Facilities

Emerald Article: Balancing collaboration and privacy in academic workspaces

Jennifer K. Parkin, Simon A. Austin, James A. Pinder, Thom S. Baguley, Simon N. Allenby

Article information:

To cite this document: Jennifer K. Parkin, Simon A. Austin, James A. Pinder, Thom S. Baguley, Simon N. Allenby, (2011),"Balancing collaboration and privacy in academic workspaces", Facilities, Vol. 29 Iss: 1 pp. 31 - 49

Permanent link to this document:
http://dx.doi.org/10.1108/02632771111101313

Downloaded on: 06-02-2013

References: This document contains references to 34 other documents

Citations: This document has been cited by 1 other documents

To copy this document: permissions@emeraldinsight.com

This document has been downloaded 894 times since 2011. *

Users who downloaded this Article also downloaded: *

Jennifer K. Parkin, Simon A. Austin, James A. Pinder, Thom S. Baguley, Simon N. Allenby, (2011),"Balancing collaboration and privacy in academic workspaces", Facilities, Vol. 29 Iss: 1 pp. 31 - 49
http://dx.doi.org/10.1108/02632771111101313

Jennifer K. Parkin, Simon A. Austin, James A. Pinder, Thom S. Baguley, Simon N. Allenby, (2011),"Balancing collaboration and privacy in academic workspaces", Facilities, Vol. 29 Iss: 1 pp. 31 - 49
http://dx.doi.org/10.1108/02632771111101313

Jennifer K. Parkin, Simon A. Austin, James A. Pinder, Thom S. Baguley, Simon N. Allenby, (2011),"Balancing collaboration and privacy in academic workspaces", Facilities, Vol. 29 Iss: 1 pp. 31 - 49
http://dx.doi.org/10.1108/02632771111101313

Access to this document was granted through an Emerald subscription provided by Emerald Group Publishing Limited

For Authors:
If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service. Information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com
With over forty years' experience, Emerald Group Publishing is a leading independent publisher of global research with impact in business, society, public policy and education. In total, Emerald publishes over 275 journals and more than 130 book series, as well as an extensive range of online products and services. Emerald is both COUNTER 3 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

The current issue and full text archive of this journal is available at
www.emeraldinsight.com/0263-2772.htm

Balancing collaboration and privacy in academic workspaces

Jennifer K. Parkin
Division of Psychology, Nottingham Trent University, Nottingham, UK
Simon A. Austin and James A. Pinder
Department of Civil and Building Engineering, Loughborough University, Loughborough, UK
Thom S. Baguley
Division of Psychology, Nottingham Trent University, Nottingham, UK, and
Simon N. Allenby
Cognatech Ltd, Lincoln, UK

Abstract

Purpose – The purpose of this paper is to evaluate the effectiveness of two different academic office environments in supporting collaboration and privacy.

Design/methodology/approach – The approach takes the form of case studies involving post-occupancy questionnaire surveys of academic occupants.

Findings – The combi-office design was found to be associated with higher levels of occupant satisfaction than the open-plan office design, with respect to support for collaboration and privacy.

Research limitations/implications – The findings highlight the importance of understanding user requirements and the role of office space as a cognitive resource.

Practical implications – Designers should consider the default location of occupants when designing academic and other creative workspaces.

Social implications – Academic creativity and innovation are seen to be important for society. However, there needs to be a better understanding of how to support this through workspace design.

Originality/value – This study contributes to the small but growing body of research on academic office design and creative workspaces in general.

Keywords Innovation, Open plan offices

Paper type Case study

Introduction

The last decade has seen attempts by many universities within the UK to create new types of office environments for their academics. A common design aim of these new environments is the facilitation and promotion of collaboration and knowledge flow between occupants – the intention being that this will ultimately lead to greater creativity and innovation in research and teaching, which will in turn, have a beneficial impact on society. However, there is also demand for academic work environments to provide occupants with privacy to support quiet concentrated work and reflection.

The authors would like to thank Tom Alexander, Dr Peter Demian and Professor Mark Lansdale for a number of useful conversations on the topic of workspace design. They would also like to thank Chris Carter for his contribution to the data collection.

Facilities
Vol. 29 No. 1/2, 2011
pp. 31-49
© Emerald Group Publishing Limited
0263-2772
DOI 10.1108/02632771111101313

This paper presents case studies of two academic office environments, the designs of which seek to manage the tension between the promotion of communication and collaboration on the one hand and the provision of privacy on the other.

Literature review

In her discussion of creativity in a work context, Amabile (1997, p. 40) holds that "At its heart, creativity is simply the production of novel, appropriate ideas in any realm of human activity, from science, to the arts, to education to business, to everyday life … Creativity is the first step in innovation, which is the successful implementation of those novel, appropriate ideas". Depending on the teaching/research focus of their institution, their subject area and seniority, an individual academic's role typically includes that of lecturer, researcher, tutor and administrator, and may include additional responsibilities such as editor and reviewer (see Frost and Taylor, 1996). With the exception of perhaps administrator, each of these roles is likely to require, or to be aided by, an element of creativity. Creativity may be regarded as particularly relevant to the role of researcher, which is underpinned by the aim of contributing to knowledge and to which novelty is therefore fundamental. The importance of creativity and innovation is explicitly acknowledged by the funding and research councils for higher education. For example, the strategic goals of the Engineering and Physical Sciences Research Council include, "Stimulating creativity and adventure in research and research processes" (EPSRC, 2006). Similarly, the Higher Education Funding Council for England's aims include the promotion of innovation in learning and teaching (HEFCE, 2009)

The provision of office accommodation for academics has changed little over the past century, with individual cellular offices off corridors remaining the norm. However, an increasing number of open, multi-occupancy environments are emerging. Whilst cost and long-term flexibility are undoubtedly key factors (see for example, Baldry, 1997), transitions from cellular accommodation to more open work environments tend also to be accompanied by arguments about the role of the physical environment in supporting collaborative working and innovation (see Pinder *et al.*, 2009 for a more detailed discussion of this). We are careful here to use the term "more open" rather than "open plan", as there remains a lack of consensus in the literature regarding what design elements constitute "open plan" environments (Price and Fortune, 2008). Becker and Sims (2001) distinguish at least four different types of office layout that fall within this classification, ranging from the high panelled cubicle office (in which individual workspace is enclosed by partitions that are too high to see over when seated), to the team oriented bullpen, with a small group of desks in a completely open area. As Price and Fortune point out, this ambiguity may have profound implications for the way in which findings from studies of "open plan" environments are extrapolated.

The notion that open, multi-occupancy office environments may be in some respects beneficial to creativity does derive some support from the research literature. Dunbar's (1995) research on scientific reasoning draws attention to the value of collaboration in creative problem solving. In his study of four world-leading research laboratories at US universities, Dunbar found that the discussions scientists had with lab colleagues about the interpretation of their data were often critical to conceptual change and insight that led to significant breakthroughs. Similarly, Kelly and Caplan's (1993) study of software programmers at Bell Labs (whose work entails a high level of creative problem solving) revealed that a key differentiator between high and average performers was the size of their networks. High performing programmers tended to

have a large network of contacts from whom they could obtain prompt technical advice. They were also proactive in developing these networks – establishing links before they actually needed them.

Interaction with their peers may have other positive impacts on academics' creativity. Cummings and Oldham (1997) posit that creative employees should be surrounded by colleagues who help to excite them about their work, holding that interactions with co-workers can play a useful role in stimulating wider interests, sharing knowledge, and boosting competitiveness. Similarly, Amabile (1997) holds that a person's social environment can have a significant effect on their level of intrinsic motivation to complete an activity or task, which in turn is likely to impact on the creativity of their output.

There is considerable evidence that the design of a work environment may impact on interaction and collaboration between its occupants. Research scientists are more likely to interact and collaborate with colleagues whose workstations are: physically proximal to their own; easily accessible; and highly visible from communal areas (e.g. Allen, 1977; Kraut *et al.*, 2002, Toker and Gray, 2008). We might therefore expect that employees working in more open environments would have more interaction than those working in cellular offices, and there is some indication that this is the case (e.g. Allen and Gerstberger, 1973; Becker and Sims, 2001).

However, creative and cognitively demanding tasks are also aided by privacy and opportunity for quiet reflection (e.g., Claxton, 1997; Kupritz, 1998). Compared with cellular offices, more open environments tend to be associated with decreased psychological privacy, and increased noise and distraction (e.g., Hedge, 1982; Brill *et al.*, 2001). In turn, they are also associated with both decreased productivity, motivation and work satisfaction (Brennan *et al.*, 2002).

One solution to this dilemma between the provision of privacy and the promotion of interaction and knowledge flow is to provide a range of activity settings within the office environment, affording occupants access to both quiet, solitary workspaces and as well as to multi-occupancy, sociopetal spaces (e.g. Duffy, 1997; Steele, 1998).

Approach

This paper presents post-occupancy evaluation data from two recently completed academic office environments, the designs of which sought to manage the conflict between privacy and communication through the provision of a variety of activity settings. The key difference between the two environments is the location of occupants' allocated workstations within the office – what might be termed their "default location". In Environment A, occupants' allocated desks are in shared/open areas of the office, and they have access to additional facilities, some of which provide privacy for individual working. In Environment B, occupants' allocated desks are located in individual study offices, and they have access to additional shared/social work settings.

Environment A was designed as generic office accommodation for a high-profile university. The office accommodation is located on all three floors of the building. Each floor has a similar layout, an example of which is given in Figure 1. Most staff (including academics, researchers and administrative staff) have an allocated desk in one of the "clusters" located in the open office space at the periphery of each floor. As illustrated in Plate 1 (a) and (b), there is some variation in the partitioning between desks, owing to the occupant teams having some control over the layout of their immediate office area. The accommodation also includes some individual cellular

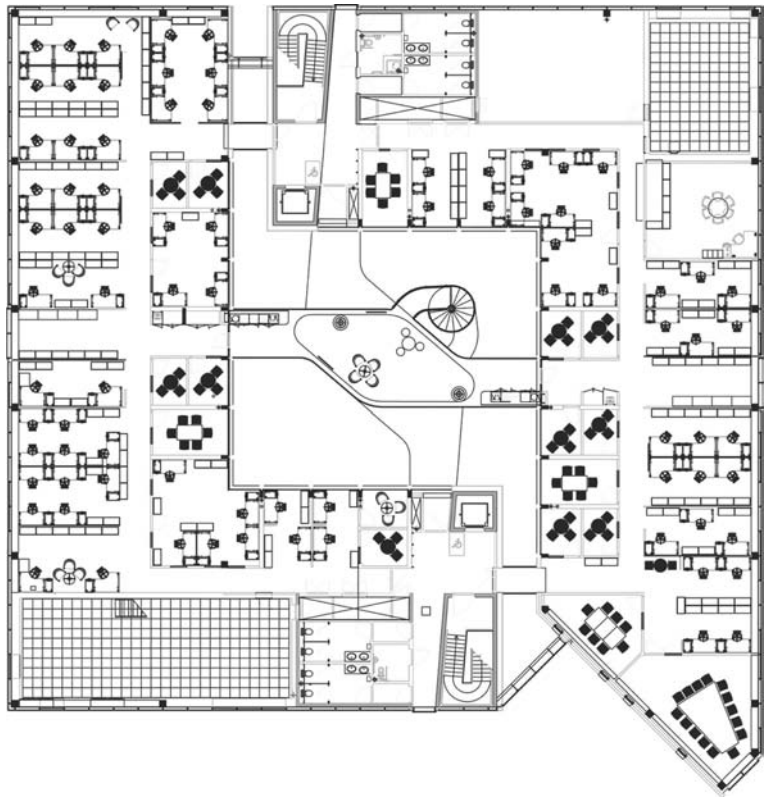
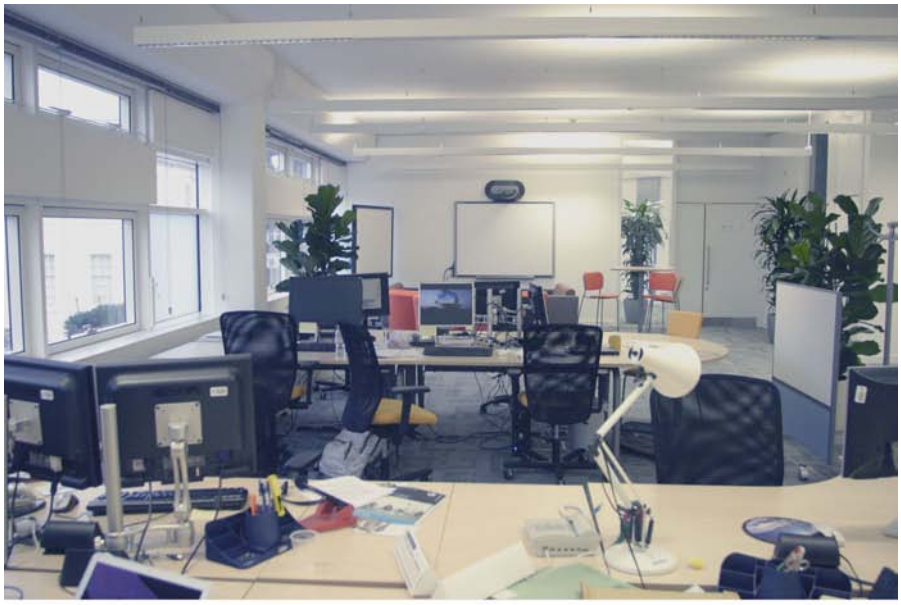


Figure 1.
Floorplan of the first floor of Environment A

offices, as well as some large, shared offices (predominantly for teams whose work is quite noisy). The cellular component also includes meeting rooms and small "pods", which are intended for occupants to use for noise-generating activities, such as phone calls, and concentrated individual tasks. Located at the centre of each floor is a hub space (shown in Plate 2), which includes kitchen facilities and breakout space, as well as access to the other floors. The cellular accommodation has floor to ceiling glazed panels, affording a visual connection with this central hub. The environment is occupied by staff and research students from two information technology departments, both of which are research-focused. The previous accommodation for staff from both departments comprised individual and small, shared cellular offices.

Environment B was purpose-designed for a research-intensive, multi-disciplinary engineering department, as part of an extension and refurbishment of an existing building. The accommodation for academic staff is located over three floors of the building, and is a combi-office design, providing each academic with their own small study (which at 10.2 m^2 is sufficiently large for occupants to hold small meetings, i.e. with one or two others). The study offices are located in a C shape around periphery of the building, and open onto a shared open space that includes a wide range of breakout areas, additional storage, kitchen facilities and print hubs, and which overlooks the central atrium. Meeting rooms are also provided on each floor. The office space also



(a)

(b)

Plate 1.
Workstations in Environment A

Plate 2.
A social hub in Environment A

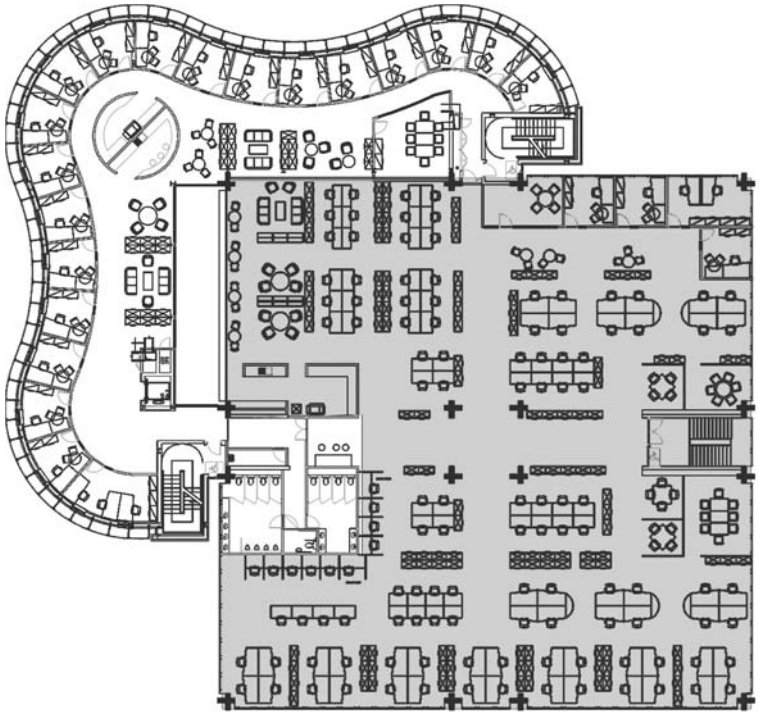
includes shared, cellular offices for administrative staff, and the Research Hub, a large, open, landscape office environment for research staff and students, which is located on the first floor, looking onto the atrium. A plan of the first floor, and photographs of the office environment are given in Figure 2 and Plates 3 and 4, respectively. The new office space replaced the previous cellular office accommodation, which was of reasonable quality, but was dated and too small for this growing department.

To some extent at least, both environments may be seen as less hierarchical than their predecessors. In Environment A space is largely allocated according to need rather than status, for example, one of the departmental heads works in the open clusters, although his allocated workspace is larger than standard. In Environment B, with the exception of the head of department's office which includes space for a meeting table, all academic staff offices are the same size – a change from their previous accommodation in which more senior staff tended to have larger offices. Thus, personal meeting space has been pooled to create informal settings and encourage casual interaction.

Environment A

Research method

Approximately 11 months after the completion of the phased migration to Environment A, a post-occupancy questionnaire survey was conducted. The design of the questionnaire was informed by a series of semi-structured occupant interviews, conducted a month previously, that sought to identify the key environmental elements that impacted (either negatively or positively) on occupants' perceived ability to work effectively in the building. Stratified sampling was used to ensure that the interview sample of 30 was representative of the occupant population in terms of job role and department.



Note: The Research Hub is shown in grey

Figure 2.
Floorplan of the first floor of Environment B

Plate 3.
A study office in Environment B

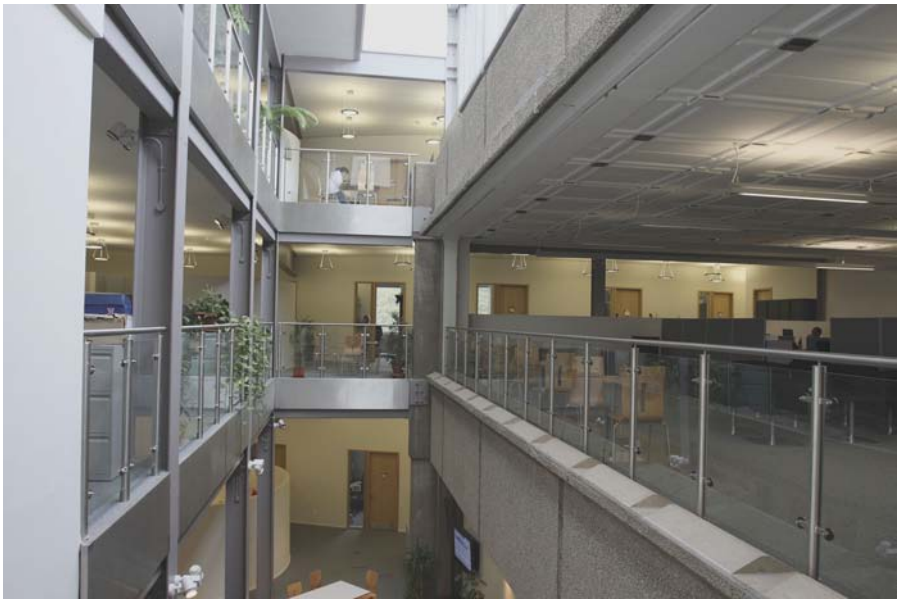


Plate 4.
The atrium and breakout areas in Environment B

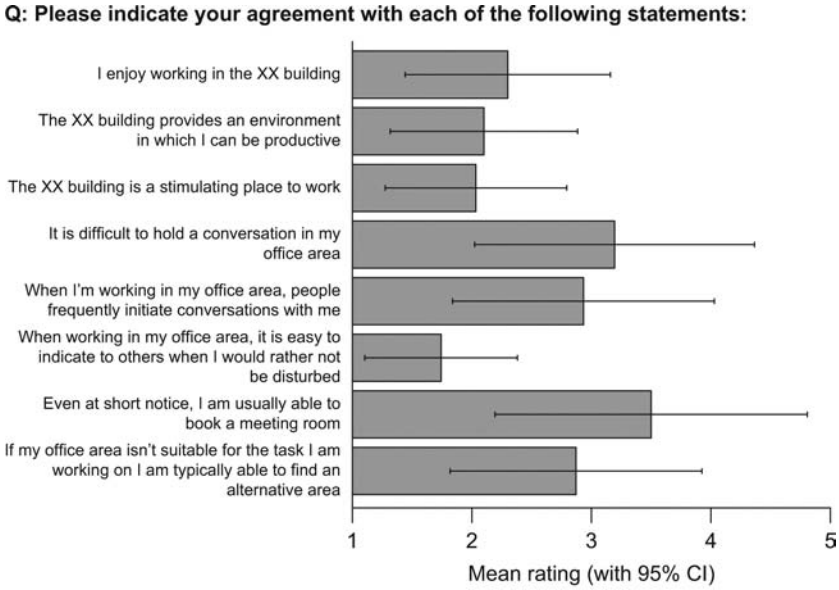
The issues explored by the questionnaire survey included: occupants' general attitudes towards working in the building and its perceived suitability for carrying out different work activities; their satisfaction with their "immediate working environment" (which was defined as: "the environment that you have been assigned as work space – typically, this would be the office in which you have a desk to work at"); and their satisfaction and usage of alternative working areas within the building. The majority of questionnaire items used a five-point rating scale, although respondents were given opportunity to elaborate on their responses through the provision of comment boxes. The questionnaire survey was conducted on-line. All occupants of Environment A were contacted by email to invite them to take part, and were assured that their responses would remain confidential.

In this paper, we report the questionnaire data from academic respondents only. For brevity, we report only the findings from questionnaire items that related to aspects of creativity (e.g. privacy and collaboration), but make reference to the qualitative data (drawn from interviews and questionnaire respondents' comments) to add context to our interpretation of the results, as appropriate.

Results

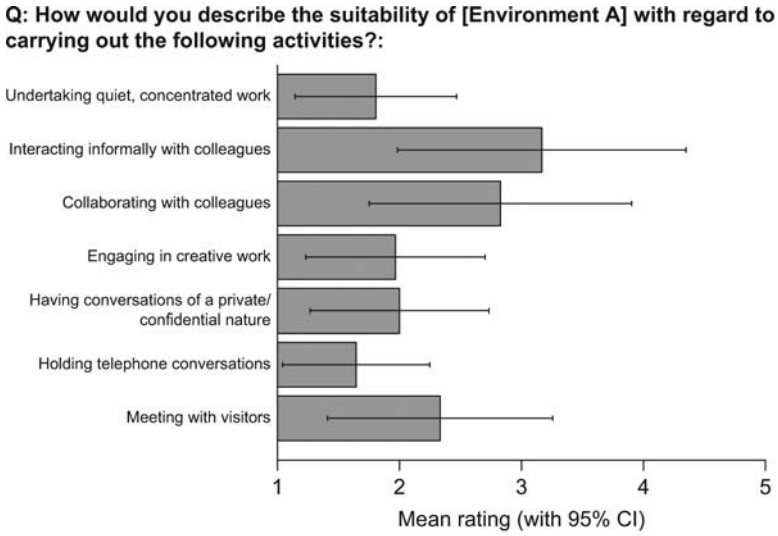
A total of 32 academics (comprising five professorial staff, and 27 lecturing staff) completed the questionnaire, all of whom described their principle work location in the building as "open plan".

Analyses indicate generally low levels of satisfaction with Environment A amongst academic occupants (see Figures 3-6, which give the response means and 95 per cent confidence intervals). As shown in Figure 3, it is not considered a particularly stimulating or enjoyable place to work, nor do the respondents rate it highly as an environment in which they can be productive. It received low ratings in terms of its



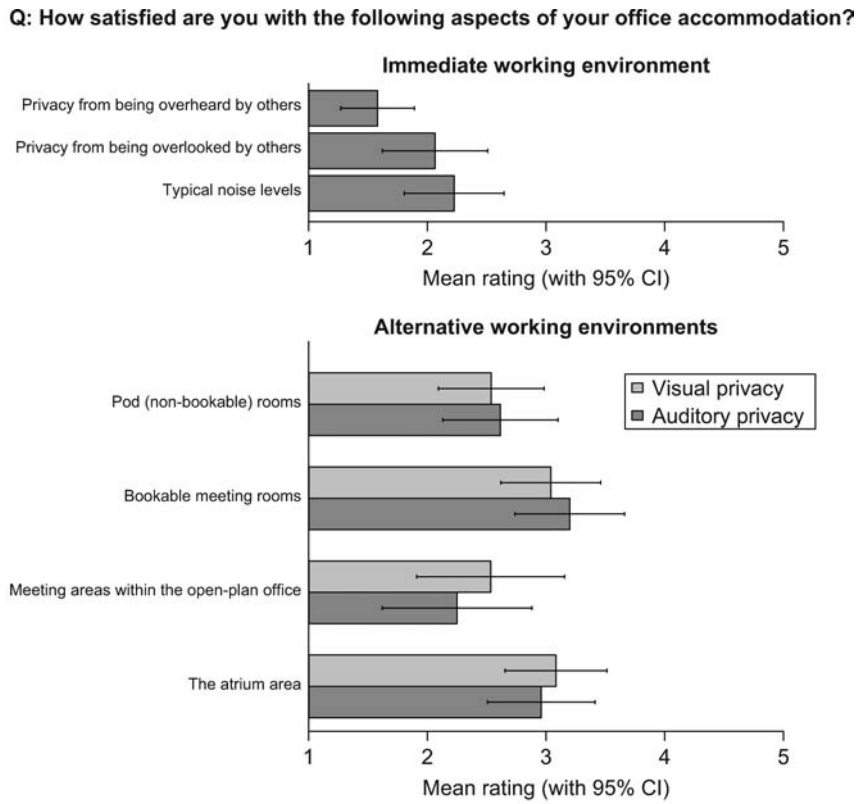
Notes: $n = 30$ (excludes "don't know" responses); scale: 1 = "strongly disagree" to 5 = "strongly agree"

Figure 3.
Environment A: occupant opinion



Notes: $n = 27$ to 31 (excludes "don't know" responses); scale: 1 = "very unsuitable" to 5 = "very suitable"

Figure 4.
Environment A: perceived support for work activities



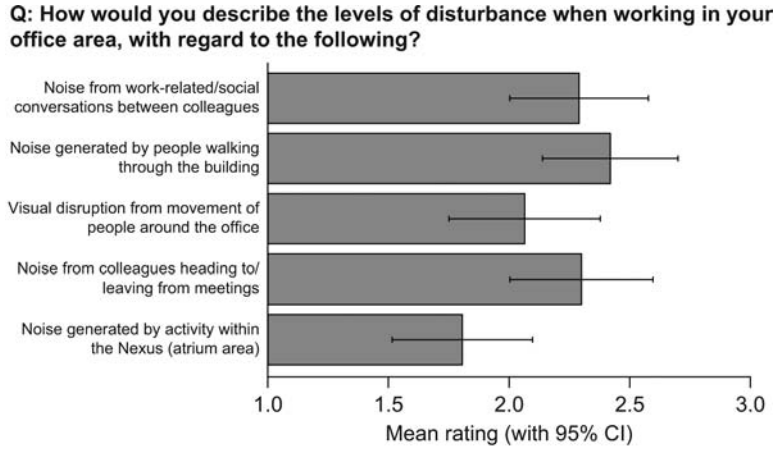
Notes: n = 26 to 15 (excludes "don't know" responses); scale: 1 = "very dissatisfied" to 5 = "very satisfied"

Figure 5.
Environment A: satisfaction with auditory and visual privacy

suitability for carrying out creative work and for concentrated, quiet working, although it did receive higher (but not high) ratings regarding the social aspects of creative work – interacting informally with colleagues, and collaborating with colleagues (see Figure 4).

Noise levels in the open office space (respondents' default location) received low satisfaction ratings (Figure 5), with the primary sources of disturbance being identified as noise from work-related/social conversations between colleagues, and noise generated by people walking through the building (Figure 6). Although interruptions from colleagues wanting to initiate conversations were not rated as particularly frequent, occupants did report difficulties in indicating to others when they would rather not be disturbed (Figure 3). Privacy from being overlooked and from being overheard by others in the open office areas received low satisfaction ratings, particularly privacy from being overheard (see Figure 5). Auditory and visual privacy was considered more satisfactory (although, admittedly, still not high) in the "pods" and meeting rooms (Figure 5).

Whilst finding an alternative setting, should their own workstation be unsuitable for the task they were working on, did not emerge as a particular difficulty (see Figure 3), many of the occupants we interviewed reported that their use of the alternative workspaces was quite limited. A number of interviewees expressed a



Notes: n = 30 to 31 (excludes "don't know" responses); scale: 1 = "low" to 3 = "high"

Figure 6. Environment A: sources of disturbance in open office areas

reluctance to transfer concentrated tasks from their allocated workstation, in spite of expressing dissatisfaction with the noise levels and distractions in their work area. One of the reasons given was inconvenience – as one interviewee explained, "It's easier said than done to move all your stuff". For some, a lack of portable technology was an issue – as they had only desk-top computers, any computer-based work had to be carried out at their desk. There was also concern about how such a move might be interpreted by their colleagues. For example, one interviewee explained that she would not consider taking concentrated work to a pod room, commenting, "I'd feel a bit prima donna-like – I think other people would probably think 'How come her work is so important?'"

Similarly, interviewees explained that although they try to hold lengthy telephone calls away from their desk, not only is this "a nuisance" but sometimes it is not possible, as they need access to information on their desk-top computer during the call. Occupants were not provided with portable telephones, which also restricted the use of alternative settings for telephone calls. Some reported that for incoming calls, they tended to phone the caller back from a telephone in one of the pod rooms. When taking calls at their desk, some interviewees said that they are aware of distracting colleagues working nearby, and are also conscious that others can overhear what they are saying, which can be "intimidating". This may explain why the environment as a whole was considered particularly poor for holding telephone conversations (see Figure 4).

Although some interviewees held that their new work environment aided knowledge flow through increased informal interaction, there was suggestion from others that concern about disturbing their colleagues inhibited communication, with people refraining from talking in case they might distract others working nearby. For instance, one interviewee commented, "In a way, the open plan puts you off talking to the people around you, because you realise you're disturbing everyone". Some interviewees pointed out they need to hold some meetings at their desk (e.g. if they need to use a particular programme or information on their desk-top computer during the discussion), and that in such cases privacy (both in terms of being overheard and

also disturbing others) was an issue. In the case of confidential conversations, there was also suggestion that the act of moving a discussion to a pod or meeting room draws attention to its confidential nature.

Environment B

Research method

A pre-move questionnaire survey was conducted approximately 26 months prior to the completion of the phased migration to Environment B, in order to assess levels of satisfaction with the existing cellular office accommodation. The survey used the architect's standard online questionnaire. It explored a number of issues, including occupants' satisfaction with their work environment in terms of: the facilities provided; the environmental conditions; and the level of support for different work activities. The majority of questionnaire items used a five-point rating scale, although respondents were given opportunity to add further comments about their work environment through the provision of a comment box at the end of the questionnaire.

The same questionnaire was used as part of a post- occupancy evaluation of the new environment. The post-occupancy survey was conducted seven months after completion of the move to Environment B (12 months after the beginning of the phased migration).

In both the pre- and the post-occupancy evaluations, the questionnaire survey was conducted online. All members of staff and research students in the department were contacted by email to invite them to take part, and were assured that their responses would remain confidential.

This paper focuses on the findings of the post-occupancy evaluation survey, but includes the pre-move survey data for purposes of comparison. In both cases, questionnaire data from academic respondents only are reported. For brevity, we report only the findings from questionnaire items that related to aspects of creativity.

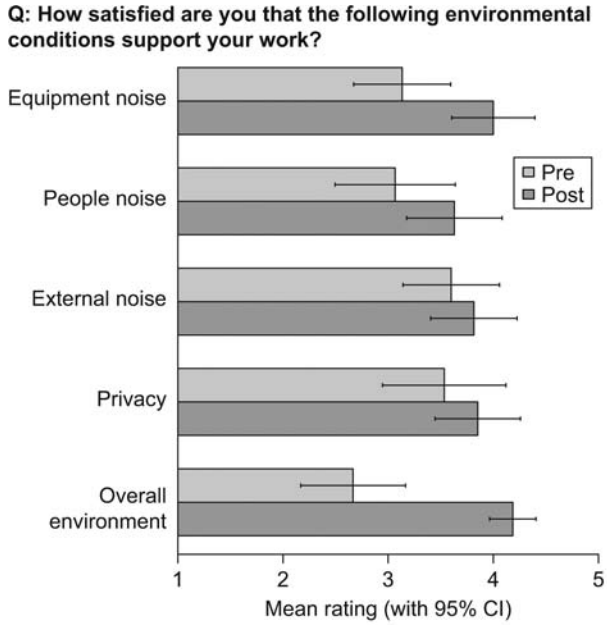
Results

The pre-move questionnaire was completed by 15 academic staff, 14 of whom were located in single-occupancy enclosed offices, and one was located in a shared office. 28 academics responded to the post-occupancy evaluation survey, 27 of whom completed the questionnaire.

Analyses indicate high levels of occupant satisfaction with Environment B, in terms of the facilities provided, the environmental conditions and support for work activities (see Figures 7-9, which give the mean responses and 95 per cent CIs).

As shown in Figure 9, respondents expressed satisfaction with the support the environment provides for working creatively, and for quiet and concentrated working, as well as aspects relating to this, such as "minimising errors". Satisfaction ratings were particularly high for what might be considered the social elements of creative working, such as team-working, formal meetings and informal meetings, and it is in these areas where the ratings show most improvement compared with the pre-move survey. Support for telephone conversations and for private conversations was also rated as satisfactory in the new environment.

In line with these findings, there were high levels of satisfaction with informal and formal meeting areas, the layout and circulation space, which showed the highest level of improvement of all the facilities compared to the pre-move ratings (see Figure 8). In terms of the provision of individual facilities, desk space and shape was rated as



Notes: Pre-move data, $n = 15$; post-move data, $n = 28$ (excludes "don't know" responses); scale: 1 = "very dissatisfied" to 5 = "very satisfied"

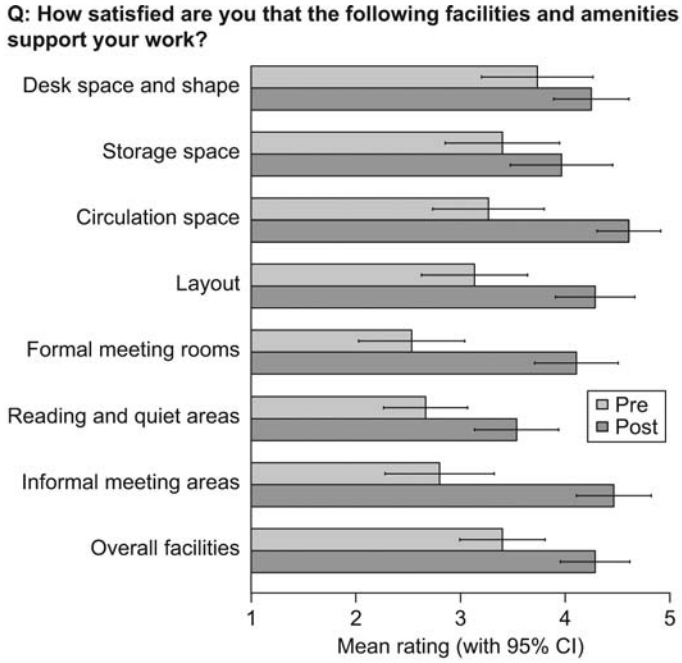
Figure 7. Environment B: satisfaction with facilities pre- and post-move

satisfactory, as was storage. Satisfaction with "reading and quiet areas" received the lowest satisfaction rating (although the 95 per cent CI is above the mid-point of the satisfaction scale and presents an improvement on the pre-move rating). Nonetheless, privacy and noise were all rated as satisfactory (see Figure 7).

Discussion

The designs of the two academic offices both sought to manage the conflicting demands of privacy and collaboration through the provision of a variety of activity settings. Yet the two environments achieved starkly contrasting results in terms of occupant satisfaction: the post-occupancy evaluation of Environment A suggests that its academic occupants are largely dissatisfied with their work environment, whereas that of Environment B indicates high levels of satisfaction. We suggest that this difference may be largely attributable to the location of occupants' allocated workstations within the office environments – which we term their "default location".

In Environment A, occupants' default location is an open, shared setting. They expressed strong dissatisfaction with this environment as a place to undertake concentrated and creative work, with the noise levels and lack of privacy at their workstations emerging as a particular issue. Although they had access to alternative work settings that did provide increased auditory and visual privacy, occupants reported that they tended not to transfer concentrated work to these supplementary spaces, citing concerns about how this may be interpreted by colleagues and also inconvenience. Whilst the former issue emphasises the need for user-training in the use



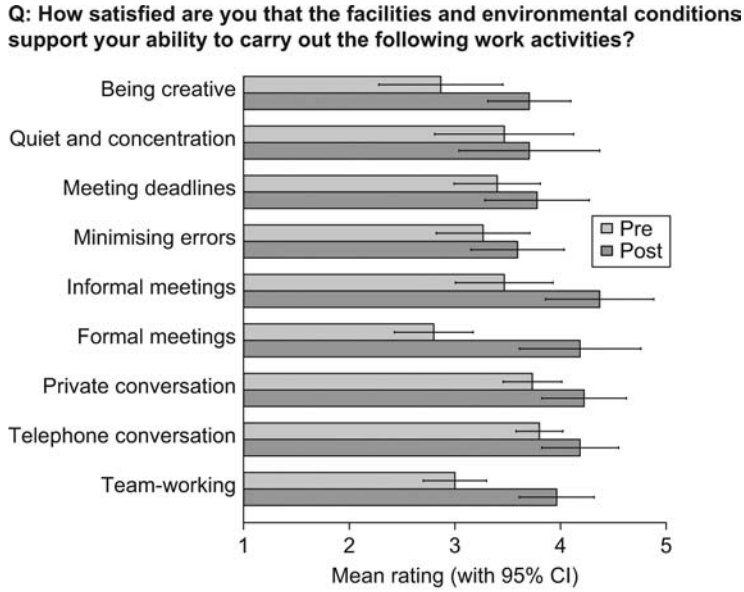
Notes: Pre-move data, $n = 15$; post-move data, $n = 27$ (excludes "don't know" responses); scale: 1 = "very dissatisfied" to 5 = "very satisfied"

Figure 8.
Environment B: satisfaction with environmental conditions pre- and post-move

of new work environments, we suggest that the latter is not an ephemeral issue, but rather reflects the role of allocated workspace as a cognitive resource.

The physical work environment is a valuable cognitive aid, onto which some aspects of a task may be offloaded in order to improve performance and reduce memory demands (Kirsh, 1995, 2001; Malone, 1983; Lansdale, 1988). For example, when writing a literature review, one may physically organise reference sources such as papers and books to reflect, say, the subject area to which they relate, or whether they are yet to be read, (Kirsh, 1995). For an academic, work on a concentrated task such as writing a paper is likely to take place over a number of days, or even weeks, and to be interspersed with work on other tasks. Any structuring that they have imposed on their work environment in relation to the task (i.e. the piles of paper and so on) may, if left in place, facilitate its later resumption – in effect allowing them to "dip in and out" of the task more easily (Kirsh, 2001; Malone, 1983).

For academics working in Environment A, the gains in terms of increased privacy that might be afforded by relocating from their allocated desk to one of the "pod" spaces to work on a concentrated task may not outweigh the loss of opportunity to benefit from any long-term structuring that they may impose on their allocated workspace. Occupants were similarly reluctant or unable to move some noise-generating telephone and face-to-face conversations away from their desks, due to a need to reference work stored on their computer or desk. In the case of incoming telephone conversations, their transfer to alternative work locations was also hampered by the provision of only wired telephones.



Notes: Pre-move data, $n = 15$; post-move data, $n = 27$ (excludes "don't know" responses); scale: 1 = "very dissatisfied" to 5 = "very satisfied"

Figure 9. Environment B: satisfaction with support for work activities pre and post move

In contrast, the academic occupants of Environment B, whose default location is an individual study, expressed satisfaction with its provision of privacy and support for both concentrated and collaborative working. We suggest that the auditory privacy and consequent autonomy provided by this solitary space is crucial to Environment B's success, in that it enables occupants to switch easily between activities that require concentration and reflection, and noise generating activities such as telephone calls and small meetings. In terms of the latter activity, the size of the study is also important, in that at 10 m^2 it is large enough to enable occupants to hold one-to-one meetings at their desk. We suggest that those meetings for which academics are most likely to need access to their computer, or to access hard copy information sources (e.g. to look up a reference) are one-to-one or one-to-two meetings (either with peers with whom they are collaborating, or their research staff or students).

Based on the above discussion, it might be argued that the combi-office design of Environment B affords little benefit over individual cellular offices. However, contrary to this is the marked improvement in occupants' satisfaction with support for social elements of creative working – namely team-working, formal meetings and informal meetings, compared to their previous cellular offices. Although some degree of overall improvement in satisfaction ratings (which Environment B does achieve compared with the previous accommodation) might reasonably be attributed to the Hawthorne effect (see, for example, Gillespie, 1991), we hold that a proportionally greater increase in occupant satisfaction with the level support for these social activities, when compared with the improvement in ratings for other elements, is indicative of a genuine improvement in provision.

Whilst we hold that a key factor in the differing success of the studied environments is the nature of occupants' default location within the office, this is not the only difference between the two cases. An obvious source of variation is that Environment A was designed as generic office accommodation, whereas Environment B was a bespoke design for its occupant department. This may have impacted on post-occupancy satisfaction, either directly through elements of design of Environment B being more closely tailored to match the requirements of its occupants than Environment A, or indirectly, such as through occupant engagement in the design process. In one of the departments occupying Environment A (which we will term Department A1 for ease of reference), the incumbent director described the period leading up to the move as "a particularly unsettled time", due to the unexpected loss of their predecessor. Linked to this, there was a suggestion that expectations may not have been effectively managed regarding the (nil) potential for closed offices, which may have led users to conclude that the engagement process was not meaningful. This, in turn, may have had a detrimental effect on subsequent user satisfaction (e.g. Allen *et al.*, 2004), although we note that this was not raised by any of the other interviewees.

Given users' observed reluctance to make full use of the range of activity settings provided in their new environment, it is also relevant to note that Department A1 did not engage in any change management in the lead up to, or following the move. The head of department explained, "There was no change management, because the plans to move were put on hold, and then all of a sudden we were moving". Allen *et al.* (2004), Kampschroer, Heerwagen and Powell(2007), Laframboise *et al.* (2003), amongst others, emphasise the value of change management programmes in facilitating the transition to new work environments, particularly in cases where the new workspace requires, or is intended to engender, a change in the way that occupants work. The approaches outlined by Allen *et al.* (2004) and Laframboise *et al.* (2003) include holding interactive staff workshops on "how to get the best of the new work environment" and the development of workplace protocols or etiquettes, to facilitate the adoption of new ways of working, and encourage occupants' acceptance of their new workspace.

The head of department A2 (the other department located in Environment A) reported that, in contrast to A1, they had engaged in a significant programme of change management to accompany the move, which included "deciding what the protocols for the building were, and what the etiquette we should have for the building – there was a lot of preparation done". Yet, the academics in A2 did not exhibit increased satisfaction with their environment compared with those in A1. Furthermore, the department occupying Environment B had not engaged in any formal change management programme, although the project champion was keen to point out that they had been very careful to communicate the aims of the new environment to staff and manage their expectations by engaging on issues such as office size, furniture and storage space. This is not to suggest that Environment A would not have been more successful had department A1 engaged in a programme of change management. However, it draws attention to the array of potential factors that may also have influenced the observed outcome, some of which relate to change management, such as the appropriateness of particular change management activities, and the magnitude of the change in work-practices required by the respective transitions in work environments.

The outcome of Environment A also draws attention to the need for technology provision to be seen as integral to, and developed alongside, the provision of any new work environment (see, for example, Pinder *et al.*, 2009 for a further discussion of this).

As discussed above, some of the potential affordances of Environment A (including those which were fundamental to its intended use – such as the opportunity for occupants to transfer between the different worksettings, to suit the particular activity they were carrying out) were undermined by insufficient provision of mobile technology, such as laptops and portable phones. This raises the important question of to what extent the outcome of Environment A would have been different, had the IT provision been appropriate.

Concluding remarks

As noted above, a key methodological limitation of this study, which may be considered one of the inherent difficulties of case study research, is the difficulty in establishing cause and effect, due to the potential influence of other factors on the measured outcomes. Another criticism of this study, which again relates to the challenges of conducting real-world research, is that we do not have any data relating to pre-move satisfaction for Environment A. Further, different survey instruments were used to measure occupant satisfaction in the two environments, although they do have close parallels, this limits the comparisons that can be made between the datasets.

Nonetheless, we hold that the cases that we report do make a valuable contribution to the literature on the built environment (see Valsiner, 1986). Although there is much opinion on the subject of office design for knowledge workers, there remains a dearth of evidence on the impact of different design solutions, particularly in an academic context (as noted by Gorgievski *et al.*, 2010).

This study highlights the need to better understand the nature of knowledge work, which to use Davenport's (2002) words, remains "a mysterious art and science" – if work environments are to support actual rather than assumed work practices. It also emphasises that although space may be instrumental in enabling change, it cannot drive organisational change. In the case of the higher education sector, if it is to achieve its goal of increased creativity and innovation through more collaborative working, then the academic reward system, which is still based around individual achievement, must be realigned accordingly (see Kerr, 1975).

References

Allen, T.J. (1977), *Managing the Flow of Technology: Technology Transfer and the Dissemination of Technical Information within R&D Organizations*, MIT Press, Cambridge, MA.

Allen, T.J. and Gerstberger, P.G. (1973), "A field experiment to improve communications in a product engineering department: the non-territorial office", *Human Factors*, Vol. 15, pp. 488-98.

Allen, T., Bell, A., Graham, R., Hardy, B. and Swaffer, F. (2004), *Working without Walls: An Insight into the Transforming Government Workplace*, Office of Government Commerce, London, available at: www.ogc.gov.uk (accessed June 2008).

Amabile, T.M. (1997), "Motivating creativity in organizations: on doing what you love and loving what you do", *California Management Review*, Vol. 40, pp. 39-58.

Baldry, C. (1997), "The social construction of office space", *International Labour Review*, Vol. 136, pp. 365-78.

Becker, F. and Sims, W. (2001), *Offices That Work: Balancing Communication, Flexibility and Cost*, International Workplace Studies Program, Cornell University, Ithaca, available at: http://iwsp.human.conell.edu (accessed January 2010).

Brennan, A., Chugh, J.S. and Kline, T. (2002), "Traditional versus open office design: a longitudinal field study", *Environment and Behaviour*, Vol. 34, pp. 279-99.

Brill, M., Weidemann, S., Alard, L., Olson, J. and Keable, E. (2001), *Disproving Widespread Myths about Workplace Design*, Kimball International, Jasper, IN.

Claxton, G. (1997), *Hare Brain, Tortoise Mind: Why Intelligence Increases when You Think Less*, Fourth Estate Ltd, London.

Cummings, A. and Oldham, G.R. (1997), "Enhancing creativity: managing work contexts for the high potential employee", *California Management Review*, Vol. 40, pp. 22-38.

Davenport, T., Thomas, R.J. and Cantrell, S. (2002), "The mysterious art and science of knowledge-worker performance", *MIT Sloan Management Review*, Fall, pp. 23-30.

Duffy, F. (1997), *The New Office*, Conran Octopus, London.

Dunbar, K. (1995), "How scientists really reason: scientific reasoning in real-world laboratories", in Sternberg, RJ. and Davidson, J. (Eds), *Mechanisms of Insight*, MIT Press, Cambridge, MA.

Engineering and Physical Sciences Research Council (ESPRC) (2006), "EPSRC Strategic Plan 2006: towards a shared vision of tomorrow's challenges", available at: www.epsrc.ac.uk (accessed January 2010).

Frost, P.J. and Taylor, S. (1996), *Rhythms of Academic Life: Personal Accounts of Careers in Academia*, Sage, London.

Gillespie, R. (1991), *Manufacturing Knowledge: A History of the Hawthorne Experiments*, Cambridge University Press, Cambridge.

Gorgievski, M.G., van der Voordt, Th., van Herpen, G.A. and van Akkeren, S. (2010), "After the fire. New ways of working in an academic setting", *Facilities* (forthcoming).

Hedge, A. (1982), "The open plan office: a systematic investigation of employee reactions to their work environment", *Environment and Behaviour*, Vol. 14, pp. 519-42.

HEFCE (2009), *Strategic Plan 2006-2011*, Higher Education Funding Council for England, Bristol.

Kampschroer, K., Heerwagen, J. and Powell, K. (2007), "Creating and testing workplace strategy", *California Management Review*, Vol. 49, p. 199.

Kelly, R. and Caplan, J. (1993), "How Bell Labs creates star performers", *Harvard Business Review*, July-August, pp. 128-39.

Kerr, S. (1975), "On the folly of rewarding A, while hoping for B", *Academy of Management Journal*, Vol. 18, pp. 769-83.

Kirsh, D. (1995), "The intelligent use of space", *Artificial Intelligence*, Vol. 73 Nos 1-2, pp. 31-68.

Kirsh, D. (2001), "The context of work", *Human Computer Interaction*, Vol. 16 Nos 2-4, pp. 305-22.

Kraut, R.E., Fussell, S.R., Brennan, S.E. and Siegel, J. (2002), "Understanding effects of proximity on collaboration: implications for technologies to support remote collaborative work", in Hinds, P. and Kiesler, S. (Eds), *Distributed Work*, MIT Press, Cambridge, MA, pp. 137-62.

Kupritz, V.W. (1998), "Privacy in the workplace: the impact of building design", *Journal of Environmental Psychology*, Vol. 18, pp. 341-56.

Laframboise, D., Nelson, R.L. and Schmaltz, J. (2003), "Managing resistance to change in workplace accommodation projects", *Journal of Facilities Management*, Vol. 1, pp. 306-21.

Lansdale, M.W. (1988), "On the psychology of personal information management", *Applied Ergonomics*, Vol. 19 No. 1, pp. 55-66.

Malone, T.W. (1983), "How do people organise their desks? Implications for the design of office information systems", *ACM Transactions on Office Systems*, Vol. 11, pp. 99-112.

Pinder, J., Parkin, J., Austin, S., Duggan, F., Lansdale, M., Demian, P., Baguley, T. and Allenby, S. (2009), *The Case for New Academic Workspace*, Loughborough University, Loughborough, available at: www.academicworkspace.com (accessed January 2010).

Price, I. and Fortune, J. (2008), "Open plan and academe: *pre-* and *post-hoc* conversations", *Proceedings of the CIB W070 International Conference in Facilities Management, Heriot Watt University, Edinburgh, June 16-18, 2008*, CIB publication No. 315, Emerald.

Steele, F. (1998), *Workspace Privacy: A Changing Equation*, Steelcase, available at: www.steelcase.com (downloaded January 2010).

Toker, U. and Gray, D.O. (2008), "Innovation spaces: workspace planning and innovation in US university research centers", *Research Policy*, Vol. 37 No. 2, pp. 309-29.

Valsiner, J. (1986), *The Individual Subject and Scientific Psychology*, Plenum, New York, NY.

Corresponding author
Jennifer K. Parkin can be contacted at: jennifer.parkin@ntu.ac.uk

To purchase reprints of this article please e-mail: **reprints@emeraldinsight.com**
Or visit our web site for further details: **www.emeraldinsight.com/reprints**