

KNOWLEDGE MANAGEMENT: CONCEPTS AND CONTROVERSIES  
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# **THE ROLE OF PRIVATE AND PUBLIC SPACES IN KNOWLEDGE MANAGEMENT**

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# THE ROLE OF PRIVATE AND PUBLIC SPACES IN KNOWLEDGE MANAGEMENT

Victoria Ward and Clive Holtham

## 1 INTRODUCTION

### 1.1 Space: conceptual, personal and social aspects

In most dimensions of knowledge management social and personal issues are highly relevant. The effectiveness of physical space for knowledge work is dependent on what is physically delivered through architecture, construction and facilities management. It is at least as dependent on personal and conceptual space - territoriality, privacy, and intimate communications.

In this particular enquiry, we are intrigued by questions such as:

- How are deeply instinctive, individual, unpredictable *tacit* processes made visible and effectively harnessed (which is not the same as managed)?
- How is the collective outcome of knowledge creation to be distilled in such a way as to maintain its relevance to that point in time, but also (without losing context and the contributions of individuals) to form part of an evolving history that inform future decisions and judgements?
- What is the role that physical space design can play in answering these questions?

The structural instability and the individuality of contribution which underpin knowledge sharing and creation pose a significant challenge.

We are primarily concerned with knowledge work in businesses, generally rather than in education or public sector workplaces, or specialist locations such as residential homes or health care facilities.

### 1.2 'Knowledge work'

The use of the term 'knowledge work' is not without its critics. Knights, Murray and Willmott (1993) argue that this term distracts attention, since knowledge forms part of all forms of human activity. Blackler (1995) amplifies this:

“all individuals and **all** organisations, not just so-called 'knowledge workers' or 'knowledge organisations', are knowledgeable”.

It is not our intention here to imply differently. Our focus is however on work activities that are dominated by the creation of new knowledge typically of strategic value to the organisation, and to its sharing primarily at managerial level. We are not here concerned with what we define as “information work”, even though we accept that this does also involve knowledgeable workers. We are using the term “knowledge work” as a shorthand, not as a method of valuing some jobs more highly than others.

### 1.3 Method

The aim of this paper is to examine the relationship between physical space and knowledge creation and sharing, with particular reference to the psychological (conceptual and personal) dimensions of that relationship. Our research method involved:

- (a) Structured interviews and site visits with over twenty executives and consultants, in the UK and USA, directly concerned with the planning, specifying, supply or use of office space geared to knowledge workers
- (b) An extensive review of the architectural/facilities management literature relating to office work space, and of psychology, sociology, communications and anthropological literatures concerned not only with office space (a relatively narrow literature), but also with more general study of the way humans perceive, and behave in, space important to them
- (c) Action research, including collaboration with specialist experts in certain fields (in particular a theatre designer)
- (d) The formulation of preliminary hypotheses which lead us to infer principles that need to inform design of space for knowledge work.

Two analytical frameworks were developed. The first is a practical mapping tool. This enables workspace planners and knowledge strategists to identify current and desired future goals for knowledge spaces. The second evolved from the research process itself. It provides those responsible for business strategy, workspace planning and knowledge management with a check list of areas that are inter-related, and to which specific attention should be paid.

### 1.4 Brief summary of literature

#### (a) Workspace planning and architecture

There is a very significant literature in this area, with a highly influential role played by practitioner Francis Duffy of DEGW (Duffy, 1992, 1993, 1997) and Francis Becker of Cornell University (Becker and Steele, 1995). Carnegie-Mellon University has been involved in research (Hartkopf et al, 1993). In the UK, the Bartlett School at UCL has developed a methodology for examining the use of space (Hillier, 1984), which has been deployed particularly successfully to office work (Penn et al, 1997). Essays can also be found on the Steelcase website which directly examine the different activities of the knowledge worker and then position these in physical space.

Some historic insights into multi-functional building purpose are to be found in the examination by Jardine (1999) of the scientific discoveries of the 17<sup>th</sup> and 18<sup>th</sup> century.

#### (b) Organisational structure

Mary Jo Hatch (1997) cites the American Hawthorne research of the 1920's and 1930's. This is often credited as providing the foundation for the field of human relations, identified links between physical structure (in the workplace), social influence and behaviour. At the same time it marginalised the importance of physical structure in that equation. The sociologist, George Homans, observed that the social effects registered by the Hawthorne researchers were, in fact, triggered by a change in physical structure. In this instance it was a move, but an alteration of design, layout etc., could equally apply. Homan's argument was that the change was symbolic of management's concern for their staff, ergo physical structure was setting the social dynamics of a changed situation in motion.

### (c) Urban design, sociology

Tornqvist (1978), Rogers (1997) and Sennett (1990) take planning and sociological perspectives on the design of urban spaces, which we have found particularly valuable when coming to consider the design of spaces for knowledge work. There is also an emerging documentation on the role of masterplanning.

### (d) Anthropology

There are very substantial ethnographic references which examine the social spaces and habitats of non-western and historic communities. We have been surprised about how much of this work appears to be of at least superficial relevance to the design of spaces for knowledge work in first world office environments. Issues of territoriality and privacy appear to be fundamental to the human condition.

### (e) Business strategy and organisational behaviour

Professor Parkinson took a close interest in the link between office space and business success (Parkinson, 1965). More recently Fritz Steele (1973; 1975) has examined the links from an organisational behaviour perspective. Michael Schrage (1995) has examined the importance of the notion of 'shared space' in collaborative work. There is a relatively small literature from practitioner experience. The description of innovations at the St. Lukes Advertising Agency is a particularly well known exception (Bumbo and Coleman, 1998).

### (f) Communication

The seminal works of Innis (1950, 1951, 1952) and McLuhan (1964) are relevant. They examine the important distinctions between oral and written, long distance and proximate communications, and their impact on 'monopolies of knowledge'. There is a direct connection here with considerations of whether a knowledge space is a space of record (written) or a space of communication (oral).

### (g) Knowledge Management (KM) practitioners

It is clear from our interviews that leading KM practitioners tend to have a good grasp of the links between knowledge, knowledge space, and business success. This is not frequently reflected in the actual design of physical space. It may be easier to inject KM principles into the design of new or nearly new workspaces, than the refurbishment of existing spaces.

There are a small number of specific examples where KM principles have been applied to specialised areas, such as Edvinsson's Skandia Futures Centre, or "Creativity Laboratories" e.g. Hoechst-Celanese, the UK Post Office Innovation Centre, West London Training and Enterprise Council Executive Studio, and the Ernst and Young Accelerated Solution Environment. The literature on these is limited.

## **2 CURRENT POSITION**

### **2.1 The gap between form and function**

At the worst, office design has been influenced by funding considerations almost wholly devoid of analysis of exactly what type of work is likely to take place in the building over its lifecycle. Less extreme, but no more desirable, is workspace planning as a by-product of a financially dominated facilities management exercise. According to Worthington (1997):

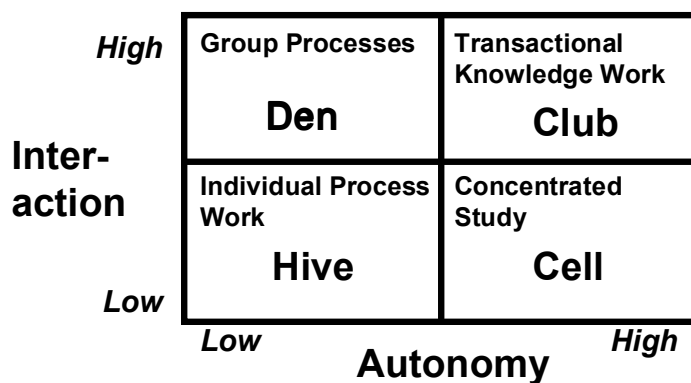
"the design of office buildings has often not been closely related to the needs of the organisations who use them".

A more encouraging picture emerges from figures collected from the City of London. These show a 40% increase in the space per person over a 20 year period. This increase reflects larger individual workplace standards and increased ancillary and support space. There are also signs that the importance of time as well as space has begun to be recognised. Priorities are established by how often a space is needed for a particular use as well as by how important that use actually is. However, there is normally a complete absence of briefing from clients on what their specific requirements are for knowledge work.

## 2.2 Conventional wisdoms on the contemporary office

Predictably, the literature from workspace planning/architecture strongly dominates the aggregate of literature on offices for knowledge workers, so this provides much of the current conventional wisdom, especially the highly influential work of Duffy and DEGW (Duffy, 1998). He has developed influential models such as the grid shown in Figure 1. This uses two axes of autonomy and interactivity, leading to four broad types of office space – Hive, Club, Cell and Den. (Figure One)

### Work Patterns and Space



Duffy(1997)

These methods, researched and implemented over more than thirty years, are entirely appropriate for the general purpose planning of office space. However, the sub-set of workers who are primarily knowledge workers, and of spaces whose purposes are primarily for knowledge work, is less well served by this type of general framework. It is not that the conventional wisdoms of office design are 'wrong' for knowledge work. It is more that those wisdoms have not been fully developed to the granularity or detail necessary to extract the maximum knowledge benefits from any given space.

## 2.3 Taking time to understand

We contend that where offices are being built or re-fitted for knowledge workers, space planners and executives should not be afraid to spend time reflecting on and clarifying the "spirit" of the building. Particular consideration needs to be given to the philosophy sought for knowledge work, not only at the time of opening but also to reflect changes over at least the first decade of the building. And we would push this further in emphasising that tools such as metaphor are critical to this blueprinting process.

## 2.4 Single mindedness and open mindedness

It is convenient to portray methods for creating knowledge on a spectrum from individualistic at one end, to, collaborative at the other end. In this paper we are particularly concerned with creating a two dimensional perspective, adding to this knowledge-methods spectrum an orthogonal spectrum relating to the physical places where knowledge may be created and shared.

In ‘Small Cities for a Compact Planet’, Richard Rogers (1997) cites the political theorist Michael Walzer, who has classified two distinct groups of urban spaces. ‘Single minded’ spaces fulfil single functions. ‘Open minded’ spaces are conceived of as multifunctional, and participative. Single minded spaces are offices, car parks, houses. Parks, cafes, busy streets are all illustrative of open-minded spaces where a sense of urgency is replaced by an inclination to engage and participate with other people. There is a very clear relevance from these two groups as a metaphor for knowledge space. So our knowledge place spectrum ranges from single-minded to open-minded.

**Figure 2: Types of Work Space**

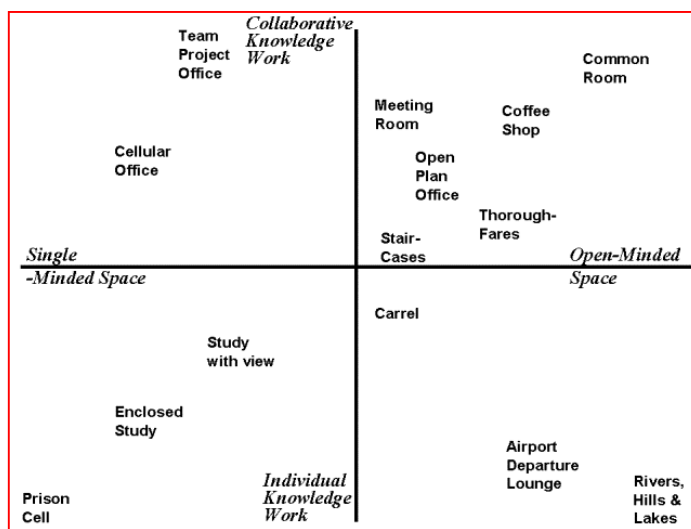


Figure 2 illustrates the two dimensions of knowledge work and of the mindedness of space, together with illustrations of particular locations. There are some interesting outliers in these examples. For example, the most open-minded space of all – the free fresh open air, has throughout history been capable of stimulating the most creative thoughts. And although the same has also happened in an enclosed prison cell, in general this form of sensory deprivation is probably not conducive to creativity. A busy, crowded, stressful airport departure lounge – a model of open-mindedness – may well be cited by executives as a place where they can readily carry out individual knowledge work. The cellular office may be frequently used as a place for small-team meetings and hence score relatively highly as a collaborative work location.

As we reviewed the very diverse range of physical spaces used for knowledge creation and sharing, and started to map them onto the methods/places grid, it became clear that there were a range of key factors that had significant implications for the relative success of spaces in supporting knowledge creation.

### 3. CONSTRUCTING SPACES FOR KNOWLEDGE CREATION

Organisations designing knowledge spaces often pay too little or no explicit attention to what we believe are key choices:

#### 3.1 Habitat

The workplace needs to be seen as a habitat rather than as a ‘web of extended social relationships’, as emphasised in Acker’s (1997) essay on space and collaboration which points out that the workplace often leaves us nowhere to hide. Knowledge ‘shelters’ need to be created which enable reflection and meditation. Doing nothing *is* an option in knowledge work.

Kraut et al (1990) studied how R&D workers actually interacted. More than 80% of the most valuable interactions were classified as informal. The study discovered three common types – the call, the vending machine and the short stop. This latter is particularly interesting:

“A typical sequence observed as people walk down halls is for them to peer into open offices and public places as they go to the printer, copy machine, bathroom, or other destination, they do not slow down, but simply turn their heads as they pass open doorways. This process of browsing the social environment while on other business provides people with a substantial amount of information about the world in which they live”

The authors concluded that

“None of these brief episodes of informal communication was especially significant in their own right.... We believe that in the aggregate, they are fundamental methods that organisations use to get their work done, transmit organisational culture and firm-specific knowledge, and maintain the loyalty and goodwill of their members.”

#### 3.2 Density and boundaries

The whole subject of boundaries within office workspaces can be as contentious as boundaries between or within nation states. Yet the actuality or perception of boundaries can play a critical role in the capability of the organisation to create and share knowledge. Ethnographic studies of office work are replete with discussions of boundary disputes, or with re-configuration of e.g. filing cabinets and desks to create ‘territory’ for a workgroup.

Sennett (1990) describes the ‘delicate balance of fear and stimulation associated with community’. In his 1968 essays on city structures, ‘The Uses of Disorder’, he also describes the benefits of proximity. Forced encounter breaks down boundaries and forces different communities to understand each other better. This leads to the idea in organisational design (both literally as in building design, and metaphorically as in human structures) of designing weak borders rather than strong walls.

Scuri (1995) draws attention to emotion: “Our first, immediate reaction to our surroundings is of an emotional nature. In the space of a few seconds, our emotions allow us to form an idea, or more precisely an impression, of the surrounding environment”

Tornqvist (1978), a geographer from the University of Lund in Sweden, was part of a tradition of Swedish research into innovation who concluded that *creative milieux* had certain shared characteristics. They thrive on communication between different areas of competence. Tornqvist also argued that this implied a certain ‘density’ of communication, and so a kind of overcrowding and chaos.

## 4. MAKING THE SPACE WORK

### 4.1 Collections and artifacts.

Throughout history, images of creativity have emphasised the importance of access to objects, artifacts and symbols as direct stimuli to creativity. This theme is increasingly taken up in new office spaces, such as the British Airways Waterside project where art and environment are introduced into the space to encourage reflection and creativity. Tuan (1997) suggested that:

“Pictorial art and rituals supplement language by depicting areas of experience that words fail to frame; their use and effectiveness again vary from people to people. Art makes images of feeling so that feeling is accessible to contemplation and thought.”

Some knowledge is created out of the mechanical or even mechanistic processing of information. But this is typically the least important type of knowledge. The most valuable knowledge is largely tacit, where there are significant creative processes at work. It is therefore essential to be able to make connections between physical space and creative processes. We have been reviewing some of the very large number of paintings, mostly from the Renaissance, of St. Jerome in his study. As the translator of the Bible into Latin, St. Jerome has long stood as the very symbol of knowledge and scholarship. Indeed he is the patron saint of librarians. Most of the paintings of St. Jerome at his study lay emphasis on three things:

- (a) Religious and other symbolism, not directly relevant here, although corporations do have parallel modern forms of symbolism.
- (b) A wide range of artifacts on the worktop. Some of these are practical, relating to the mechanics of reading (bookmarks) and writing (pen and ink). But others are clearly designed as objects of contemplation, most notably the skulls, which can regularly be seen in the paintings.
- (c) The workstation itself. These range from modest tables to high technology L or U shaped lecterns, invariably with bookcases behind, some with complex mechanisms such as rotating bookstands, and reading lecterns at a 45 degree angles of the reading lectern.

Thornton (1998) identified that for Renaissance scholars:

“It was not only the fact of owning a study, but also the nature of the decoration and contents which indicated an individual’s credentials, and many of the characteristic things found in the room subtly suggest ways in which an individual related to the wider social world. Like the memoranda which they often contained, studies often represent their owners both as individuals and as responsible members of families, clans and neighbourhoods”

### 4.2 Unburied time capsules

The role of artifacts extends beyond that of creative stimulus. Used properly, the act of collecting and archiving can play an important role in the creation of communities extending beyond organisational boundaries. Or they can serve as a catalyst to capture and preserve the important experiences of a project in such a way as to develop tools for understanding. In one instance we have studied, the organisation has developed a concept of Unburied Time Capsules. The project team selects important artifacts. By describing what these mean to the initiators of a new project, the team is actively seeking to capture and transfer the important histories and stories which will influence success.

In our view this method, and other methods like it, make an important bridge between the physical and the conceptual, or the public and the private, using narrative and storytelling technique expressed through artifacts. There is also a nice counterpoint here between speed and longevity. Projects, begin and end, with teams dissolving. Handled correctly the collections or artifacts used to encapsulate project histories and pass them on provide continuity in change. Wenger (1998) in his work on communities of practice emphasises this interaction of participation and artifact as key to the existence of shared meaning in communities. Schein (1992) underscores the importance of artifacts as the visible expression of the hidden layer of an organisation – the basic underlying assumptions, unconscious beliefs, perceptions, thoughts and feelings that are taken for granted and not questioned.

### **4.3 A room with a view**

Knowledge management is often described as being underpinned by diversity, inclusion of different points of view and many perspectives. This can be taken literally as well. In his work on space, and the development of scholarly workstations, Clive Holtham (1998) emphasises the importance of having a view to the outside. In several of the paintings of St Jerome the view is a noticeable feature. This can again be seen as an aid to contemplation and reflection. Klein (1982) points out that:

“a beautiful view gives pleasure. We’re linked with the natural order. We know the weather, the time of day, and the season at a glance. What up close would seem chaotic blends with the advantage of height into a larger pattern. From a distance we perceive order in the natural landscape and the urban one. An intermittent glance at a distant horizon gives your eyes a chance to refocus after close work. This visual rest relaxes eye muscles and reduces fatigue. Framed by the office window like a painting, a view should be treated as a work of art”

### **4.4 Ritual and codes**

Gorman (1990) defines ritual as:

“a complex performance of symbolic acts, characterised by its formality, order and sequence, which tends to take place in specific situations, and has as one of its central goals the regulation of the social order”

In the South of Italy, there is a daily ritual known as the passeggiata. In the early evening, the streets and squares are filled with groups and individuals taking a stroll. This leads to an important connection between understanding the making of space for sharing and the necessary rituals and celebrations needed to make the space work effectively. In this context Lowe (1992) applies ethnographic analysis to the use of the similarly purposed Plaza in the Costa Rica capital of San Jose.

It is not necessarily easy to create new rituals from the top down. One of the most interesting innovations in British Airway’s Waterside Headquarters is the creation of a small olive grove, intended for quiet reflection and contemplation. But in practice this area is scarcely used. It is, in fact, poorly located in a very public location on the main thoroughfare. Even with a better location, it might be difficult to expect a primarily Anglo-Saxon workforce to want to be seen publicly in contemplation.

Staying with the BA illustration, there is also an important point to observe about emergent codes and signals. One observation was made to us about the BA open spaces and how the individuals who use them have evolved their own shared signals and codes which indicate whether they are in private (papers spread out over desk) and not to be approached; or whether they are in public (papers in a neat pile) and open to an informal meeting or conversation. This implies an important balance of instilling organisational tradition and ritual, and observing the codes and behaviours that emerge in a particular environment after it has been created.

## 4.5 Performance spaces.

There is growing understanding that business can learn from theatre (e.g. Pine and Gilmour, 1999).

A new office building is initially designed as an empty shell, probably with a notional configuration of cellular and open plan offices, and meeting rooms. From the very day the offices open there will then be a continual process of adjusting and modifying layouts in the light of experience. Indeed these ongoing adjustments may eventually be of greater impact than the original design (Brand, 1994).

We began to consider whether there was, in fact, a quite different way of conceiving of offices as knowledge spaces. Is there a different model from that of construct-occupy-adjust? Our minds turned to the idea of the spaces being configured for a given purpose for a finite period, then regularly reconfigured to meet changing business requirements.

We turned to a theatre designer for input on a specific office design project. It quickly became very clear that she had incredible expertise in understanding the human and social dynamics of space. Theatre designers are used to working with minimalist physical resources (the empty stage) and by no means generous amounts of financial resources for any given play. Yet they have to create not merely an adequate experience for the cast and for the audience but a memorable experience in which cast and audience become an extended community for a period of time. Admittedly they can draw on tools of illusion, and audiences, at least, only spend a small slice of their time in the theatre, and are in a mood to suspend normally held beliefs. But our experiences have shown that using theatrical design expertise can add a significant dimension to generating the appropriate mood or spirit for the office space. This is likely to be particularly valuable for knowledge as opposed to information work.

The theatre metaphor also embraces the strengths of evolution, testing and experiment which are necessary ingredients of knowledge creation. Theatre starts with rehearsal (*work*):

'In a living theatre, (*organisation*) we would each day approach the rehearsal (*work*) putting yesterday's discoveries to the test, ready to believe that the true play (*solution*) has once again escaped us... There is a place for discussion, for research, for the study of history and documents as there is a place for roaring and howling and rolling on the floor. Also there is a place for relaxation, informality and chumminess, but there is also a time for silence and discipline and intense concentration' (Brook, 1972 our additions in *italics* in brackets)

## 5. MULTI-FUNCTIONAL/NON-OWNED SPACE

### 5.1 Third places.

Oldenburg's (1989) classic work on places that are neither home nor work has been followed up by business commentators such as the Henley Centre (1993), which has done seminal work on third places:

‘with the growth of self-employment and home working, the need for a ‘third place’ to meet clients and to spark ideas becomes more important...freelancers may go to cybercafés to use the computer and Internet facilities, much as some visitors went to coffee houses in the 18th century to read newspapers which were too expensive to purchase themselves.’

As more and more individuals start to operate as ‘knowledge workers’ the same holds true within organisations, or in the way organisations manage the interactions between themselves, their suppliers, partners and clients.

## **5.2 The café cliché.**

There are always the lurking dangers of the *café cliché*. All knowledge management programmes tend to propagate the notion that knowledge is social, to be found in networks, or discovery prompted by serendipitous encounter. But in several organisations we have visited, the ‘official’ organisationally accredited café is deserted. One contact in a global financial institution commented “Group Audit have a coffee/cafe place in their new open plan flexible space. I've never seen anyone in it!”

The workers all retire to the ‘real’ café round the corner where conversations are off the record, and individuals have a sense of more free choice. In trying to design deliberately third places, or open minded space, the organisation needs to consider carefully the negative impacts of ‘authorising’ social contact, as well as the positive aspects.

## **5.3 Markets and exchanges.**

Markets, exchanges, bazaars are all open minded spaces. One of the reasons for the growth of the coffee houses in London in the late seventeenth century was the high cost of access to information - newspapers. They also performed an overt social role, and of course coffee houses such as Lloyd’s evolved into financial exchanges. The exchange of knowledge under informal terms of reciprocity (‘I owe you one for that’) shifts to an active negotiation which formally connects information and price in such a way as to establish value (Ward and Butler 1999). It is intriguing that the word ‘market’ in economics derives directly from a physical place.

## **5.4 Monastery metaphor.**

Holtham and Tiwari (1998) call for consideration of the metaphor of the medieval monastery as one where diverse spaces have been evolved and adapted to fulfil diverse knowledge needs. ‘(The medieval monastery) has customised spaces, developed by evolution over centuries, which were ideally geared to team briefing meetings (chapter house), individual quiet work (cloisters, carrels), serendipitous meetings (cloister walkways) and private reflection (cells).

## **5.5 The historic argument for multi-functional purpose.**

Monasteries are not the only historic example of multi-functional purpose. When researching the metaphor of an exploratory, we discovered that even some of the great religious architecture in Britain in the seventeenth century has been designed with scientific experiment in mind:

‘The Great Fire that gutted Old St Paul’s destroyed one of Hooke’s carefully chosen locations for pendulum and barometer experiments. But it did not destroy his belief that buildings on a grand scale could be conceived of as multi-purpose – part monumental building, part scientific instrument or oversized piece of scientific equipment.’ (Jardine, 1999)

## **6. MANAGING KNOWLEDGE SPACE TENSIONS**

### **6.1 Private space is essential for some types of knowledge work.**

We know enough about knowledge management to understand that conversation is key. The best transfers are serendipitous, personal, private. But the best insights need periods of reflection as well as periods of exposure and communal activity. All of this works directly counter to process, management and order. And so the perfect paradoxes of knowledge management emerge. How is one to resolve the conflict between designing spaces for observation and reflection, spaces for control and efficiency, and spaces that encourage free, unscripted interaction?

### **6.2 Cost and knowledge management goals may be in conflict**

As new (21<sup>st</sup> century) working models emerge, so does a challenge to post-enlightenment architecture which has been aimed increasingly at the joint optimization of operational efficiency and control on the assumption that this was the only way in which wealth for stake holders could be maximized. As the internet emerges, so does an entrepreneurial culture, hitched to emergent ways of collaborative working in new business structures. These start to prove that intelligence works best in a distributed, relatively unconstrained manner in an environment where free-form conversation is encouraged (Cappelli, e mail conversation 1999).

### **6.3 Multi-disciplinary skills**

Making space for knowledge, or making knowledge spaces, is considerably more of a master-planning exercise than it is a knowledge planning exercise. The planner needs to create the necessary balance of privacy and exposure, of safety and challenge, of certainty which incorporates the possibility of surprise, and to understand that any organisation, like any city, consists of two interactive negotiations – structural and human. Both are constantly mutating, and each changes the other (Tan, 1999).

### **6.4 Planning for knowledge space**

This BA example shows that physical space and facilities alone do not inevitably lead in themselves to an effective environment for knowledge creation. One of our interviewees, a consultant in creativity, suggested:

“location is no more than one tenth of the solution to effective knowledge creation. Organisational climate is absolutely fundamental, as part of the other people-oriented nine-tenths”.

## **7 CONCLUSIONS**

### **7.1 Implications for research**

We have examined the great potential of detailed initiatives, either in planning (such as the Space Syntax Interaction Mapping) or in delivery (such as the impact of artifacts). There is considerable scope for detailed study of the actual benefits of these detailed initiatives.

Our own frameworks, roles and maps are very much preliminary in nature. They need to be subject to more critical analysis and refinements.

The range of sources that can inform such research implies a need for a multi-disciplinary, eclectic approach. Our success in working with specialists such as theatre designers reinforces this.

## **7.2 Implications for practice**

Although there is increasing practitioner interest in the design of spaces for knowledge work, we believe that there needs to be much greater awareness of the importance of this subject to executives in organisations with e.g. a majority of the workforce who are knowledge workers. There is also an urgent need for architects specialising in the design of spaces which should be knowledge orientated, to have heightened awareness of frameworks such as those who have developed here or originated earlier.

## **7.3 Concluding observations**

Perhaps the relationship between personal and public space is, after all, a continuum rather than a conflict. At the recent Cities on the Move exhibition (Hayward gallery) Fumihiko Maki (1979) described the Japanese concept of *oku*, or innermost space. This stands well beside the better thinking on the role of knowledge management, and the relationship between individual, communal and organisational layers of thinking:

“In the process of forming a city space, a certain stable image undergoes a screening through a sieve of communal realization. Its memory remains throughout a long period of time and functions autonomously as the collective unconscious of the community.”

This takes us to Spark’s founding essay, November 1997, which was called ‘Designing spaces for knowledge’ (Ward, 1997):

“It becomes clear that knowledge management needs to balance the rigour of diagnostics, processes, analysis and monitoring with the purposeful design of real and virtual spaces where people can

- discover what they know (and don’t know)
- exploit what they know and
- share and increase what they know

...There are also internal spaces. For example, time to think and reflect, watch, listen. Not always to be doing. The time and space to take risks, challenge the system, push the envelope, cross boundaries. Places of greater safety in which to experiment, fail, learn from failure and apply the lessons to the next experiment....in effect spaces designed for knowledge are survival spaces.”

A change in attitudes towards the design of space is inescapable. This paper built on the dichotomy of developing private and public, internal and external spaces in such a way as to create a balanced flow.

## REFERENCES AND BACKGROUND READING

- Acker, Stephen R (1999) "Space, Collaboration and the Credible City: Academic Work in the Virtual University" *Journal of Computer-Mediated Communication*, Vol 1, No 1, <http://www.ascusc.org/jcmc/vol1/issue1/acker/ACKTEXT.HTM>
- Altman, Irwin & Lowe, Setha M. (1992) "Place Attachment" Plenum Press, N.Y
- Baldry, Christopher (1997) "The Social Construction of Office Space", *International Labour Review*, Vol 136, No. 3, pp. 365-378
- Becker, Franklin, and Steele, Fritz (1995) "Workplace by Design: Mapping the High-Performance Workscape" Jossey-Bass, San Francisco
- Blackler, Frank (1995) "Knowledge, Knowledge work and organisations: An overview and Interpretation" *Organisation Studies*, 1995 16:6, pp 1021-1046
- Brand, Stewart (1993) "How Buildings Learn" Viking Penguin, New York
- Brook, Peter (1972) "The Empty Space" Penguin, Harmondsworth
- Bumbo, Notty & Coleman, David (1998) "Case Study: Knowledge Sharing The Old Fashioned Way An Inquiry into the Culture and Technology at St. Lukes" Collaborative Strategies, San Francisco
- Cappelli, Will (1999) Analyst at GiGa in e mail conversation
- Duffy, F (P. Hannay Ed) (1992) "The Changing Workplace" Phaidon Press, London
- Duffy, F, Laing A. and Crisp, V. (1993) "The Responsible Workplace: the redesign of work and offices" Butterworth Architecture, Oxford
- Duffy, Francis (1997) "The New Office" Conran-Octopus, London
- Eley, Joanna and Marmot, Alexi (1995) "Understanding offices : what every manager needs to know about office buildings" Penguin, Harmondsworth
- Gorman, Frank H (1990) "The ideology of ritual: space, time and status in the Priestly theology" JSOT Press
- Hall, Peter (1998) "Cities in Civilisation", Weidenfeld & Nicolson, London
- Harrison, Robert (1989) "Eccentric Spaces", Secker and Warburg, London
- Hartkopf, V., et al, (1993) "Designing the Office of the Future: The Japanese Approach to Tomorrow's Workplace", John Wiley and Sons, New York,
- Hatch, Mary Jo (1997) "Organization Theory", Oxford University Press, Oxford
- Henley Centre (1993) "Eating out... and cheating in" Henley Centre, London
- Hillier, W., and Hanson, J. (1984) "Social Logic of Space", Cambridge University Press, Cambridge

Holtham, Clive and Tiwari, Ashok (1998) "Adapting the physical office of the twenty first century to capitalize on emerging information system opportunities for managerial productivity and creativity" Proceedings of Business Information Technology 98 Conference, Manchester

Innis, Harold Adams (1950) "Empire and Communications.", Clarendon Press: Oxford

Innis, Harold Adams (1951) "The Bias of Communication" University of Toronto Press, Toronto

Innis, Harold Adams (1952) "Changing Concepts of Time" University of Toronto Press, Toronto

Jardine, Lisa (1999) "Ingenious Pursuits: building the scientific revolution" Little, Brown, London

Klein, Judy Graf (1982) "The Office Book: ideas and designs for contemporary work spaces", Frederick Muller, London

Knights, D; Murray, F and Willmott, H. (1993) "Networking as knowledge work: a study of interorganisational development of the financial services sector" Journal of Management Studies, 30; pp 975-996

Kraut, Robert E.; Robert S Fish, Robert W Root, Barbara L Chalfonte (1990) "Informal communication in organizations: Form, Function and Technology" in Oskamp and Spacapan, pp145-199

Lowe, Setha M. (1992) "Symbolic ties that bind: place attachment in the plaza" in Altman and Lowe (1992) pp165-186

Maki, F. (1979) "Japanese city spaces and the concept of oku" Japan Architect, 265 pp51-62

McLuhan, Marshall (1964) "Understanding media: the extensions of man" Routledge & Kegan Paul, London

Moleski, Walter, and Jon Lang, "Beyond Four Walls and a Door: Understanding Privacy in the Office" [http://www.hermanmiller.com/research/summaries/four\\_walls/](http://www.hermanmiller.com/research/summaries/four_walls/)

Nonaka, I & Takeuchi, H (1996) "The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation", Oxford University Press, Oxford

Oldenburg, Ray (1989) "The Great Good Place: Cafés, coffee shops, community centers, beauty parlors, general stores, bars, hangouts and how they got you through the day" Paragon House, New York

Oskamp, Stuart and Spacapan, Shirlynn Eds (1990) "People's reactions to technology: in factories, offices and aerospace" Sage, Newbury Park, CA

Parkinson, C. Northcote (1965) "Parkinson's law, or The pursuit of progress" Penguin, Harmondsworth

Penn, Alan; Desyllas, J. & Vaughan, L. (1997) "The Space of Innovation: interaction and communication in the work environment" Proceedings of the Space Syntax first Internal Symposium, Vol 1, UCL, London

Pine, B. Joseph II and Gilmore, James H. (1999) "The Experience Economy: Work Is Theater and Every Business a Stage" Harvard Business School Press, Cambridge MA

- Rogers, Richard (1997) "Cities for a Small Planet" Faber And Faber, London
- Schein, Edgar (1992) "Organisational Culture and Leadership". Jossey-Bass, San Francisco
- Schrage, Michael (1995) "No More Teams!: Mastering the Dynamics of Creative Collaboration" Currency Doubleday, New York
- Scuri, Piera (1995) "Design of Enclosed Spaces" Chapman & Hall, New York
- Sennett, Richard (1968) "The Uses of Disorder" WW Norton, New York
- Sennett, Richard (1990) "The Conscience of the Eye" WW Norton, New York
- Sennett, Richard (1999) *The Corrosion of Character: the Personal Consequences of Work in the New Capitalism*, Norton, New York
- Sims, William (1997) "Team space: planning and managing environments to support team work" *International Journal of Facilities Management* 1(1), pp21-33
- Steelcase: [www.steelcase.com](http://www.steelcase.com)
- Steele, Fred (1973) "Physical Settings and Organization Development" Addison-Wesley Publishing Co., Reading, MA,
- Steele, Fritz (1975) "The Open Organisation: The impact of secrecy and disclosure on people and organizations" Addison-Wesley Reading, MA
- Steele, Fritz and Jenks, Stephen (1977) "The Feel of the Workplace: Understanding and Improving organizational climate" Addison-Wesley, Reading, MA
- Stone, Philip, and Robert Luchetti (1985) "Your Office is Where You Are," *Harvard Business Review*, March-April 1985
- Streitz, N.A., S. Konomi, H.-J. Burkhardt (Eds.), *Cooperative Buildings – Integrating Information, Organization and Architecture. Proceedings of the First International Workshop on Cooperative Buildings (CoBuild'98), Darmstadt, Germany, February 25-26, 1998. Lecture Notes in Computer Science 1370. Springer: Heidelberg*
- Sundstrom, E., (1986) "Workplaces: The Psychology of the Physical Environment in Offices and Factories", Cambridge University Press, Cambridge
- Tan, Aaron (1999) "The Walled City as Allegory" (from the Cities on the Move Exhibition at the Hayward) also see: <http://www.artnode.se/city/catalogue.html>
- Thornton, Dora (1997) "The scholar in his study: ownership and experience in Renaissance Italy" Yale University Press, New Haven
- Tuan, Yi-Fu (1977) "Space and Place. The Perspective of Experience", University of Minnesota Press, Minneapolis, MN
- Tornqvist, G (1983) "Creativity and the Renewal of Regional Life." In Buttimer, A (ed) *Creativity and Context: A Seminar Report* (Lund Studies in Geography). B. Human Geography, No. 50) 91 –

112. Lund: Gleerup.

Turner, Gavin & Myerson, Jeremy (1998) "New Workspace, New Culture: Office Design as a Catalyst for Change" Gower, Aldershot

Ward, Victoria (1997) "Spark Founding Essay: Designing Spaces for Knowledge" Spark Press, London

Ward, V (1999) 'Can the design of physical space influence collaboration?' Knowledge Management Review, Issue 10, September/October

Ward, V and Butler, R (1999) "Traders and Agents; new roles for the knowledge economy" Knowledge Management Review, Issue 11 November/December

Wenger, E. (1998) "Communities of Practice, Learning, Meaning & Identity" Cambridge University Press, Cambridge

Wineman, J.D. ed (1986) "Behavioral Issues in Office Design" Van Nostrand Reinhold, New York

Worthington, J. (1997) "Reinventing the Workplace" Architectural Press, Boston, MA