fuller, 2001; Knights et al., 1993; Meyerson, 1991). From this perspective, the 'heat' and 'hype' around knowledge management may represent part of a long-running saga in which executive management seeks to control labour's ability to learn and develop expertise (Chumer et al., 2000). Labels, around which interventions by executive management cohere, such as 'knowledge-intensive firms'¹ (Blackler et al., 1993; Boland and Tenkasi, 1995), may be no more than 'an institutionalized myth, which seeks to ensure employee conformity with the institutionalized expectations of their environment' (Hayes and Walsham, 2000: 70). Such arguments highlight the strong managerialist ideology that underpins the introduction of knowledge management and that is more likely to reinforce oppressive social relations of inequality and exploitation than to emancipate employees. Despite this scenario, however, executive management is likely to

encounter everyday organizational practices and perspectives which attempt to counter disciplinary and discursive attempts to lay down prescriptions for knowledge management and dis-advantage employees (Chumer et al., 2000).

From the employer's perspective, knowledge management initiatives are driven by difficulties of retaining scarce and mobile labour (Chumer et al., 2000)—that is, 'experts can "walk"' (Chumer et al., 2000: xxiii). It may also represent a response to loss of knowledge when seasoned employees, particularly middle managers, retire or are made redundant (Davenport and Prusak, 1998; Hull, 2000; Nonaka and Takeuchi, 1995). However, if organizations attempt to elicit previously held tacit knowledge for coding into databases for access by anyone at any time from any place, then this is likely to impact adversely upon employees, since knowledge may give them power within an organization and the external labour market. From this point of view, the audacity of knowledge management has been described as 'breathtaking' and reflecting 'vaulting managerial confidence [since] the tacit knowledge of the workforce [is seen] as a resource to be willingly shared by all' (MacKinlay, 2002: 77). Such managerial confidence, however, is misplaced. Particularly under poor trading conditions for the organization, with its omnipresent threat of redundancy, employees may be particularly resistant to allowing their knowledge to be appropriated for organizational benefit (Willmott, 2000).

For example, a study of sales representatives in the pharmaceutical industry reports the unwillingness of employees to engage in sharing knowledge through ICT where they perceive it to be against their interests (Hayes and Walsham, 2000). The main factor emphasized, which inhibits the sharing of knowledge, is that the sales representatives may not freely share problems and solutions with others because, first, they felt themselves to be under the surveillance of senior managers in doing so. They therefore fear that anything negative they say about the company would be detrimental to their career advancement. Second, the sharing of knowledge via ICT is also inhibited because employees felt uneasy working discursively with other employees with whom they were unfamiliar or of whose motives they were suspicious.

A second study also picks up on the question of appropriability (Mueller and Dyerson, 1999). They report an uneasy tension between the need for an organization to retain staff expertise in a particular area and to orientate their action towards organizational goals through appropriation of their knowledge and skills. Any attempt to appropriate knowledge and skills is continuously challenged by informal parochial interests with employees unlikely to give away information where it represents 'the primary unit of organizational currency' (Davenport et al., 1992). Mueller and Dyerson (1999) highlight, as an example, that career concerns are likely to be particularly acute in a situation of organizational downsizing, as a result of which an organization's ability to appropriate the added value arising from their stock of human resources is inhibited. Hull (2000) also reports that career interests are a prime concern of employees in his study of research and development practitioners. In this case, employees don't see sharing knowledge as a good thing. Instead, Hull reports that they hoard knowledge. It may be that in the changed environmental context of the 1990s employees take their revenge on the re-engineering and downsizing organization by retaining the benefits of new ideas to enhance themselves rather than organizations (Kanter, 1990; Mueller and Dyerson, 1999).

Normative Control and Knowledge Management

As well as an individual's unwillingness to share knowledge, which is located in a wider tension between labour and capital, knowledge hoarding may manifest itself at a group level, which is influenced by the development of sub-cultures within an organization. A relevant study, which draws our attention to this, is that of Alvesson and Karremen (2001), which argues that there is similarity between the interest in 'communities of practice' (Brown and Duguid, 1991; Lave and Wenger, 1991; Wenger, 1998, 2000) and organizational sub-cultures. Alvesson and Karremen (2001) suggest that the reported problems of managing sub-cultures (e.g. Alvesson, 1995; Kunda, 1992) provide important lessons for managing communities. Rather than the unitary view of culture, the existence of sub-cultures within an organization renders the sharing of knowledge less open between employees. The presence of distinctive sub-cultures may mean, for example, that the necessary social capital for sharing knowledge across sub-cultures or communities lies underdeveloped (Nahapiet and Ghosal, 1998).

First, the informal networks—that is, the structural dimension of social capital—that enable individuals to identify and relate to others with potential expertise may be unused (O'Dell and Grayson, 1998).

Second, it may also mean that a common context and language—that is, the cognitive dimension of social capital—across the organization, which is necessary to foster effective sharing of knowledge, is absent (Lesser and Prusak, 2000). Instead each distinctive sub-cultural community, as it develops, may strengthen its own knowledge domain and practices, in the process of which there is a shift from a global and undifferentiated construct to a more precise explanation. The end result may be an inability for one sub-cultural community to appreciate the distinctive knowledge of another (Boland and Tenkasi, 1995; Dreyfus and Dreyfus, 1986; Hayes and Walsham, 2000; Tsoukas and Vlacharidou, 2001). 'The problem of integration of knowledge . . . is not a problem of simply combining, sharing or making data commonly available. It is a problem of perspective in which the unique thought worlds of different communities of knowing are made visible and accessible to others' (Boland and Tenkasi, 1995: 39). For example, marketing specialists learn a marketing perspective, which is embedded in the discipline and handed down through generations of practitioners (McDermott, 1999). In short, a sharing of perspective is necessary.

Third, the development of distinctive subcultures may mean that the necessary trust and reciprocity between groups—that is, the relational dimension of social capital—for effective sharing of knowledge is, instead, replaced by mistrust and a lack of reciprocity. If parties do not trust each other, it is doubtful that the knowledge transfer will be complete (Davenport and Prusak, 1998), since relations between experts typically are based upon the confidence, reputation and reliability each ascribes to the other (Hull, 2000).

In response to these issues, typically perceived by executive management as a 'cultural problem', knowledge management can be viewed as an attempt to exercise normative control to cultivate community tendencies across an organization and downplay boundaries within the organization. That is, executive management attempts to engineer and control values and ideas and in so doing produces the correct line of action (Alvesson and Karremen, 2001).

Alvesson (1993) illustrated how managers in knowledge-intensive firms used ideological control—for example, performance-related rewards and cultivating a positive buoyant outlook—to create a ‘strong’ culture of sharing knowledge by manufacturing a sense of community. In a similar vein, in a later study of a large international management consultant firm, Alvesson and Karreman (2001) revealed a knowledge management system to be a powerful organizational symbol, which stands for the expectation that people throughout the organization ‘belong to the same tribe and each one supports each other’ (Alvesson and Karreman, 2001: 1010).

However, in light of frequently reported problems of managing or engineering culture, normative control is likely to be less effective than anticipated by executive management (Alvesson, 2001; Martin et al., 1985). For example, within Alvesson and Karreman’s study, organizational members could easily resist and disregard norms manifested through the knowledge management system. As a result, the utilization of the knowledge management system was uneven and varied at individual, group and departmental levels. Their study reveals that culture is an important pre-condition and constraint for knowledge management. The implication of this is that knowledge management initiatives, rather than imposed, should be sensitive to organizational culture and social practices and any successful knowledge management system is likely to ‘evolve naturally from the firm’s cultures and processes’ (Alvesson and Karreman, 2001: 1015).

Connecting back to our previous discussion of epistemology issues, Alvesson and Karreman (2001: 1015) argue, therefore, that knowledge is best understood not as ‘objective facts and causal explanations, but as a situated, community-based set of meanings’. Yet, ‘most knowledge management efforts treat these cultural issues as secondary implementation issues. They typically focus on information systems—identifying what information to capture, constructing taxonomies for organizing information, determining access and so on’ (McDermott, 1999: 104). Even where it is sensitive to the issue of culture, those executive managers promoting knowledge management within the organization typically operate in control mode. In response, group-level cultural and social-psychological processes may significantly counter such attempts so that knowledge creation in particular is inhibited (Alvesson and Karreman, 2001).

Case Study and Methodology

Pharmco National is a sales and marketing organization connected to a major global pharmaceutical manufacturing and retailing company. It has responsibility for the brand planning and promotion of a number of pharmaceutical products manufactured by the parent company that are very well known in the UK, some of which can be purchased off the shelf as well as some whose sale is regulated through pharmacists. Pharmco National employs 200 people and is structured into functions: Sales, Trade Marketing, Marketing, Finance, and Human Resources. At the time of the study, the two largest functions were Sales, which was divided into geographically based teams and Marketing, which was divided by product. Trade Marketing, which linked Sales and Marketing, was the next largest function and this was divided into teams based upon trade customers—for example, large

supermarket chains. Human Resources and Finance were relatively small support functions.

Pharmco National provides an illuminating case study from which to theoretically generalize (Yin, 1994). Describing employees as 'knowledge workers' may be a gross over-generalization (MacKinlay, 2002; Warhurst and Thompson, 1998). However, their work can be described as 'knowledge-intensive' because employees are working to produce 'soft' deliverables such as reports, presentations or simply decisions to be given at meetings, rather than 'hard' deliverables such as products.

In an exploratory stage of this study, 10 interviews were carried out with executive directors, members of the 'Knowledge Management Team', and employees from two Sales and Marketing teams to gain data about organizational context and an outline of the development, design, implementation and usage of the intranet. However, the data presented in this paper were gathered from 34 subsequent semi-structured one-hour interviews. These were carried out with a representative sample of managerial-level employees in the organization, including middle managers, the Knowledge Management Team, executive directors and graduate management trainees. It was at this level, rather than the administrative and clerical levels, where work activity could be described as knowledge-intensive. The majority of middle managers and graduate management trainees was drawn from the Marketing or Sales functions in recognition that these two were the largest functions. Within this group two Marketing Managers and two Sales Managers were also chosen for in-depth task analysis interviews. These participants were questioned further about their use of the intranet. These interviews were carried out while participants were using the intranet. They were therefore complemented by some limited observation.

Issues in Developing and Implementing an Intranet for Knowledge Management

In presenting the data, first, we illustrate the problems associated with the epistemological assumptions which the Chief Executive and his appointed Knowledge Management Team brought to bear during the introduction of the intranet. Second, we consider the 'economic' rationale of the Chief Executive and Knowledge Management Team in introducing the intranet and its relationship with the challenges facing contemporary capitalism. In connection with this we examine how individual employees respond by hoarding knowledge, which reflects wider tensions between capital and labour. Third, we examine the inhibiting effect of organizational sub-cultures upon the attempts, by executive management, to exert normative control through a knowledge management system.

Epistemology: Knowledge is Context Specific and Embedded in Practice

The Chief Executive set up a team to develop a knowledge management system ('Knowledge Management Team'). A former Marketing Manager was appointed as Knowledge Manager. Two newly appointed Market Analysts supported the Knowledge Manager. A fourth new appointment was made, that of an Intranet Manager, who was responsible for the technical aspects of the knowledge management

system and also reported to the Knowledge Manager. All four employees in the Knowledge Management Team were selected by the Chief Executive with an emphasis on 'their enthusiasm for the intranet as a way of sharing knowledge and some evidence of computer literacy' [Director of Human Resources]. Knowledge Champions were nominated in each team within a function. The Knowledge Manager was responsible for overseeing their activity, although their reporting relationship was with their functional manager. Their role was to systematize the knowledge in their team through 'learning review reports', a one page pro-forma to be posted on the intranet following completion of projects, such as the launch of a new product. Typically one person in a team, therefore, had their workload extended with one more duty in the margin (Alvesson and Karreman, 2001). The aim was, through learning reviews, to develop 'templates of best practice; for example, generic principles for Sales peoples' behaviours' [Chief Executive].

While members of the Knowledge Management Team were computer-literate, the absence of the requisite technical expertise for intranet development meant an external consultant was brought in to work with the team. The Knowledge Manager complained that the intranet designed by the external consultant was 'an off-the-shelf intranet design that didn't meet our needs', as a result of which he and the Intranet Manager 'had to get to grips with technical design issues ourselves to tailor the system to our needs'. In the process, the Knowledge Manager admitted, 'we became rather "techie and nerdy" ourselves'. It seemed, therefore, that those responsible for the development, design and implementation of the intranet became captured by the technology itself.

Epistemological problems only superficially surfaced. The Knowledge Manager reinforced the assumption held by the Chief Executive that with the right technical design, knowledge could be transferred relatively easily through the intranet. The sole difficulty recognized beyond this was that contextualization of information might be necessary so that it represented insight. Market Analysts would help by trying to interpret information on the intranet for different audiences. 'For example, we might provide insight into market data so that a National Account Manager could use it to get a product stocked in a supermarket' [Market Analyst 1]. This interpretation, the Chief Executive claimed, 'would mine the real nuggets of knowledge'.

Yet, epistemological problems significantly inhibited effective utilization of the intranet. The main problem was that of relevance. That knowledge is embedded in practice meant anything posted on the intranet by one individual or group was insufficiently contextualized for others to use, despite attempts by Market Analysts to provide insight. 'It burdened employees with producing reports and reviews that are not read.' The reason they go un-read is because:

It may make sense to those writing it, it doesn't to those reading it. Why? Simple! Because it's isolated from the situation or problem. [Marketing Manager 4]

As a result, free from any organizational sanctions when a learning review was not completed, 'We don't do them. It's not learning. Instead it's bureaucratic' [Marketing Manager 2].

In short, 'the information on the intranet lacks real meaning for the reader' [Director of Human Resources]. Employees highlighted differences between information and knowledge in an intuitive way in recognizing that the lack of a

shared context meant that, in many cases, where information was presented on the intranet by one team, it lacked relevance for another:

What the intranet does is to try and give one generic byte of information hoping it's relevant to all problems across all functions. It's not. It's too removed from our reality. [Marketing Manager 4]

The difficulty is I don't know who needs to know it, when they need to know it, why they need to know it so that I can put it in a way that's useful to them. [Even if this was known] does this mean I need to adapt everything I know for the different people when I post a learning on the intranet. In which case I may as well go and talk to them. So what's the point of the intranet? [National Account Manager 2]

So how did the necessary contextualization of information take place? Beside the attempt by Market Analysts to provide insight, the Intranet Manager felt the solution lay with sophisticated search facilities within the intranet, so employees could access information that was relevant to their problem. This was proving difficult technically but also in indexing terms used by different functions. 'Everyone has different words for the same thing. A marketer might say to a Sales person, "go into category management". The Sales person would ask, "what's category management?"' [Intranet Manager].

A National Account Manager [3] advocated the development of 'chat rooms', 'where the Sales guys can dump ideas and marketers can actually have a look at it and pick up on the ideas'. This also seemed rather optimistic given functional barriers in the organization, as discussed later. Instead, rather than re-shape work practices, the intranet encouraged employees to continue their existing practices, both in gaining the information in the first place and in engaging in dialogue to generate insightful solutions to the problems they were facing. Through the intranet, for example, they interacted with employees from their own function rather than across functions. There seemed much greater potential for cross-functional interaction through 'hanging around the drinks machines with marketers or smoking with them outside the fire doors' [National Account Manager 2].

Marketing Managers described much of their knowledge sharing as meeting based, in which problems and processes were discussed and much of this was not written down. To a large extent problem-solving was at an informal level—for example, through conversations outside those meetings—with limited documentation of process. Occasionally e-mails would document this, but it was generally only at the end point that any learning was written up on the web through the learning review pro-forma. The process of the decision-making and knowledge sharing was never represented on the intranet, only the outcome. Thus the Marketing function felt unable to represent its knowledge on the intranet because it was embedded in the work practices of the community.

The contrasting ineffectiveness of the intranet with the benefit of face-to-face interaction was illustrated during an attempt to share knowledge about brand management across countries. Pharmco, to some extent, had grown through acquisition of brands, one of which was a well-known German soap brand. There was a desire from both UK-based Marketing Managers for soap products and their German counterparts to share knowledge for mutual benefit. There was some initial hope from both sides that merely posting information on the intranet, when

followed up with e-mail queries, would prove sufficient to share knowledge effectively. This was not the case.

You can't really get at what you want. It's very frustrating. There's a will but we talk across each other through the intranet, rather than to each other. [Marketing Manager 3]

As a result, one team invited a Marketing Manager from Germany to 'live and breath with us' for a two-week period because they were frustrated at the limitations of the intranet in facilitating their understanding of brand management issues in Germany. They involved him in a new product launch so that they could 'capture the subtleties and nuances of his knowledge in a way the intranet just can't' [Marketing Manager 2].

The same team instituted other mechanisms to capture knowledge which went beyond the intranet and which highlighted the importance of face-to-face real time interaction so that information was contextualized:

Information on the intranet needs to be brought alive. What we did is set up breakfast meetings and invite different people along to present case studies of successes and failures. They made it real. When people do that, you can start to see the logic behind it. [Marketing Manager 2]

Yet, even with contextualization through face-to-face interaction, those in Sales, in particular, emphasized that much of the knowledge they employed in their job was 'intangible, like fresh air, you can't see it . . . Sometimes it's a hunch about the customer and how to sell to them. It's often very specific to that customer. You can't talk about it' [Sales Person 1]. As a result, Sales employees scoffed at the aspiration of the Chief Executive that, for example, a generic prescription for sales techniques be placed on the intranet:

Customers are different, salesmen are different. Products are different. Put those sets of differences together and you've got a million permutations of what might represent the 'right' sales approach. Instead you just feel what's right at the time of the sales visit. [National Account Manager 2]

Power: Contesting the Sharing of Knowledge

When asked why the organization had focused upon knowledge management, the Chief Executive was highlighted as the champion within the organization for the initiative. 'He intuitively believes there is value in it. Reflecting this, unlike most other things, he hasn't asked for its value to be proved' [Knowledge Manager]. In particular, enthused by a visit to the USA, during which he was exposed to examples of ICT knowledge management systems, the Chief Executive argued:

A more efficient way of learning would be to wire all employees' brains together to produce one super brain. We can design this into the organization via the intranet to encourage the sharing of learning.

Intervention, utilizing 'knowledge management' as an organizing principle, first reflected a wider pattern of changes in contemporary capitalism, in which there was increasing global competitive pressure upon commercial activity in which

Pharmco had previously enjoyed dominance. Knowledge held by expert labour was seen as a distinctive resource that the organization should 'lever' to counter these threats and maintain domestic and international market dominance. 'Our knowledge', the Chief Executive argued, 'gives us our advantage over competitors'. Yet expert labour was also perceived to be a source of potential weakness because it was mobile. 'Key account managers or brand managers can leave and the knowledge goes with them, often to our competitors.' The Chief Executive, therefore, laid claim to their knowledge on the basis that 'we pay their wages.' This reflected his fear that the company's competitive edge was fragile when dependent on the minds and learning of individual workers, who could leave, taking intellectual capital with them to the detriment of Pharmco.

Meanwhile, any concern that employees may be unwilling to share knowledge was subsumed within the unitarist perspective taken by the Chief Executive and Knowledge Manager that managing knowledge was beneficial to all employees since it was necessary to ensure that market position and profitability were maintained. The intranet institutionalized expectations that knowledge should be shared to the benefit of all. The expectation that all employees would share knowledge through the intranet was linked to a growth in project group working. Examples of myriad such project groups include a multi-functional task force, which was constituted in response to a competitive threat in the cough syrup market and 'the de-complexity project', which examined and improved brand planning processes and again drew employees from different functions. In such project groups the expectation was that they were non-hierarchical and that contribution and influence was predicated upon expertise, rather than position in the organizational structure. That is, a rather utopian vision of the knowledge management system prevailed, which, when combined with project group working, would free employees from the constraints of hierarchy.

Yet in opposition to institutionalized expectations that knowledge is shared, employees hoarded knowledge. This reflected wider conflict between capital and labour in a situation of downsizing in which middle-level managers were being delayered in pursuit of efficiency gains to enhance shareholder value. A particular group who perceived itself to be under threat of redundancy was the National Account Managers in the Sales function. Many of the National Account Managers had been with the organization for a decade or so and felt that they had 'paid their dues, earned their spurs' [National Account Manager 1]. They claimed that they 'could do the job in their sleep' [National Account Manager 2]. They were not particularly inclined to 'post "learnings" on the intranet and to share hard-won nouse with any old Tom, Dick or Harry' [National Account Manager 3], particularly in the face of large-scale cuts in the number of middle managers across the company:

The experience I have built up over the years is knowledge the organization needs. They have to keep me if they want to benefit from my years of experience. They can't replace me with a young kid and I'm certainly not going to help them do so by giving away to a young kid what I have learned through my years of experience. [National Account Manager 3]

When referring to 'young kids', National Account Managers identified graduate management trainees as a threat to their position. In Marketing, all the managers

were graduates. This was not the case in Sales, where managers prided themselves as graduating from the 'school of hard knocks' [National Account Manager 2]. They appeared to associate those graduate management trainees with executive decision-makers 'who are trying to get rid of us' [National Account Manager 3]. Their suspicions fuelled their reluctance to share knowledge through the intranet in line with institutionalized expectations of executive management.

The situation worsened as performance targets became increasingly 'stretched'—Marketing employees had to make increasing gains in profitability for their brands, Sales Representatives had to sell more:

People consider their targets as stretched to breaking point. They are working flat out to meet those targets. They aren't inclined to share knowledge with others if it's not necessary to meet their targets. [Marketing Manager 2]

National Account Managers, as evident earlier, increasingly viewed their interests at odds with that of the company, represented by executive managers and shareholders. As a result of which, counter to unitarist assumptions held by the Chief Executive that knowledge management benefited all employees, they felt they were being increasingly exploited to deliver more value to shareholders in the face of declining profitability.

The Knowledge Management Team had set up 'yellow pages', an intranet page designed to allow employees to identify 'experts' across the company:

We've set up a directory of experts who present themselves on the intranet as experts around a particular issue. An employee can search the intranet to find experts under a certain heading and then e-mail them and so the necessary knowledge-sharing interaction begins. [Knowledge Manager]

This required employees to voluntarily present themselves as experts. Again this was proving difficult to realize. Reflecting employees' resistance to the sharing of knowledge, only six employees had currently presented themselves as 'experts'. The Chief Executive and Knowledge Management Team did not anticipate such resistance to their expectation that employees freely share knowledge through the intranet. As a result of this, they perceived employees that were not prepared to share knowledge as exhibiting irrational behaviour and complained specifically about National Account Managers as 'a problem when it comes to sharing knowledge' [Knowledge Manager].

Normative Control: Oppositional Sub-cultures

While political motives for the introduction of the intranet were not made explicit, cultural ones were. Specifically, the Chief Executive and Knowledge Management Team aimed to change the way in which employees worked so that knowledge held by expert labour could be transferred across functional boundaries within the organization. Building upon this claim, the intranet, the Chief Executive argued, was 'going to bring knowledge held by the different silos in the organization together so that everyone has access to it'.

However, the unitarist assumptions that the Chief Executive Officer and Knowledge Management Team brought to the introduction of the intranet were

exposed as insensitive to distinctive functional sub-cultures, particularly Sales and Marketing, which had a significant degree of antipathy towards each other. Employees from Sales and Marketing described themselves as being ‘from two different planets’ [Graduate Trainee Marketing]. To some extent, the development of functional sub-cultures was a result of institutionalized, narrow career paths for employees, during which they lacked exposure to functions other than their own. The narrow career paths were reinforced by informal social practices within the function:

If you go out with Sales we’ll go somewhere scruffy, get drunk, the humour will be a bit blue and we’ll end up at some dodgy club [whereas, in Marketing] they’ll go somewhere sophisticated and drink wine and probably have polite chit chat before going home early. [National Account Manager 3]

Each blamed the other for problems. ‘If product X hadn’t performed to expectations, then Marketing might claim that Sales didn’t sell enough. [National Accounts Manager 4]. Not surprisingly, employees from Sales and Marketing tended to be defensive towards each other. Instead of freely posting information on the intranet, ‘because you’re never too sure how others [from other functions] are going to use it’ [National Account Manager 2], Sales and Marketing preferred to interact face-to-face in formal meetings to share knowledge. This was not so much due to a need for contextualization of information but due to ‘our lack of trust in each other, which means we like more public responses from the other’ [Marketing Manager 4]. Not only did there appear a lack of trust, there appeared a lack of respect between the Sales and Marketing functions for what the other was doing:

Why should I tell someone in Marketing, that is still wet behind the ears from university, what they need to do to make the brand work in the field through a learning review document. They should be out there in the field finding out for themselves, not flying a desk. [Sales Employee 1]

Unsurprisingly, therefore, outside formal meetings, there was limited interaction between employees from each function. Any interaction was mainly undertaken as necessary to complete tasks.

Further exacerbating this problem, there were divergent objectives set out for employees in each of the functions in their performance agreements. For example, objectives were volume focused for Sales employees and focused upon brand profitability for Marketing employees. As a result, Sales employees focused their efforts upon identifying the ‘right’ potential customer and increasing the volume of sales of all brands to that customer. They were relatively unconcerned about any brand in particular or profit margins associated with each brand. Meanwhile, employees in Marketing were concerned only about the brand(s) for which they were responsible and its price against its costs, for example, of distribution and promotion. In short, they remained ‘knowledge hungry’ only about their area. Their browsing of the intranet was limited to very specific areas that they could readily identify as relevant. Typically, what they perceived as relevant was information or learning reviews posted by someone within their own function, rather than information posted by someone within another function. On

the one hand, this relates to some of the epistemological problems discussed earlier: 'In Marketing we know what each other needs and we can help out by posting that on the intranet. We don't necessarily know what Sales needs and maybe we don't want to help them anyway' [Brand Manager 2]. On the other, the latter part of this statement reflects a lack of reciprocity and trust between Sales and Marketing. The intranet, rather than mediating this, appears to reinforce existing work practices that inhibit the sharing of knowledge. As a result, executive management's attempts at normative control through the intranet were frustrated. Instead, there were norms and values held at the functional level, which discouraged knowledge sharing across functional boundaries.

Yet, there appeared to be a need for sharing knowledge across the functional boundary between Sales and Marketing. For example, Sales employees considered the 'brand proposition' to be important since 'what they are asking us to sell and the way in which it is presented makes life easier or more difficult for us' [Sales Employee 2]. However, the 'brand proposition' was developed by Marketing in isolation from Sales employees and then presented to them with little input from Sales. Sometimes, if merely modifying the existing brand proposition for a well-established product, it was presented via the intranet. This brought complaints from field Sales employees. 'They presented something called the "new brand proposition" for a product that I've been selling for years. I don't know what they are on about. They seem to have a language of their own—Marketing speak' [National Account Manager 3]. It appeared that the respective functions of Sales and Marketing lacked the necessary common context and language through which to share knowledge. In the words of one manager, Sales and Marketing 'see the world through different filters' [Medical Information Manager]. Again this links back to epistemological problems discussed earlier—that knowledge is context specific and embedded in practice.

Conclusion

The Knowledge Management Team in our case are 'captured' by an investment in knowledge management that is geared primarily towards technology implementation (Ruggles, 1998). This was encouraged by the employment of external IT consultants who supported this approach. The Knowledge Management Team assumed that knowledge can be codified, to the extent that it is reduced to storage in databases, 'where it can be accessed and used easily by anyone in the company' (Hansen et al., 1999: 107). Therefore, any debate about its characteristics went unrecognized. The result was that the intranet, at best, would become an archive of collective memory, rather than reshape work organization (MacKinlay, 2002). Yet our case shows that characteristics of knowledge significantly influenced the effectiveness of the intranet for sharing knowledge.

The debate about epistemology of possession and epistemology of practice (Cook and Brown, 1999), and their necessary complementarities for the creation of new knowledge, draws our attention, first, to the importance of context in the application of knowledge. The aspiration, expressed by the Chief Executive, that knowledge could be presented in a propositional way—for example, a generic approach to selling—so that the link between general categories and particular

instances could be transferred across contexts is ill-conceived. Instead, knowledge is actioned when faced with a particular set of events (Brown and Duguid, 1991; Orr, 1990; Tsoukas, 1998). Yet, even if attempts are made to take account of this in the design of ICT intervention—for example, groupware—this is unlikely to sufficiently recreate the necessary dialogue and interaction amongst community members that facilitate knowledge sharing, since typically such attempts take a rather harmonious view of community. These fail to recognize sub-cultural cleavages or the exercise of power by individuals and groups.

In our case, the competitive pressures of contemporary capitalism that led to a perceived need for a knowledge management intervention were evident (Blackler, 1995; Drucker, 1993). However, that the Chief Executive and Knowledge Management Team laid claim to expert knowledge held by employees was contested. Employees felt pressured to exert more effort in pursuit of ambitious performance targets and increasingly perceived this as exploitative. Resistance to giving up knowledge in pursuit of organizational goals was particularly strong because the organization was downsizing (Willmott, 2000). As a result, Sales Managers perceived themselves to be under threat and hoarded, rather than shared, knowledge with their potential replacements, graduate management trainees. In short, they were unwilling to share knowledge through the intranet even if this had been possible, taking into account epistemological problems. They felt this was justified on the basis that it reduced the threat of redundancy. Such resistance to sharing knowledge was seen beyond the cadre of Sales Managers when a 'yellow pages' of 'experts' elicited little contribution. As one employee commented in a study by MacKinlay (2002: 81), through an ICT-based knowledge management initiative, 'I'm being asked to give myself away.' Crucially, from an employee's perspective, our case suggests that they can successfully resist knowledge management interventions and exercise power so that knowledge is not shared to their disadvantage. That is, executive management may find it more difficult to appropriate expert knowledge than they anticipate (Mueller and Dyerson, 1999).

That the intranet knowledge management intervention merely reflected existing organizational practices and perspectives, rather than mediate these in pursuit of more effective knowledge sharing, was also evident in knowledge sharing across functional boundaries. Sub-cultural cleavages, specifically between Sales and Marketing, exposed the rather harmonious view of community, taken by the Chief Executive and the Knowledge Management Team, as misguided. This was exacerbated by the need for the intranet to incorporate the diversity of perspectives developed by different functions (Boland and Tenkasi, 1995). The necessary social capital to mediate antagonism between Sales and Marketing was absent. If anything, the intranet exacerbated perceptions that Sales and Marketing did not share the necessary language and context to effectively exchange knowledge. That is, rather than manufacture a sense of community the intranet hardened existing cultural cleavages in the organization (Alvesson and Kärreman, 2001).

Our study makes a contribution to a more critical literature that highlights political and cultural issues connected with knowledge management interventions utilizing ICT (Hayes and Walsham, 2000; Hull, 2000; MacKinlay, 2000). It supports the view that 'technical fixes' to knowledge management issues merely harden existing practices and routines, rather than open up new directions (Hull, 2000; MacKinlay, 2002; Newell et al., 2001). That much advice about knowledge

management systems is still predicated upon an information-processing epistemology demands that more research is carried out, which not only recognizes epistemological issues, but also political and cultural issues associated with ICT-based knowledge management interventions. Broader organizational issues of power and culture may mean that employees are unwilling or unable to share knowledge and, beyond the epistemological problem, this is likely to further inhibit the contribution of ICT to the management of knowledge (Blackler et al., 1998, 1999). 'At present, accounts of the political and normative issues in the mainstream knowledge working literature, particularly with reference to the role of information systems, are not as plentiful as these issues warrant' (Hayes and Walsham, 2000: 70). As a result, there appears a clear need for a more political theoretical contribution that addresses the potential hegemonic effect of knowledge management systems, but which also recognizes the scope for employees to resist these forces.

Notes

1. Contemporary organizations which comprise a high proportion of qualified staff who trade in knowledge itself through peer-to-peer collaboration are referred to as knowledge-intensive firms (KIFs).
2. Communities of practice are informally constituted and self-organizing groups that are formed at work, through which knowledge is shared in interactions as problems arise and solutions are discussed.

References

- Alvesson, M. (1993) 'Organization as Rhetoric: Knowledge-Intensive Companies and the Struggle with Ambiguity', *Journal of Management Studies* 30(6): 997–1015.
- Alvesson, M. (1995) *Management of Knowledge- Intensive Companies*. Berlin: de Gruyter.
- Alvesson, M. and Karreman, D. (2001) 'Odd Couple: Making Sense of the Curious Concept of Knowledge Management', *Journal of Management Studies* 38(7): 995–1018.
- Blackler, F. (1995) 'Knowledge, Knowledge Work and Organizations: An Overview and Interpretation', *Organization Studies* 16(6): 1021–1046.
- Blackler, F., Reed, M. and Whitaker, A. (1993) 'Editorial, Knowledge and the Theory of Organisations', *Journal of Management Studies* 30(6): 851–861.
- Blackler, F., Crump, N. and McDonald, S. (1998) 'Knowledge, Organisations and Competition', in G. Krogh, J. Roos and D. Kleine (eds) *Knowing in Firms: Understanding, Managing and Measuring Knowledge*. London: Sage.
- Blackler, F., Crump, N. and McDonald, S. (1999) 'Organisational Learning and Organisational Forgetting', in M. Easterby-Smith, J. Burgoyne and L. Araujo (eds) *Organisational Learning and the Learning Organisation: Developments in Theory and Practice*. London: Sage.
- Boland, R. and Schultze, U. (1996) 'Narrating Accountability: Cognition and the Production of the Accountable Self', in R. Munro and J. Mouritson (eds) *Accountability, Power, Ethos and the Technologies of Managing*. London: Thomson International.
- Boland, R. and Tenkasi, R. V. (1995) 'Perspective Making and Perspective Taking in Communities of Knowing', *Organization Science* 6(4): 350–63.
- Boot, R., Laurence, J. and Morris, J. (1994) *Managing the Unknown*. Maidenhead: McGraw-Hill.

- Brown, J. S. and Duguid, P. (1998) 'Organizing Knowledge', *California Management Review* 40(3): 90–111.
- Brown, J. S. and Duguid, P. (1991) 'Organizational Learning and Communities of Practice: Toward a Unified View of Working, Learning and Innovation', *Organization Science* 2(1): 40–57.
- Button, G., Coulter, J., Lee, J. and Sharrock, W. (1995) *Computers, Minds and Conduct*. Cambridge: Polity Press.
- Chumer, M., Hull, R. and Pritchard, C. (2000) 'Introduction: Situating Discussions about "Knowledge"', in C. Pritchard, R. Hull, M. Chumer and H. Willmott (eds) *Managing Knowledge: Critical Investigations of Work and Learning*. Basingstoke: MacMillan.
- Cook, S. and Brown, J. (1999) 'Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing', *Organization Science* 10(4): 381–400.
- Davenport, T. H. and Prusak, L. (1998) *Working Knowledge*. Boston, MA: Harvard Business School Press.
- Davenport, T. H., Eccles, R. G. and Prusak, L. (1992) 'Information Politics', *Sloan Management Review* 14 (Autumn): 67–81.
- Dewey, J. (1934) *Art as Experience*. New York: Perigree Books.
- Dreyfus, H. L. and Dreyfus, S. E. (1986) *Mind over Machine*. New York: Free Press.
- Drucker, P. (1993) *Post-Capitalist Society*. Oxford: Butterworth-Heinemann.
- Fahey, L. and Prusak, L. (1998) 'The Eleven Deadliest Sins of Knowledge Management', *California Management Review* 40(3): 265–76.
- Foucault, M. (1977) *Discipline and Punish: The Birth of the Prison*. Harmondsworth: Allen Lane.
- Fuller, S. (2001) *Knowledge Management Foundations*. London: Butterworth-Heinemann.
- Gates, B. (1999) *Business @ the Speed of Thought*. London: Penguin Books.
- Hansen, M. T., Norhia, N. and Tierney, T. (1999) 'What's Your Strategy for Managing Knowledge?', *Harvard Business Review* 77(2): 106–16.
- Hayes, N. (2001) 'Boundless and Bounded Interactions in the Knowledge Work Process: The Role of Groupware Technologies', *Information and Organization* 11: 79–101.
- Hayes, N. and Walsham, G. (2000) 'Safe Enclaves, Political Enclaves and Knowledge Working', in C. Pritchard, R. Hull, M. Chumer and H. Willmott (eds) *Managing Knowledge: Critical Investigations of Work and Learning*. Basingstoke: MacMillan.
- Hickman, L. (1990) *John Dewey's Pragmatic Technology*. Bloomington, IN: Indiana University Press.
- Hislop, D. (2001). 'Mission Impossible? Communicating and Sharing Knowledge via Information Technology', *Managing Knowledge: Conversations and Critiques Conference*, Leicester University.
- Hull, R. (2000) 'Knowledge Management and the Conduct of Expert Labour', in C. Pritchard, R. Hull, M. Chumer and H. Willmott (eds), *Managing Knowledge: Critical Investigations of Work and Learning*. Basingstoke: MacMillan.
- Kanter, R. (1990) *When Giants Learn to Dance*. New York: Simon and Schuster.
- Knights, D., Murray, F. and Willmott, H. (1993) 'Networking as Knowledge Work: A Study of Strategic Interorganizational Development in the Financial Services Industry', *Journal of Management Studies* 30(6): 975–996.
- KPMG (1999) 'IKON Conference Report', available at http://kpmg.interact.nl/new/confer_IKON.html
- Kreiner, K. (1999) 'Knowledge and Mind', *Advances in Management Cognition and Organizational Information Processing* 6: 1–29.
- Kristoffersen, S. and Ljungberg, F. (1998) 'MobiCom: Networking Dispersed Groups', *Interacting with Computers* 10: 45–65.

- Kunda, G. (1992) *Engineering Culture and Commitment in a High-Tech Corporation*. Philadelphia, PA: Temple University Press.
- Larsen, S. (1986) 'Information Can Be Transmitted but Knowledge Must Be Induced', *Programmed Learning and Educational Technology* 23(4): 331–36.
- Lave, J. and Wenger, E. (1991) *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.
- Lehner, F. (1990) 'Expert Systems for Organizational and Managerial Tasks', *Information and Management* 23(1): 31–41.
- Leonard, D. and Sensiper, S. (1998) 'The Role of Tacit Knowledge in Group Innovation', *California Management Review* 40(3): 112–32.
- Lesser, E. and Prusak, L. (2000) 'Communities of Practice, Social Capital and Organizational Knowledge', in E. L. Lesser, M. A. Fontaine and J. A. Slusher (eds) *Knowledge and Communities*. Boston, MA: Butterworth-Heinemann.
- MacKinlay, A. (2000) 'The Bearable Lightness of Control: Organizational Reflexivity and the Politics of Knowledge Management' in C. Prichard, R. Hull, M. Chumer and H. Willmott (eds), *Managing Knowledge: Critical Investigations of Work and Learning*. Basingstoke: MacMillan.
- MacKinlay, A. (2002) 'The Limits of Knowledge Management', *New Technology, Work and Employment* 17(2): 76–88.
- Martin, J., Sitkin, S. and Boehm, M. (1985) 'Founders and the Elusiveness of a Cultural Legacy', in P. J. Frost et al. (eds) *Organizational Culture*. Thousand Oaks, CA: Sage.
- McAdam, R. and McCreedy, S. (2000) 'A Critique of Knowledge Management: Using a Social Constructionist Model', *New Technology, Work and Employment* 15(2): 155–68.
- McDermott, R. (1999) 'Why IT Inspired but Cannot Deliver Knowledge Management', *California Management Review* 41(4): 103–17.
- Meyerson, D. E. (1991) 'Acknowledging and Uncovering Ambiguities in Cultures', in P. J. Frost, L. F. Moore, M. R. Louis, C. C. Lundberg and J. Martin (eds) *Reframing Organizational Culture*. Thousand Oaks, CA: Sage.
- Milton, N. Shadbolt, N. Cottam, H. and Hammersley, M. (1999) 'Towards a Knowledge Technology for Knowledge Management', *International Journal of Human-Computer Studies* 51: 615–41.
- Mueller, F. and Dyerson, R. (1999) 'Expert Humans or Expert Organizations?', *Organization Studies* 20(2): 225–56.
- Nahapiet, J. and Ghosal, S. (1998) 'Social Capital, Intellectual Capital, and the Organizational Advantage', *Academy of Management Review* 23(2): 242–66.
- Newell, S., Scarbrough, H. and Swan, J. (2001) 'From Global Knowledge to Internal Electronic Fences: Contradictory Outcomes of Intranet Development', *British Journal of Management* 12: 97–111.
- Nonaka, I. (1994) 'A Dynamic Theory of Organizational Knowledge Creation', *Organization Science* 5(1): 14–37.
- Nonaka, I. and Takeuchi, H. (1995) *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford: Oxford University Press.
- O'Dell, C. and Grayson, J. (1998) 'If Only We Knew What We Know: Identification and Transfer of Best Practices', *California Management Review* 40(3): 80–8.
- Orr, J. E. (1990) 'Sharing Knowledge, Celebrating Identity: Community Memory in a Service Culture', in D. Middleton and D. Edwards (eds) *Collective Remembering*. London: Sage.
- Polanyi, M. (1966) *The Tacit Dimension*. New York: Doubleday.
- Rheingold, H. (1993) *The Virtual Community: Homesteading on the Electronic Frontier*. New York: Addison-Wesley.
- Roos, J. and von Krogh, G. (1996) 'The Epistemological Challenge: Managing Knowledge and Intellectual Capital', *European Management Journal* 14(4): 333–37.

- Rorty, R. (1982) *Consequences of Pragmatism*. Minneapolis, MN: University of Minnesota Press.
- Ruggles, R. (1998) 'The State of the Notion: Knowledge Management in Practice', *California Management Review* 40(3): 80–9.
- Senge, P. (1990) *The Fifth Discipline: Mastering the Five Practices of the Learning Organization*. New York: Doubleday.
- Swan, J. and Scarbrough, H. (2001) 'Knowledge Management: Concepts and Controversies', *Journal of Management Studies* 38(7): 913–21.
- Terrett, A. (1998) 'Knowledge Management and the Law Firm', *Journal of Knowledge Management* 2(1): 67–76.
- Tsoukas, H. (1996) 'The Firm as a Distributed Knowledge System: A Constructionist Approach', *Strategic Management Journal* 17: 11–25.
- Tsoukas, H. (1998) 'Forms of Knowledge and Forms of Life in Organized Contexts', in C. H. R. Chia (ed.) *In the Realm of Organization*. London: Routledge.
- Tsoukas, H. and Vladimirou, E. (2001) 'What is Organizational Knowledge?', *Journal of Management Studies* 38(7): 973–93.
- van Baalen, P. J. and Moratis, L. T. (2001) *Management Education in the Network Economy: Its Context, Content and Organization*. Dordrecht, Netherlands: Kluwer Academic Publishers.
- Warhurst, P. and Thompson, P. (1998) 'Hands, Hearts and Minds: Changing Work and Workers at the End of the Century', in P. Thompson and C. Warhurst (eds) *Workplace of the Future*. London: MacMillan.
- Wenger, E. (1998) *Communities of Practice*. Cambridge: Cambridge University Press.
- Wenger, E. (2000) 'Communities of Practice: The Key to Knowledge Strategy', in E. L. Lesser, M. A. Fontaine and J. A. Slusher (eds) *Knowledge and Communities*. Woburn, MA: Butterworth-Heinemann.
- Willmott, H. (1995) 'The Odd Couple?: Re-engineering Business Processes; Managing Human Relations', *New Technology, Work and Employment* 10(2): 89–98.
- Willmott, H. (2000) 'From Knowledge to Learning', in R. Hull, M. Chumer and H. Willmott (eds) *Managing Knowledge: Critical Investigations of Work and Learning*. Basingstoke: MacMillan.
- Yin, R. K. (1994) *Case Study Research: Design and Methods*. London: Sage.

Contact Addresses

Graeme Currie is at the Business School, University of Nottingham, Jubilee Campus, Wollaton Rd., Nottingham NG8 1BB, UK.

[email: graeme.currie@nottingham.ac.uk]

Maire Kerrin is in the Department of Psychology, School of Social Sciences, City University, Northampton Square, London EC1V 0HB, UK.

[email: m.kerrin@city.ac.uk]