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Reproducing Knowledge: Xerox And The Story Of Knowledge Management

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Abstract

This paper is a commentary on discursive transformations that occur in stories told about Xerox's photocopier technicians, comparing particularly Orr's brilliant ethnographic study and a later management case study. It argues that significant shifts take place in how knowledge is understood between these accounts so that what begins as elusive, oral, improvised and social becomes increasingly presented as encodable in a structured database, countable, auditable, individualistic. These ideological transformations seem much to do with Xerox's own historic need to rebrand itself, and simply to sell a commercial product. Thus how knowledge is represented and what knowledge management might mean seems to be heavily influenced by corporate vested interests. The paper stresses the need to capture complexity in case studies if they are to promote a realistic or critical understanding of the organisation.

Keywords: Xerox, knowledge management, case studies

Introduction

One of the surprising findings of the Xerox PARC researcher, Julian Orr's studies of photocopier repairmen was that they talked a lot and with passion about their jobs (1996, p.89). They even used lunch times and breaks to chat usefully about work. In fact, storytelling (of a sort) was integral to their work fixing machines. These stories were collaborative, with the individuals spinning ideas off each other.

> "War stories are told in diagnosis when no clear formulation of the problem is emerging from the welter of facts. Technicians may find with some problems that they know a great many things about the machine but that the facts do not add up to a clear picture of the problem. Telling stories of more or less similar experiences is a way of pushing the facts around, trying other perspectives to see if they suggest other interpretations… The available information about the machine is not necessarily reliable and frequently less than clear: war stories have a great advantage in credibility because they recount the personal experience of a specific individual, whose competence is known and can be considered along with the material about the machine." (Orr 1996, p.126)

As stories told among experts they are elliptical, missing out taken for granted knowledge making them difficult for an outsider to understand (or recognise as stories). The final stories were reused, reversioned, reproduced:

> "Once war stories have been told, the stories are artifacts to circulate and preserve. Through them, experience becomes reproducible and reusable. At the same time, each retelling is, in a sense, a re-representation." (ibid., p.126)

Orr differentiated diagnosis stories from other narratives:

> "War stories are also told in pursuit of more purely social functions than diagnosis. They preserve and circulate hard-won information and are used to make claims of membership or seniority within the community. They also amuse, instruct, and celebrate the tellers' identity as technicians… Such tellings are also demonstrations of one's competence as a technician and therefore one's membership in the community." (ibid., p.126)

The technicians' work was found to be much to do also with customer relations: with "fixing the customer" (ibid., p.79). Thus the stories could be regarded as social in at least three senses: because

they were improvised socially, because part of their benefit was to produce a sense of belonging, and because some of the material of the stories is about people, customers.

Orr's work showed an early appreciation of the importance of narrative in organisational contexts. Other writers have further established the importance of stories as a means to study organisational cultures (Boje 1991, 2001, Boyce 1996, Gabriel 2000, Czarniawska 1997, 1998, 1999) as well as a tool, potentially, through which to change organisations (Denning 2001, 2005).

Organizational life is experienced as complex, frequently unexpected and ambiguous (Alvesson 2004, p.49). Yet managerialist and technocratic accounts tend to stress order and reasoned behaviour (Czarniawska 2003), privileging the perspective of "instrumental rationality" ie purposive, goal directed action (Watson 2002, p.81). Without denying the power and success of this perspective it does not really represent the fabric of social experience and it is precisely at this level the management task often occurs. Ambiguity stresses that there will always be multiple points of view. People will always operate within bounded rationality. Labelling different published accounts of events as stories acknowledges their ambiguity as claims about what happened. We know that stories are told from particular points of view and told for specific purposes. This opens up a focus on rhetorical character of discourse, with all its contradictions and evasions (Potter and Wetherell 1987) and allows us to hunt for the stories that are not told (Boje 2001, p.18).

Further, one could say that management is itself often taught through a sort of story, the case study. But part of the point of this paper is to ask how authentic are these case study stories? Often the case study appears as a pre-packaged narrative with a neat(ish) moral. It is revealing to look hard at how such case studies are produced. Frequently they seem to be constructed from existing practitioner publications or based on very limited research. The needs of the corporation to manage its image often influence what we are told. That is obvious, but in rather abstracted case studies the precise social/historical context is made less obvious, so that bias is disguised and a fuller and critical understanding is foreclosed. I want to argue that we should look at different versions of events to reconstruct a fuller more complex picture. For we need to offer truly complex stories in case studies or we are continuing to suppress the forbidden knowledge about organisational life (Czarniawska 2003) i.e. that it is messy, irrational, chaotic, conflictual.

Of course, we rarely have the luxury of a variety of published accounts about corporate experience from which to construct a truly complex case study. Fortunately, in the Xerox case we do (at a later point I will ask why?). This enables us to try and unravel the process by which the case study comes into existence, and to inquire into influences on its character. In understanding this, I will argue, we may also better understand the nature of the process by which knowledge management as a discursive construct is itself produced.

Purpose

Thus this paper examines the further layers of storytelling that have built up around Orr's (1996) findings. A particular focus will be on the differences between Orr's account and a management case study in the same problem space written by Biren (2000). These accounts are at variance in how they understand knowledge and the meaning of the term "war story" and in their view of the role of senior management. It is argued that a series of transformations have been wrought on Orr's work to produce the case study. These changes are evidently quite ideological and reflect a need to make the story safe and maintain corporate credibility, eg to disguise the ambivalent role of management. In fact, a link is identified between publicity for various KM initiatives and Xerox's need for corporate rebranding. It is suggested that this is an instance of a more general process in which the complex nature of knowledge gets turned into something far simpler and manageable, in order to produce advertising for IT based KM and laudatory accounts of corporate strategy. In this process, important voices are silenced and many potential lessons lost.

There is a direct link between Orr's work and *two* classic KM stories. Most obviously, Brown and Duguid used Orr's data and early papers to themselves write a seminal paper about communities of practice (Brown and Duguid 1991, note this was published before Orr's own book). Like Orr, Brown and Duguid were employees at Xerox's Palo Alto Research Center (PARC), one of the most

productive corporate research establishments of the 70s and 80s (Hiltzik 1999). Brown and Duguid were also colleagues, at the Institute of Research on Learning, a PARC spin-off (Jordan 1996, Clancey 1992) of Lave and Wenger, the researchers who first coined the term community of practice (Lave and Wenger 1991). So a widely read early account of communities of practice was written by Xerox staff, based on research by another Xerox researcher about Xerox employees.

Xerox's Eureka system is also a widely cited KM ICT solution, enabling technicians to share copier fixes. The system evolved across a variety of implementations and platforms, but in essence it is a structured database of problems and solutions. A key aspect of this is generally seen to be that the repairmen themselves upload the fixes, though there is an expert validation process too. The motivation to share fixes is professional pride rather than financial reward. Eureka was widely reported in technology news channels (Brown and Gray 1995, Moore 1999, Powers 1999, Barth 2000a, 2000b, Mitchell 2001, Roberts-Witt 2002) and found its way into such works as Earl's taxonomy of approaches to KM as a classic form of "technocratic systems" KM (2001, pp.218-9) and Blackler's (1995) account of the different forms of knowledge. A first hand account by two of the developers appears as Bobrow and Whalen (2002, see also Bell et al. 1997). It is also a central part also of Biren's INSEAD case study on Xerox's application of KM. It even appears as an instance of a portal in a recent book (Terra and Gordon 2003).

So some important narratives about KM emerged from Xerox PARC work during the 90s, all having a connection to the issue of "managing" the knowledge of photocopier repairmen. This paper examines the variations between these stories to try and reveal what lies behind their creation. It addresses the question of how Xerox's specific corporate needs feed into the process by which these classic KM solution(s) emerged? What does this tell us about the nature of KM? Is it – as some have claimed (Wilson 2002) – just a rebranding of IM?

The repairmen's stories are tied up with the story of KM, but they may also be wrapped about by stories about Xerox and PARC themselves as organisations. Broadly there seem to have been three versions of Xerox's history current in the Nineties. They tend to focus on PARC's contribution to developing the microcomputer, for PARC more or less invented the graphic user interface, the mouse and the PC – not to mention Ethernet (PARC 2006, Wu 2002). Smith and Alexander's (1999) *Fumbling the future* tells the story of how Xerox invented the PC but never made any money out of it. The invention was handed to Apple on a plate. Hiltzik's (1999) judgement in *Dealers in Lightning* is less harsh. His point is that Xerox's business was leasing big machines to business, they would not be a plausible company to market the PC to end-users. Selling PCs to a mass market was never going to fit into their existing business. Besides Xerox did make a lot of money out of the laser printer, so PARC's endeavours were not wasted (see also Brown 1991).

It may be possible to identify a third view. Ted Nelson argues that a great chance to reinvent how work is done was lost because the PC as we know it is deeply inscribed with patterns of behaviour from the print world: so that we tend to use the PC within a print world mindset. This is reflected in a lot of the language of the PC where we spend most of our time typing documents, saving them into folders and printing them. Nelson sees radical possibilities in true hypertext.

> The usual story about Xerox PARC, that they were trying to make the computer understandable to the average man, was a crock. They imitated paper and familiar office machines because that was what the Xerox executives could understand. Xerox was a paper-walloping company, and all other concepts had to be ironed onto paper, like toner, to be even visible in their paper paradigm.

> But who cares what Xerox did with their money? That was lab stuff. It was Steve Jobs that turned PARC's work to evil. He took a team from PARC and made a bargain with the Devil, and that bargain with the Devil was called the Macintosh. […]

> Today's arbitrarily constructed computer world is also based on paper simulation, or WYSIWYG. That's where we're stuck in the current model, where most software seems to be mapped to paper. ("WYSIWYG" generally means "What You See is What You Get"-- meaning what you get *when you print it OUT*). In other words, paper is the flat heart of most of today's software concepts.

> This too was a key legacy of Xerox PARC. The PARC guys got a lot of points with Xerox management by making the "electronic document" MIMIC PAPER-- rather than extending it outward to include and show

all the connections, possibilities, variations, parentheses, conditionals that are really there in the mind of the author or the speaker; rather than presenting all the details that the reporter faces before cooking them down.

(Nelson 1999)

Nelson blames Apple for the failure to realise the possibilities of hypertext. But the key point for the argument here is that it is possible that inadvertently PARC were rather successful in benefiting Xerox through their involvement in the early history of the PC. For although the company made no money directly from the invention, the way that the paper-full office was embedded into the PC benefited the "document company" because it maintained a document centric view of the world. This plants the seed of the question: did something similar happen through Xerox's prominent role in the creation of KM?

Method

So this paper unravels some of these stories: about KM, Xerox, PARC, Eureka - as well as the stories told by the repairmen themselves.

My method is partly that of the historian. It assembles different accounts (books, journal articles, media reports) of broadly the same events and compares those accounts to try and build up a fuller picture, noting the tendency of documents to be created for a specific purpose to persuade us of something and also to contain unwitting testimony (Marwick 2001, pp.180-2). I made every effort to obtain everything that had been published about Eureka and the case of the copier repairment. The process could be conceived of as somewhat equivalent to the triangulation of data, ie building up a more complete account by comparing different perspectives on the same phenomena. In this case in the absence of direct access to the organization or actors, published accounts provide different view points. These probably reflect local differences of interpretation, different local stories about the same events (Gabriel 2000, 32-42) though one has to take into account the impact of the process of writing and publication itself in forming how the stories are presented. The method is partly also discursive, analysing rhetorical variations between different accounts of the same or related events, and linking such variations to wider discursive structures. Potter and Wetherell (1994) stress that "using variation as a lever" ie finding differences within and between texts, is a key analytic strategy in discursive psychology. I will also note that within certain genres of writing aspects of problems are systematically dropped.

It should be acknowledged that the author has no direct knowledge of what happened at Xerox. I am deeply respectful of Julian Orr's marvellous study. One has also to admire the ingenuity and energy of the developers of the Eureka system. I hope it will be obvious that I am not accusing any of the writers of the works I cite of bad faith: they were assembling accounts of complex and ambiguous events (Alvesson 2004) – it is not surprising if they were selective about what is presented. That is inevitable. This paper itself is after all just another narrative in which these accounts are reassembled by another storyteller.

Differences between the stories

Orr's book encapsulates the many ways in which important workplace knowledge is often different from the socially dominant, scientific ideal of written, generalised theoretical knowledge, in that it can be:

· Kinaesthetic (Orr 1996, p.98)

· Pragmatic

· Local

· About the social as well as technical

· Oral

· Improvised

- Narrative
- Elliptical
- Collective, owned, contested

Foregrounding these attributes can be seen as a post modern vision of workplace knowledge. It surfaces the impossibility of disentangling information, knowledge and culture. In fact, I would argue that seeing knowledge as being (sometimes) like this is more fruitful than focussing on the tacit/explicit knowledge divide so often emphasised in writing about KM. Certainly, it poses an extreme challenge to the organisation – how can such knowledge be "managed"?

This stance is in contrast to much KM writing which takes as its starting point a positivist view of knowledge as "justified true belief", ie something objectively true and which, if it starts as being tacit or embrained, is capable of being elicited or harvested and then encoded in a document or on a computer. In other words, it assumes that knowledge can be commodified, made into a thing. IT systems that do this, be they expert systems or intranets, are among the classic KM solutions.

Without denying the possible organizational benefits of such an elicitation process - it could also be troublesome and unsuccessful. Knowledge can be too difficult, uncertain, dynamic, context dependent, costly or sensitive to be encoded (Newell et al 2002, pp.106-7; see also Hislop 2005, pp.27-40). More fundamentally, the notion of knowledge as objective truth is epistemologically outdated (Alvesson and Karreman 2001, p.998). Any encoded "knowledge" will always require interpretation by the reader of it, and the framework of interpretation is itself not something that could be simply transferred or recorded (Newell et al 2002). On the whole therefore knowledge elicitation processes only address part of the problem of knowledge sharing.

Orr comments:

> Reporting the importance of stories to many audiences, however, draws an apparently automatic response that those stories must be collected, preferably in a data-base (Orr 1995, pp.53)

This is indeed prescient, for what we see in works by later authors is precisely that creating a database is claimed to be the "solution" with the effect that the challenging nature of the knowledge of the repairmen evaporates. To show this I will itemise a number of transformations that occur through the different representations of the problem space, particularly between Orr (1996), Bobrow and Whalen (2002) and Biren (2000). Of particular importance are transformations in the nature of "war stories" and the role of management.

1. "War stories"

Critical transformations take place between Orr's account of what a war story is and what the phrase means in accounts of Eureka. Thus Orr sees them as:

- Oral
- Narrative
- Social - improvised by a number of people in face to face interaction
- About the professional identity within a community as much as about sheer information
- The construction of a professional identity of competence is partly to help "fix the customer"

Writers about Eureka continue to use the term "war story" (eg Biren 2000, p.8), but within the Eureka system they are:

- Written down, recorded
- Recorded within a relatively simple structured database framework: problem / cause / solution – not narrative at all

- Owned by a particular individual, whose (global) reputation is boosted by his sharing of the fix

- Formally validated by other experts

- Strictly about technical matters

Firstly, for Orr the stories are collaborative and improvised – the whole point is that understanding arises through a social process of bricolage. In contrast, the Eureka system is essentially a database, the main interactive process is formal validation. So the creative interaction of people talking to each other disappears. Next whereas Orr's point is that the knowledge is oral, in Eureka the knowledge is precisely written down, or at least encoded into a computer database. Rather than an emergent narrative, retold in different ways, the information in the database is highly structured, fixed. Central in Orr's account of the technicians' knowledge are practices relating to the customer, and fixing the customer. Again, the database is purely for technical fixes. Further, the reward in Eureka is individualistic: for personal reputation within a global community. The motivation Orr uncovered was to be part of an essentially local community, which is key to a sense of belonging in an alienating context. It is difficult to see people gaining the same sense of social support that the original community offered through a global reputation system.

It may be worth noting in passing that Orr never himself uses the term community of practice, rather refers to van Maanen and Barley's (1984) notion of occupational community. This is the idea that people in the same line of work, such as railwaymen or policemen, will like to associate with each other and have a similar mindset. Such strong associations arise because the work they do carries with it a way of thinking and is the same in many different locations/ organizations. If we look at the subsequent history of the notion of community of practice, there is a consistent tendency to muddle the idea of a pattern of communication and relationships that emerge locally, around a specific practice, without regard to pre-existing professional boundaries (Wenger 1998, p.125) with organized professional communities of some sort. There is a good case for saying that Orr was well advised in trying to maintain the distinction. The repairmen are a community because they are in the same job, have had the same training etc, not through primarily local processes.

Other aspects of the photocopier repairmen's knowledge also drop out of sight. Orr makes great play of the local nature of problems, i.e. that specific machines have their own history therefore their own problems, they also exist in particular social settings and are known by this (1996, p.91). In other words, context is key, knowledge is local. The Eureka system is global, by definition it cannot address issues of local knowledge. So however successful it is, it cannot be addressing knowledge at this level.

To note these transformations is not to deny that Eureka works or that it has saved Xerox a lot of money (critically, for its apologists, a quantifiable amount of money) (Biren 2000, p.10). Clearly the Eureka system offers Xerox a range of advantages: global sharing of fixes, measurable outcomes, the potential for the data for the field technician to feed into sales or design, or the same database to be used for other "communities" within Xerox (Holthouse 2002) or sold to other organisations (Hawes 2002). In some sense the whole point of the case is to prove how knowledge which is difficult to get at can be harvested into measurable, generalised forms. However, it does seem that Orr's most challenging observations are subverted in this.

The upshot of these transformations is to make the knowledge that the repairmen have much more familiar looking, the main difficulty being to harness individual pride and motivate that knowledge "be shared" through technology. The implications of accepting that much of working knowledge is oral, collective, contested drop away. The nature of the transformation clearly makes it fit the soceital preference for encoded over narrative knowledge (Czarniawska 1997, p.17). This is not to say that Xerox have not benefited from Orr's insights. Orr's own "solution" ("the Denver project") was to give the technicians radios so that they could keep in constant contact and extend the storytelling even when not collocated (Orr 1995). Xerox technicians continued to use radios and value them. But Xerox are keener to tell the story about the database Eureka. Certainly it focuses our attention on a fairly palatable conclusion: if you want to manage knowledge get a database. From Xerox's point of view, buy theirs.

Although Bobrow and Whalen's (1999) account is sympathetic to Orr in its stress on the importance of participative development and implementation, a large focus is on solving the technical problems of delivering a reliable up-to-date information source within a changing technical infrastructure. Thus Eureka migrates across laptops, Minitel, the web – mirroring broader changes in computing. This reminds us of the complex actuality of developing a system within an emergent technical framework, and is a useful anti-dote to the buy a system to solve your problem mentality. Barth (2000c) refers to other failed strategies to getting the technicians to share knowledge – working out what works is difficult. I would argue that the Biren case study gives relatively little weight to the long and complex task of development and implementation, thus again crucially foreclosing the reader's learning from the case. But even the Bobrow and Whalen paper does seem to be far more technocentric than Orr's. When all is said and done, however participatory the design and implementation process is, the claim is now that knowledge can be captured in a database.

Eureka has continued to be developed and is now offered as a commercial product Linklite which "is based on a scalable, distributable, light-weight native XML database, with [sic] and extensible XQuery front end that makes it easy to adapt and shape applications to users needs for knowledge sharing" (Bobrow 2006). To quote this is slightly unfair, but it does hint that the rhetorical focus is now on a specific technical infrastructure, on difficult technologies not difficult knowledge.

2. Management's role

The other key difference across the stories about the technicians is in the role of management. For Orr, the counter culture of the repairmen is premised precisely on the disregard of a Taylorist senior management. Management assume that the technicians should simply follow instructions in the manual. In reality, the manual is just a "useful resource" (Orr 1996, p.111). A quirk of the production process means that the manual is anyway simplistic and certainly it does not offer a definitive set of instructions for every eventuality. The war stories told by the technicians resist management disregard by presenting themselves as professional, knowledgeable heroes, not just manual workers mechanically following rules. The whole point is that their collaborative activities are invisible, occurring outside management control – uncounted, unvalued. This is how they resist management's definition of their status.

Brown reports that one of Xerox's first reactions to Orr's discoveries was to put up posters telling people not to waste time telling war stories (Brown 2001).

Orr's own "solution" (aimed at improving the lot of the technicians rather than productivity as such) was giving them radios, but he deliberately did not give management radios, to avoid it becoming a tool of surveillance (Orr 1995, p.56). Nevertheless the project is subverted (see also Baba 1998):

> As the radios become a goal in themselves it becomes reasonable for those with that goal to contemplate buying radios by reducing the number of technicians. It also becomes reasonable to save money on the purchase price of the radios by giving up some of the functionality of the radios […] (Orr 1995, p.58)

His point is that management have difficulty acknowledging the creativity of the workforce (see also Mitchell 2001), and constantly regress to Taylorist assumptions, i.e. that ultimately the repairmen are a cost.

This chimes well with one of Lucy Suchman's two fears about the use of ethnographic field work inside organisations. For Suchman (also a one time Xerox employee) there was a concern about the potential mis-use by corporations of ethnographic work making "invisible work" visible, through a trusted relationship between ethnographer and worker, resulting in increased surveillance and control (1995). For ethnography respectfully examines how work is really done, but how the findings are used by management is unpredictable.

Orr's point about the role of senior management is echoed in Bobrow and Whalen's (2002) story of Eureka (see also Scharmer 1999). They show that it was PARC working with the peripheral French division of Xerox that first developed the system. The early project name, Colombos, implies an intent to recross the Atlantic at some point. Clearly it is significant, however, that it was pioneered in a relatively small part of the corporation, distant from the centre. Lack of management support forced

the team to adopt a participatory design and implementation approach. US management consistently disbelieved that the repairmen had any knowledge worth recording or sharing (Bobrow and Whalen 2002, p.57).

Ironically, when management did finally accept the concept of Eureka the consequences were ambiguous because they then required the system to be rolled out at such a speed that the participatory process was truncated (ibid., p.57). Management support was a double edged sword.

Further, in at least one of the journalistic pieces, it seems that lack of management support was a *success* factor:

> Next the researchers turned their attention towards Canada. Still unsanctioned by management, Eureka was distributed quietly at first, handed from user to user on a floppy disk, like a bootleg Springsteen tape. "We just did it. It was a guerrilla sort of thing," says Cheslow. "And it was clear this added to the sense of ownership." (Mitchell 1998)

This sense of contested knowledge disappears in the INSEAD case study. Rather the account of Eureka is placed after a long piece of text describing how Xerox is an early adopter of KM, evidently based on interviews with senior management. No explicit claim is made that Eureka is a management initiative, but the reader is bound to infer this from the structure of the text – why else is the Eureka case preceded by a long account of management thinking about KM? There is little in the account here of Eureka that hints of difficulties between management and repairmen. Indeed, if anything it is implied that there may be worker resistance to the innovation (Biren 2000, p.13), helping us to read the story in a familiar way that the "old-fashioned" workforce resists technical change.

The explanation for this narrative transformation seems to me to lie partly in the demands of the genre of case study, which is meant to be a tool to teach management skills. The central rhetorical trick of such works is to construct the reader in the position of identifying with senior management. Inevitably, therefore it tends to focus on positive images of and lessons for management. This makes it difficult to acknowledge the conclusion that a success factor is lack of senior management support. It also reflects the needs of Xerox itself.

Buried in the Biren study and some of the other works that have been referred to is a sense that the Eureka project may have been a hard learning lesson for Xerox management and that they have truly learned from the experience. Barth (2000c), for example, refers briefly to various other failed attempts by Xerox to capture the technicians' knowledge, eg at appraisal. Bobrow and Whalen refer to another technical approach which had failed (2002, pp.48-9). It seems reasonable to guess that Xerox management were worn down by these failures and finally learned the hard lesson that their staff did actually have worthwhile knowledge. But none of the accounts tell us this story properly. If we want to explore these failed initiatives and observe management learning happening, none of the accounts really supplies us much to go on. This means we have no chance to follow the learning experience; rather we are given the pre-packaged solution.

Transformations

Thus, just as the nature of knowledge embedded in war stories changes to a more familiar individualistic, technical story making the nature of knowledge (in KM) precisely something that can be captured effectively in a database; so also the role of management in KM – at least in the Biren account - becomes something much more acceptable to conventional thinking. The usual wisdom that KM will only work with senior management buy-in seems to be supported.

Table 1 summarises some of the transformations that seem to have occurred to Orr's (1996) account in Biren (2000).

Table 1: Knowledge is…

For Orr (1996)	*In Eureka (Biren 2000)*
Narrative	Entered into a structured database
Oral	Written, encoded

Improvised socially	Formally validated
Motivated by desire for membership of a group of peers, collectively owned	Motivated by individual reputation within a global community, individualistic
About managing the customer as well as technology	Purely about technology
Authentic in its complex detail and recognition of human agency	Productised
Uncountable, invisible	Countable, visible
Incommensurable (because judged by a particular community)	Of measurable financial value
In resistance to management, or at least interstitial, invisible	Manageable
Interconnected with both information and culture, making KM a difficult concept to make seem sensible	Can be turned into information, producing KM which looks much like IM
Discovered by a lengthy and difficult process of ethnographic field work	Constructed as a case study from interviews with senior management

The transformations are just those we would expect. After all, in the long run knowledge is likely to be seen as worthwhile only when it can be counted, measured in money terms, written down, put into a computer database, transmitted globally, is owned by individuals/ the corporation and extracted via individualistic motivation and - above all - managed. But to manage what is essentially information is not the same challenge as Orr discovered at the heart of the Xerox.

This is not to deny that Eureka works, just that Xerox have chosen to focus on the less challenging aspects of the issues raised by Orr. This (and decisions like it) has influenced how this case and knowledge *management* has been understood. Thus an open minded, critical interest in workplace knowledge is continuously being turned into KM, generally little distinguishable from IM.

It is interesting to note how ethnography as a practice has been compromised in this process. Suchman's second warning about the use of workplace ethnography is about it being used effectively as a rebranding tool (2000). A corporation can use its employment of ethnography as a way of showing that it is "really interested" in its customers or staff. We see this potentially in several accounts of Eureka. For example, Barth (2000c) writes:

> Xerox managed to deploy a system that serves every technician's needs, but the solution wasn't technology. It was anthropology.

Introducing anthropology delivers a nice dramatic shock in the story. But this does not take away from the fact that the solution is nevertheless actually a computer system. The mention of anthropology is merely a rhetorical device.

Of course, it is possible to argue that the community of practice concept embodies these more radical, challenging ideas, whereas Eureka offers an alternative view of the extent to which such intangible forms of knowledge, can with some effort be made explicit. This would be not an unreasonable conclusion. However, since we increasingly have a technology orientated, managerialist conception of the community of practice this perspective has gradually been extinguished too. But that really is another story (Contu and Willmott 2003, Cox 2005).

The story of PARC

Thus a series of significant transformations have occurred across the Xerox stories. These systematically subvert the more challenging aspects of Orr's original findings, especially how

complex, rich and social is knowledge – and how difficult it is for management to get involved in its control.

The next question is how and why has this occurred? In order to understand the case properly we need to locate it in a precise historic and social context. Most obviously, one part of the explanation is that Xerox offered Eureka productised as a KM solution for sale. So the story of Eureka can be seen as a piece of marketing for this product. This influences them to disregard more inconvenient aspects of Orr's story.

However, at a deeper level I would argue that the work that is being done through all the stories is that Xerox itself is being rebranded, through its association with KM. If this seems a little cynical the following extracts from a case study by a global technology PR agency, Text100, shed light on this self conscious process:

> In 1996 Xerox came to Text 100 for help turning around the reputation of the company. Xerox sought to reinvigorate its image, to eliminate the negative angles from its coverage and to ensure that PARC was seen as it truly is, a brilliant research center that will prove to be a pioneering force of the future. (text100 n.d.)

The text continues:

> Xerox was losing money, and to the business press, it appeared the twenty-year cycle would never end. Text 100 realized that in order to combat the negative perceptions of Xerox and to prove to its critical audiences Xerox' ability to lead the digital revolution, the company urgently needed to implement an aggressive repositioning program. Text 100 identified the best strategy to build credibility for Xerox – to use PARC as a proof point for innovation by clearly communicating the intellectual talent at PARC and what steps Xerox is taking to use PARC's research to impact the bottom line.

So it would seem that, in the context of damaging stock market perceptions, the PR company explicitly recommended that Xerox use PARC research activities to rebrand itself as a cutting edge company, and escape its potentially old fashioned image bound up with copying paper.

The PR company reviewed activities at PARC and from this "Text 100 identified five research projects that were likely to have media appeal and could be used to position Xerox as a technology leader." One guesses that Eureka has benefited from being identified as such an interesting project.

After all, Eureka is a corporate dream. It saves money directly by sharing fixes and improving reliability of leased machines. The data it contains is potentially reusable in redesigning machines or selling new ones. The community orientated database concept is reusable across the corporation and the database system can be resold to other organisations. Above all, the case projects Xerox as a go ahead, dynamic company through its pursuit of KM and waving of the magic wand of "anthropology". Of course, this masks some ironies.

In the INSEAD case study the author quotes (unquestioningly) a Xerox manager saying:

> If X(erox) equals D(ocuments) and D equals K(nowledge), then X also equals K (Biren 2000, p.4)

This is a truly ironic claim, for the whole point of Orr's research – certainly in the hands of Brown and Duguid (1991) - is that knowledge is not equal to documentation. What is written down is *inevitably* flawed as an account of how work is done. It follows presumably that Xerox does *not* equal knowledge management, since D does not equal K.

This deconstruction hints that just as Nelson argues that the self-described "document company" managed to inscribe within the personal computer a paper orientated view of the world, so they also managed to inscribe within Knowledge Management a document orientated view that revolves around recording information in computers and is often little more than Information Management. Given Xerox's core business we should not be surprised that for them KM morphs into something document centric, ie something centred on explicit, codifiable knowledge.

This is not to claim that there is a corporate conspiracy. Rather it reflects the needs both of Xerox to turn a rather challenging case into something palatable, productisable and ideologically safe and further linked to the management school need to produce a satisfying output within the case study genre, and leverage the magic of the name of the big corporation. I would argue that this is a process

that may be continuously happening with knowledge management. Observations from a critical interest in knowledge are continuously being turned into ideologically safe accounts, which reproduce dominant social values such as individualism, managerialism and the privileged status of that which is written or encoded in a computer. This reflection shows how KM is compromised by the needs of brand and productisation, and begins to explain how it comes about that KM so often gets turned into Information Management. Often commentators have focussed on the role of management consultancies in inventing knowledge management (Wilson 2002, Hislop 2005). No doubt they are central to the process, but corporations themselves have a role. And all these institutions draw on underlying ideological constructs that define what is credible.

These reflections are relevant also to the critical appraisal of case studies. Here, it becomes relevant to ask how the case was chosen and why Xerox cooperated in its creation. Once these questions begin to be asked the case study can be seen as a story, a version of events. We start to query the adequacy of the methodology and to try and locate bias.

This I would argue is a generic problem. Many management text books borrow case study material from previously published articles. In the process of decontextualisation, one view point becomes priviledged and aspects of the concrete historical and social context are hidden, making it difficult to get a critical purchase on the material. It is always worth tracing the source of a case study to a previous publication. Just seeing it in its original context of publication is enough to turn it from a seemingly timeless, prototypical case to a concrete example capable of being criticised, its generality questioned, its methodology unravelled.

Conclusions

I have referred to a number of conflicting stories in this paper:

- A subtle and sensitive ethnographic account of work practice (Orr 1996)

- A seminal analysis which identified a classic social form (a community of practice) in which knowledge is created (Brown and Duguid 1991)

- A genuinely successful computer system for people to share knowledge in a global corporation (Biren 2000)

- A bottom up initiative that produced a knowledge sharing system (Bobrow and Whalen 2002)

- A bottom up initiative that changed Xerox management philosophy (untold)

- A marketing exercise used to launch a product (Linklite) (Digital perspective 2002)

- The tale of how PARC, anthropology and KM are used as material for corporate rebranding (Text100)

There is no one "true story" (Czarniawska 1999, pp.90-2). A fuller understanding involves accepting uncertainty and not evading the complexity by trying to define one account as the true one. We need to have a "negative capability" to be "capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason" (Keats 1817). There are plenty of grounds to read the story as Xerox wishes it to be read: to see Eureka simply as a success story about how knowledge can be reified and efficiently harvested. Equally, there are elements in Orr's account of the technicians' knowledge that can be presented not as post-modern, but as pre-modern. There is something atavistic in the storytelling around mechanical work. One might also recognise that the culture of the repairmen has the hallmarks of a male boasting culture. Orr does not himself comment much on matters of gender. But what is most missing from the INSEAD case study is a sense of complexity.

I would argue that we need to develop many more of the case studies we work with in teaching KM/management to represent such complexity: to let in the forbidden knowledge of organisational confusion, multiple stories, conflicting values, subverted intentions. As part of this we need to question how existing seminal case studies have been produced and to identify the discursive

transformations that occur as the story is spun in the service of corporate and management school needs, in order to recapture the truly challenging aspects of these stories.

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