

**The Design and Management of Open  
Plan Technology Rich  
Learning and Teaching Spaces  
in Further and Higher  
Education in the UK**

**The Report**

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# **The Design and Management of Open Plan Technology Rich Learning and Teaching Spaces in Further and Higher Education in the UK**

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## 1.0 EXECUTIVE SUMMARY

This study set out to discover what issues there are with the management of Open Plan Technology Rich Learning & Teaching Spaces (OPTRL&TS). A questionnaire was used to gather information from institutions that have this type of space and this was followed up in some cases by telephone interview and site visit. It quickly became clear that the management of OPTRL&TS is intimately linked to the design of the space and therefore in this report, and the accompanying management guidelines, we include not only information on the management of these spaces but also comments on aspects of design.

What has been taken as a given in the study is that over the past 50 years there have been seismic shifts in the power and availability of technology and its use for communications. The technology and information revolutions of the last millennium have put us in a strong position to start to make effective use of these resources. New types of learning spaces are part of our attempt to do so. This is an exciting scenario dampened only slightly by the fact that the most frequently reported issues, with the greatest impact on these spaces, were heating, ventilation, noise (from users), and behaviour. These 'operational' factors, if not resolved successfully, can distract us from the challenge of providing imaginative, innovative, experiential places for learning.

In addition to this report, which provides information on the findings of the study, information on aspects of space and building design and suggestions of approaches and techniques for dealing with the issues raised, we have produced a set of case studies giving examples of issues with OPTRL&TS and, in many cases, suggested resolutions, and a set of guidelines for managers.

In the guidelines we have distinguished between strategic, design and operational issues. The main thrust of this guidance is a hierarchy of concerns. Of primary importance is the embedding of the strategic intent of the organisation in developing OPTRL&TS in the minds of all those involved – from the user all the way down to the manager. If this does not happen then preoccupation with the operational issues mentioned above can divert the space from its real purpose and deny it success. Part of this task is to ensure that the development of these spaces transcends departmental boundaries and goes beyond silo responsibilities. For those managing the space, institutions should seek to enable them to experiment with operation and configuration of the space, inevitably enabling greater local control – which may involve rethinking internal structures and responsibilities. OPTRL&TS is a powerful agent for change that has repercussions beyond the space itself.

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## **2.0 ABOUT THIS STUDY**

### **2.1 Why is this study needed?**

Over the past few years there has been considerable growth in the provision of open plan technology rich learning spaces, but, while the take-up of these facilities has been enthusiastic, their operation has at best been mixed. The Joint Information Systems Committee commissioned this study to investigate issues that have been encountered in the use and management of such spaces.

Whilst there is a considerable amount of information on the use and management of 'traditional' FE/HE space, due in part to the work of the Higher Education Space Management Group (SMG), there is little guidance on the issues arising from open plan technology rich space and how these spaces might be managed. The SMG has produced a number of publications dealing with the extent and levels of use of 'traditional' space <sup>[1]</sup> and has produced some useful tools for institutions to use for analysis and space planning. Open plan technology rich space does not fit easily into such frameworks as it is not treated in the main as timetabled space and in many cases its use relies on student preference and choice. The growing importance of 'learning space' is acknowledged in the work of the SMG as stated in the publication 'Impact on space of future changes in higher education' when discussing the remodelling of spaces for future needs. They state:

We believe that 'learning space' will be seen as one of these new needs, with more provision being made for student-led and 'blended' learning

This study aims to provide some background to the growing interest in, and use of, open plan technology rich space, identify key issues in the management of such space and outline the strategies that institutions are using to deal with these issues.

### **2.2 The Methodology for the study**

This study was conducted in 4 phases. An initial desk research phase sought out published papers and web based information on current practice with respect to open plan space in education and commerce. This was followed by a questionnaire that aimed to discover the extent of provision, and the management issues related to, both current and planned open plan technology rich learning space. The questionnaire was made available online on the JISC Infonet website. An email was distributed to Estates, IT, Library and senior administrative contacts in Universities and Colleges via relevant JISCmail lists asking for input to the project by completion of the questionnaire. Following analysis of questionnaire data a number of institutions were contacted by telephone to discuss, and clarify their responses. The telephone interviews, as well as providing useful information in their own right, were also used to identify a number of institutions for follow up visits. The final phase of the project was the production of this report, a set of case studies and management guidelines for institutions on aspects of open plan technology rich learning space.

### 2.3 Setting the boundaries - some definitions

In order to guide respondents in the completion of the questionnaire we provided a 'definition' of open plan technology rich space :

*A space for learning and/or teaching in a University or College that is:*

- *over 200 square metres in area and/or accommodates over 100 students at any one time*
- *has a variety of study environments*
- *which can be used for any or all of the following activities -*
  - *private study*
  - *group study*
  - *project work*
  - *library activity*
  - *IT use*
- *has comprehensive networking and access to computers*
- *is available to students and/or staff and/or members of the local community*

This 'definition' was provided as a general guide only and was not intended to be restrictive.

Whilst the focus of this report was initially the **management** of open plan technology rich learning and teaching space (OPTRL&TS) it was inevitable that in exploring the issues such space presents our investigations went beyond this to explore the effect of the **design** of the space. There is clearly interplay between the design solution and the ensuing management issues and in short, management issues can to a large extent be 'designed out' at the outset by careful development of the space.

### 3.0 CONTEXT

#### 3.1 A very brief history of open plan space

The creation of large open plan office spaces came, initially, in response to the need to accommodate clerical teams dealing with routine tasks, made possible through the technical advances of typewriters and telephones. At the same time new forms of building construction enabled the creation of larger spaces.

At this time managers still sat in enclosed offices and the open plan space was essentially production-orientated, much as a factory floor.

The idea of open plan moved forward in the late 1950's with the development in Germany of "Burolandschaft" [2]. Articulated by organisational designers, Eberhard and Wolfgang Schnelle, this drew attention to the way in which the behaviour of members of an organisation was affected by the nature of the space they worked in, and to how communication in particular was restricted by the hierarchical accommodation of managers in their enclosed offices. The concept of "Burolandschaft" was therefore as much to do with the development of the organisation and the qualitative nature of this new way of working as it was with the quantitative, efficiency-driven examples of the previous area. There is a clear parallel here with the move in the education sector from what might be termed "1st generation learning space" to "2nd generation learning space".

The 1960's marked something of a heyday in the history of open plan, with development around this time of iconic buildings that set the style of modern office design. These buildings, downgraded, simplified and made appropriate for a commercial situation, then fell into a certain amount of disrepute as people discovered that the new flexibility and egalitarianism which these buildings were supposed to offer was not so easy in practice, with problems of noise, lack of privacy, poor environmental control and numerous other difficulties coming to light; again problems similar to those currently being experienced by certain institutes of education.

Progress was maintained however, partly because of the commercial advantages, which these buildings offered, driving down the cost of space use, but also because of the ongoing and accelerating change in technology, where the technical problem of accommodating equipment increasingly gave way to the need for change and operational effectiveness. With this came a more subtle and sophisticated use of open plan, recognising the need to accommodate a series of different work modes and an appreciation of space planning and building technology, which could accommodate these different requirements without loss of flexibility and quality of environment. The result today is an open plan office which is less simplistic than the prototypes of 1960, 70 and 80, which draws out and deals with the problematic special areas and modulates the environment of the resulting strictly open plan space. **As with the changes we are starting to see in the education sector, there has been a dramatic move away from the mere efficiency of space use to the ultimately more rewarding pursuit of effectiveness in space use**, which might be seen to parallel the change in learning terms from "computer labs" to "social learning spaces".

Looking ahead we are starting to see offices which are as much virtual networks as they are physical spaces and where the physical office is more meeting place than the place where work has to be done. So it is likely to be (or already is) with university and college campuses, where the important social function we see being performed by the best learning facilities is something to be taken seriously as a foretaste of the learning environment to come.

### **3.2 Open plan spaces in Universities and Colleges – providing access to technology**

The growing interest in open plan technology rich spaces and the increasing number of such spaces is driven by a number of factors.

Firstly the availability of computer-based personal productivity tools such as word processors and presentation software has resulted in the expectation that student work will be produced using technology, which in turn has demanded that Universities make technology widely available, leading to extensive provision of computer facilities, often on a large scale. Many early open plan technology rich spaces in Universities and Colleges were focused simply on providing large-scale access to the technology itself for specialist subject areas such as computing. In many cases these spaces are still in operation although often with a shifting focus to generalist computer use and general information and network access needs (see University of Sunderland Information Terraces case study). Information technology has now become a ubiquitous requirement of the 21<sup>st</sup> century learner and is no longer restricted to specialist technological and scientific subjects.

### **3.3 The information factor**

In parallel with developments in technology there has been an enormous increase in the availability of digital information. As more and more information, initially in the form of journals but now increasingly as e-books, has become available online there has been a need to provide hardware to access these essential information resources. In some institutions the facilities developed for access to technology (mentioned above) have been repurposed to meet this need either deliberately or by default. In others specific facilities have been developed to provide information access for large numbers of users. Such facilities are often sited in Libraries, Learning Centres or Learning Resource Centres.

### **3.4 The sociality (and orality) of learning**

Since the start of the new millennium there has been a growing interest in Universities and Colleges in social learning. Undoubtedly technology has played a part in the realisation that learning has its foundations in communication, described by Vygotsky<sup>[3]</sup>, among others, in his conception of learning as a social process. Academic practice in Universities and Colleges changes slowly but continuously and has always involved the setting of group work of one kind or another. The growing interest in the idea of socially constructed knowledge has given impetus to this, with new approaches such as problem based learning and learning as research. These group approaches now form the larger part of the post school student experience with some institutions responding specifically by providing 'social learning spaces'. The requirements of such spaces are that they are technology rich in order to support the access to resources needed by students engaged in group work, but are not technology dominated as is the case in IT labs and information focused facilities. A key feature of these spaces is that they also provide environments that encourage conversation and interaction.

### 3.5 A 'commons' theme

The demand for student access to computers has grown phenomenally and schools, colleges and universities have invested heavily to meet this need. For reasons of efficiency essentially, and ease of management, computing facilities have generally been provided in single areas where access is open to students and staff of all sorts and where the facilities have been provided by IT services departments (often within library facilities) and linked to training in computer usage. **They have not, until recently, necessarily been linked to new ideas about learning.** The freely accessible and non-department specific nature of these facilities has had its advantages and its disadvantages.

The accessibility of these facilities likens them in the first instance to other shared and 'common' facilities, hence their frequent description as a "commons". Their 'free for all' provision however and the need to provide for 'optimum' as opposed to 'peak' demand, also means that the facility is frequently inadequate for the number of persons wishing to access it. This can be described as a 'rivalrous' resource, a resource that students have to compete for to some extent in order to use. This often means that the 'commons' is characterised by a 'buzz' and energy that is absent from smaller dedicated facilities. This has been partially responsible for the evolution of these spaces into something more than just "computer farms", but into spaces where there is a dynamism and social interaction similar to that of a market place, and where the places start to perform an important component of student life and learning. From here it is a short step to making 'sociality' the heart of the 'commons' provision. It is useful therefore to use the 'commons' theme as a way of characterising the different sorts of open plan, technology rich environments commonly found in HE and FE institutions. Having to identify these differences also indicates the direction of change that is starting to occur. Different types of commons may be identified and defined as:

- **IT commons** – large scale provision of desktop computers focused on computing activity or assignment 'production' by students
- **Information Commons** – similar large-scale provision of desktop computers along with extensive access to digital information resources, and with paper based information resources within close proximity.
- **Social Learning Commons** – large scale provision of a range of formal to informal study facilities with access to technology, digital and paper-based resources as well as catering and social facilities.

### 3.6 "Strategic Intent"

What particular form a 'commons' might take should of course **reflect the 'strategic intent' of the institution**, i.e., its intention merely to provide computing facilities or to go further with respect to enabling particular types of learning. As has been suggested facilities can evolve to become something different from what was originally intended. This is of course legitimate but can lead to a discrepancy in what is provided and how the facility is expected to operate, and suggests two things: first the need for educators to be as clear as possible about what they intend and what they think is necessary to engender a certain result and, secondly, the need for a clear line of communication between those developing a particular educational strategy and those being responsible for implementing it. **Without the intention being clear, there is little chance of the result being fully successful.** There is inevitably however a degree of uncertainty in the most innovative space projects that frustrates attempts to be absolutely clear about the intent. To this extent new learning space requires to be an experiment, which will evolve and is bound to cut across current operation and traditional ways of working.

### 3.7 'Strategic' vs. 'Operational' intent

The need for a clear chain of intent from "vision" to "strategy" to "operation" will be appreciated. What is not always appreciated is how this intent is communicated and thereafter whether responsibility for implementation is either clear or consistent. As has been seen technology-rich spaces have come about in some situations because of one perceived need and then evolved into another. They have also found themselves located within a building whose functions overlap with other functions within the college of university. These facilities are seldom run by educationalists. What might or might not be understood at a strategic level is therefore sometimes only loosely linked to what is happening at an operational level. Indeed as noted because "social learning" is still an evolving concept, it does not necessarily have a champion at faculty level or not someone who has authority at senior level. 'Social Learning' facilities are therefore sometimes coming into effect thanks to individuals within libraries or other parts of the institution who are not 'teachers' themselves, do not have control over the systems and resources required and where powerful independent Estates and IT departments further complicate the task. Something of this split between 'strategic' and 'operational' intent can be seen in the following chart, contrasting the perception and attitudes of those at the two different levels of institutional responsibility:

<b>Operational</b>	<b>Strategic</b>
Planned	Experimental
Status quo	Innovative
Procedural	Playful
Single use	Multipurpose
Silo driven	Institution wide
Known	Unknown
Safe	Risky

In addition to highlighting the different roles of those within subject faculties, information services and estates, it is important to understand the role of the "Facilities Management" (FM) function. **At its best 'FM' should be involved at a strategic and senior management level and fully understand organisational objectives.** Often however responsibility is restricted to 'janitorial' tasks only where keeping to ever constrained budgets is the priority and where overarching contracts can have little to do with the objectives of an evolving facility within an institution, but which can do much to constrain them.

### 3.8 Directions of change that affect open plan technology rich space provision

#### 3.8.1 Changing Technology

The pace of technological change in all its aspects from hardware to software, and resources and services is rapid. Post school educational institutions are well aware of this pace and of the investment required to make the best of the opportunities afforded. In the past technological infrastructure requirements have often limited the pace of facilities development but this is now less of an issue. Flood wiring (providing extensive network wiring throughout a space) and wireless networking of any refurbished or newly built space is now a given. Whilst there may be some 'technical' issues to be resolved in some of these spaces their resolution is comparatively simple. What does need to be carefully considered is the balance between wired and airborne network provision as wireless networking becomes more robust and achieves greater bandwidth. For the foreseeable future it is likely that these types of open plan facility will require both types of network infrastructure. **Increasingly important is the need to take account of other (airborne) networks from providers other than the institution.** Many students are, and more will become, users of wireless network services delivered to them by external providers while they work within University and College buildings. We should welcome these services and enable students to access them (see 3.8.4 below). Wireless technology can also enhance the 'spread' of an OPTRL&TS facility providing opportunities for the use of external open space on campus - perhaps a wireless lawn?

#### 3.8.2 Who Owns Technology?

There is a clear increase in **student ownership of technology** devices and this **suggests there should be a shift in institutional investment from the current one on infrastructure and client devices to one focussed more on infrastructure and services.** This increased student ownership also means that new facilities should provide easy access to power and network points within open plan facilities with, for example, wired furniture and spaces where technology based work can be effortlessly carried out.

#### 3.8.3 Student Numbers and Diversity

The drive for increased participation in post school education has the consequence of greater student numbers and, more importantly, greater diversity. Open plan technology rich spaces need to **respond to this by providing a range of microenvironments that appeal to all types of learners.** As Howard Gardner <sup>[4]</sup> suggests, we all have different "landscapes" of intelligence and prefer to learn in different ways at different times. A space with one type approach to learning, silent study for example, will disadvantage a large proportion of 21<sup>st</sup> century students.

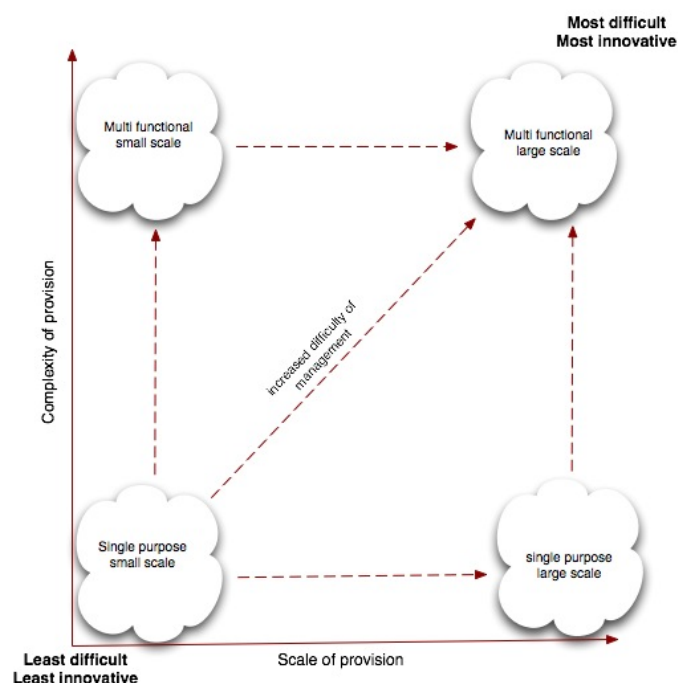
#### 3.8.4 Sociality – WEB 2.0 and Social Software

The big news of the new millennium is the use of technology for social networking, communication and connection through sites such as Bebo, MySpace, Second Life, and Facebook. The young, and not so young are using these tools to learn from and with others, to build their social networks and to participate and contribute in a variety of ways. Open plan technology rich spaces can work with this significant societal change or against it. By working with the social software movement our institutional spaces can become an important part of students' lives both at University and College and throughout their lives. **To work with Web 2.0 means, as mentioned earlier, enabling external network service providers to access students' devices in our campus buildings, to use software tools and web services that have the look, feel, and capabilities of Web 2.0 tools, and above all to realise that the future is not about our conception of IT but theirs.** Student use of web 2.0 tools is becoming so extensive as to subvert the traditional approach to IT in our Universities. The opportunity is well articulated by John Seely Brown former Chief Scientist of the Xerox Corporation:

If you can **design the physical space, the social space and the information space** together to enhance **collaborative learning**, then that whole milieu **turns into a learning technology**. People just **love working there** and they start **learning with and from each other**.

## 4.0 THE CHALLENGE

In managing workspaces, as in undertaking other projects, there is a clear correlation between the ease of management and the simplicity of the task to be managed.



The obvious question to be asked therefore, relating to management, is **what is the point of making things more complicated than they really need to be?** This question sits at the heart of open plan technology rich space development. In reviewing different organisations' experiences of the kinds of new learning facilities being developed, issues, at either an organisational or technical level, appear to increase as more is attempted. Conversely, simple facilities seem to work, at least at a management level. But clearly ease of management cannot be the only criterion. If it is, then one is put in mind of the caricature librarian who believed that all was fine, so long as the books stayed on the shelves.

In the section on context we gave a brief overview of the changes in technology, and teaching and learning opportunities that are fuelling the drive for new types of learning space. **If these drivers are credible and the new freedom that goes with them to learn in different ways, individually suited to different types of learner, is our aspiration, then we start to see the need for more complex spaces.** We see that learning is an activity that has many variables and quiet spaces with easy access to well organised book stacks cannot fulfil the needs of all learners. This is especially important **in a post school education sector that has a greater diversity of learners than ever before.**

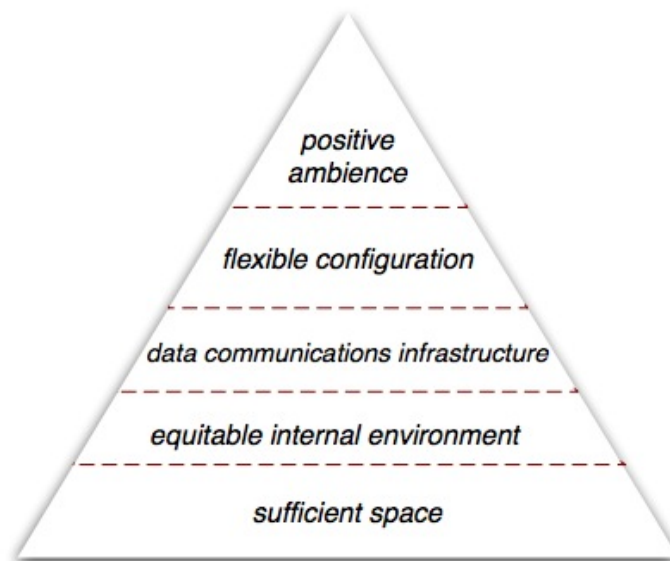
This is not to say that the traditional model of “reflective” learning is not still valid. It is to recognise rather the rise in credibility of other models of ‘practical’ and ‘conversational’ learning and the consequent pressure that they are putting on the space and resources previously devoted to the university or college “library”. It is to recognise also that it is these types of learning which start to call for more managerially complex types of space: that there is a need for different types of space, accommodating: concentrated fixed computer usage, specialised IT usage, assisted IT usage, mobile IT usage, group work, informal and formal meeting space, preparation space and relaxation space; and that there is the need for conversation and acceptance of not just the necessity but the desirability to overlap all of these activities with the kind of social interaction that admits mobile telephones, food and drink and embraces sociality.

It is to be recognised also that on occasions some of these modes of work are easily separable but that both custom (as driven by a younger generation of scholars) and pedagogical theory support the concepts of multi tasking and “blended learning” whereby there is either an overlap between the different types of learning or the need for a rapid switch between them. **In building terms this calls for the kind of change that has previously been seen in the design of office space**, driven by the same revolution in behaviour and technology; namely, larger spaces and greater amounts of “open plan”.

The origin and expansion of open plan working in commercial office space is complex and has in part been driven by the pressures of real estate, but has come about also as a genuine attempt to deal with an ever increasing need for flexibility. The changes in education and the design of learning spaces might be similarly summarised by saying that the need to accommodate new ways of learning behaviour is **a need to understand and accommodate flexibility**. And it is in the over-simplicity of translating this need for flexibility into a need for unadulterated large open plan space that much of the difficulty has arisen in the design of modern office space. So it is with the design of modern learning space.

Ease of management, as has been suggested, at a personal, organisational, technical and spatial level is assisted by physical separation of different modes of operation. Hence the popularity of the enclosed personal office where “the world can go hang”, and of other physically enclosed spaces which contain noise or smells, or deal with other “problem” functions, or at least separate other users from them. Such a design strategy is not wrong, but, as is increasingly understood within the commercial office sector where the cost of space and the economic benefits of performance are more directly felt, **the benefits of such separation and enclosure come at a cost to flexibility, interaction and the accommodation of change – thus the relentless advance of “open plan”**. It should be noted, however, that this is not “open plan” at any cost or in any over-simplified shape or form - but open plan where the equally real costs of disruption or lack of security are balanced with flexibility and dealt with in sophisticated design terms bringing organisational benefits as outlined in 3.1 above.

In the provision of quality learning space (or office space), there is a hierarchy of needs to be satisfied, illustrated by the following adaptation of the Maslow Triangle



The triangle illustrates the pre-requisites on top of which are built the aspirations of increasingly responsive, individualised and sophisticated learning. The pyramid is supported at its base by the need for an equitable physical environment. This need for good ventilation, temperature control, control of noise, smells etc, remains basic, and was reinforced totally by the study's questionnaire responses and subsequent interviews. Obvious though they are however, in moving forward into the design of new and flexible space it would appear that they are sometimes forgotten or at least compromised in the pursuit of other objectives. **In building terms therefore the challenge is to ensure that they are maintained while starting to move away from the simplistic model of total separation of conflicting work modes.**

In their list of criteria for evaluating new library and learning facilities SCOUNL (Standing Conference on University and National Libraries) include an "oomph" factor. This suggests spaces that have an 'extra' component, a feeling of vibrancy, inclusiveness and belonging that actively supports learning and inspires its users. In other words, there is a critical need for buildings, and especially spaces designed to encourage learning to be more than just so much usable square footage of space, or, in addition to the physical attributes of space underpinning its general usability, there are essential psychological attributes that immediately come into play once the physical attributes have been satisfied. **The "oomph" factor characterises these psychological attributes.** The term also has a strong suggestion of architectural drama and there is no doubt that there is a first impression on entering a building which can immediately indicate that something different is on offer, that can excite and encourage learners (of all sorts) as part of the building's function to promote the activity of learning. In drawing attention to this need however there is the danger also that this factor (in terms of its architectural drama) can start to take over, at the expense of some of the environmental pre-requisites so strongly emphasised by the study's user response. Definition of the building challenge (the challenge of creating the new learning environment) starts to take on an even greater complexity therefore. **It has to be flexible, blended, variable, accessible, inclusive, exciting, but at the same time utterly practical in its provision of the basic components of physical space.**

The way in which these components might be dealt with is further examined under "Building Strategies", where the notion of **zoning** (applied, to a greater or lesser extent, by all those institutions where there was a positive experience), is given full credence. Where "zoning" starts however to fall into the traditional provision of physical and inflexible "separation" is of course a moot point.

The ultimate answer to these competing demands will rely therefore on the all-too-easily-voiced concept of "balance" – which depends on context and which can become an excuse for why "in this particular instance" a compromise was essential. Excuses are understandable given the multiple and sometimes nebulous demands put onto the design team, but such a response would not be meeting the particular challenge of what is currently an exciting time in the development of the learning environment. Especially at such a time a good solution is unlikely to be characterised by something bland or easy. At the risk of courting dissatisfaction therefore from at least some elements within the enlarged user group, **it would appear that the challenge should include an element of creative tension, of exploration and uncertainty, that which possibly underlies the excitement of learning itself.**

## 5.0 WHAT THE QUESTIONNAIRE, INTERVIEWS AND VISITS TELL US

### 5.1 The questionnaire

An electronic web-based questionnaire was used for the initial fact-finding phase of the project. Key networks of Estates Directors, Heads of Library, IT Directors, senior administrative staff, and Pro Vice-Chancellors in Universities and Colleges were asked to complete the questionnaire using group emails via the appropriate JISCmail groups with the help of JISC Infonet and the Higher Education Academy. There were 49 responses to the questionnaire, with one duplicate response, making 48 discrete inputs. Some institutions provided more than one input as they had developed more than one open plan technology rich facility. Some responses were, inevitably, incomplete and the analysis below is consequently not based on all respondents in all cases. However the spread of responses by institution provided a good range of coverage of the HE/FE sector as shown in Table 1 below.

Type of Institution	percentage of total
Universities (pre 1992)	21%
Universities (post 1992)	35%
Further Education Colleges	39%
Schools and Sixth Form Colleges	4%

Table 1 Diversity of respondents

It is interesting to note a significantly higher occurrence of open plan technology rich spaces in post 1992 Universities and FE Colleges as compared with pre 1992 Universities. This may relate to a number of factors such as age of building stock (although this is a less important factor than perhaps expected – see table 4) or growth in student numbers and associated space development activity.

Each open plan facility identified in its description of purpose a number of 'primary' activities that they supported. In the table below these have been categorised as student learning (usually library, study, or IT facilities predominantly for student use), teaching (where the space has been identified with teaching as its primary use the facilities are usually computer suites and are also used for student drop-in when not used for teaching), and what we have categorised as "other" (which covers access to student services, use for continuous professional development activities, or use by administrative functions of the university). In some cases there is a degree of 'dual use' of facilities in order to make the best, and most efficient, use of the space available – consequently the percentages in table 2 sum to more than 100%.

<b>Main activity in the space</b>	<b>percentage of total</b>
Student Learning – Library, study space, student IT facilities	91%
Teaching	10%
Other	12%

Table 2 Type of use

It can be seen from table 2 that the majority of the open plan technology-rich spaces reported in the survey were located in library type space, with access to information resources, study space and IT facilities being most frequently the purpose of the space. In at least one respect this is not surprising – libraries have always been the most significant academic open plan space on campus. Indeed it can be argued that Libraries in their transition to Learning Resource Centres and then Learning Centres have led the way in the development of open plan technology rich learning space.

In the study we were also interested in the age of buildings that were being used to create open plan technology rich space. Of the institutions responding to the questionnaire the age of building in which learning spaces have been developed is as shown in Table 3 below.

<b>Age of Building in which space has been developed</b>	<b>percentage of total</b>
Under 10 years old	48%
10 to 25 years old	15%
Over 25 years old	36%

Table 3 Age of buildings

It is clear from table 3 that many of the spaces in question are in new facilities less than 10 years old. Both the development of open plan space and provision of a technology-rich environment are historically less problematic in such buildings since the installation of IT infrastructure in new buildings is much simpler than in older ones. However with the advent of wireless networking, and in the future wireless power, the 'technological' advantage of new build should diminish. The table also shows us that a significant number of facilities have been developed in buildings that are over 25 years old – indicating that age of building is not necessarily a barrier to creating open plan technology-rich space.

We were also interested to have some idea of whether the spaces in question created in existing older buildings had more management issues than those developed in younger or new buildings. The issues that were covered by questions in the questionnaire (see appendix 1) were:

- Ventilation
- Heating (temperature control)
- Humidity
- Lighting
- Noise
- Behaviour
- Staffing
- Maintenance
- Booking

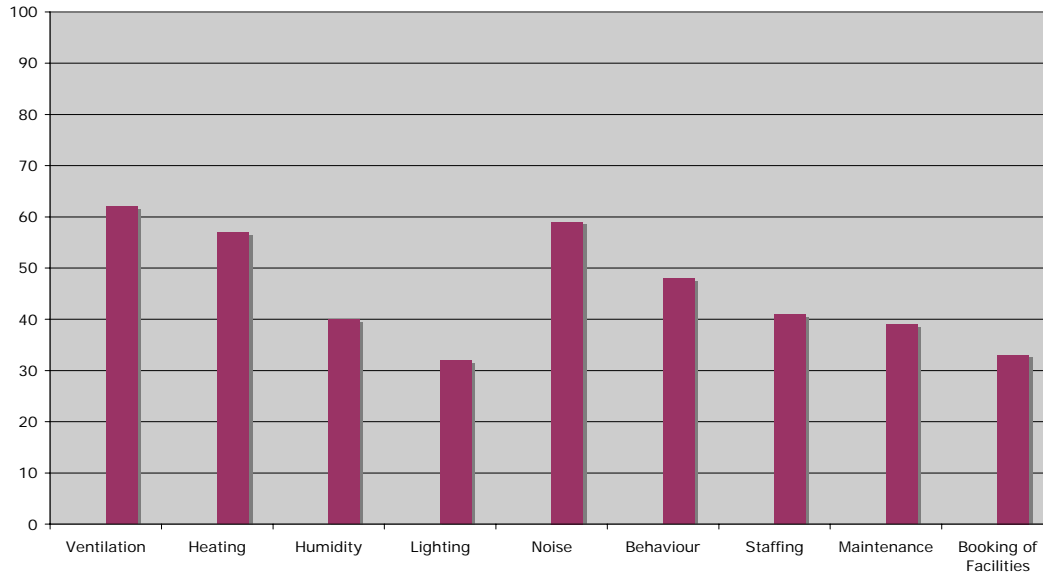
For each of these issues respondents made an assessment of whether the issue was 'not at all' (an issue), 'a minor problem', 'a problem' or was 'highly problematic'. For the purposes of analysis these responses were converted to numerical values of 0,1,2,3 respectively so that an 'issues rating' could be obtained for the issues themselves across all institutions responding, and for each institution. These 'issues ratings' have then been used to give some insight into which issues present the most frequent and most important management problems, and what the total extent of any difficulties with the management of open plan technology spaces there might be across the range of institutions that responded. The possible highest score for a facility that had highly problematic issues with all aspects was 27. By relating these scores to the age of the buildings in which the space has been developed (45 institutions provided age data) we can see (in Table 4 below) that, although newer facilities do have a slightly lower 'issues rating' score (as a percentage of the total possible) than older facilities, there is in general little significant difference between the averaged scores of older as compared with newer facilities.

<b>Age of building (years)</b>	<b>'Issues rating' as a percentage of total possible</b>
Over 25 years	34
10 to 25 years	33
Under 10 years	30

Table 4 Extent of management issues related to age of building

In Chart 1 below we have used the 'issues rating' to give an indication of the relative occurrence of each issue as a percentage across the open plan technology rich spaces covered by the study.

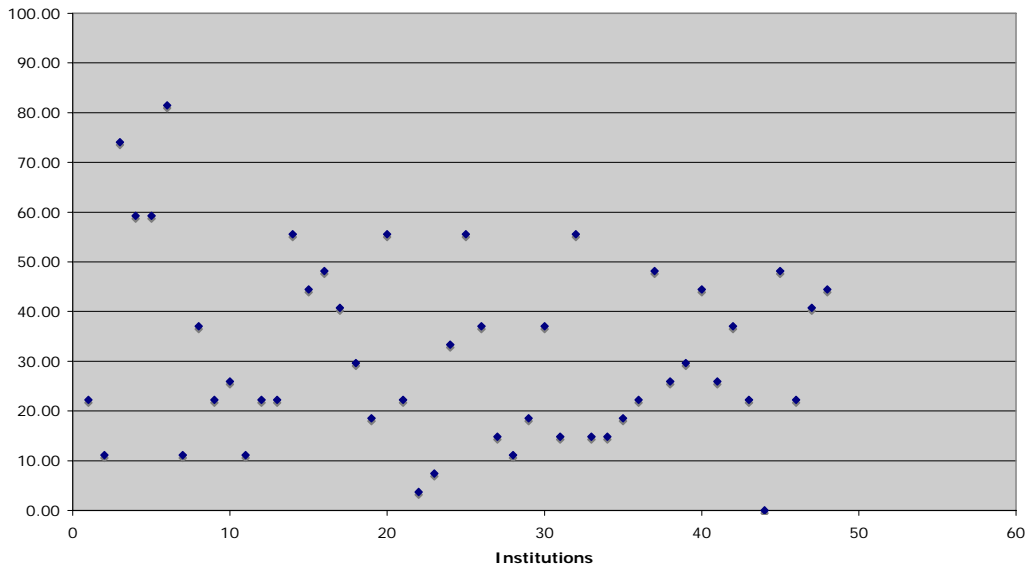
Chart 1 - relative importance of issues as a percentage



It is no surprise that the issues of ventilation and heating are the top 'physical' factors giving concern in open plan technology-rich spaces. The possible reasons for this and strategies for ensuring that these issues can be avoided at the design stage or dealt with through management strategies are discussed in sections 7 and 8. It can also be seen from the chart that noise and behavioural issues rate as some of the most problematic issues. Again these are discussed in sections 7 and 8.

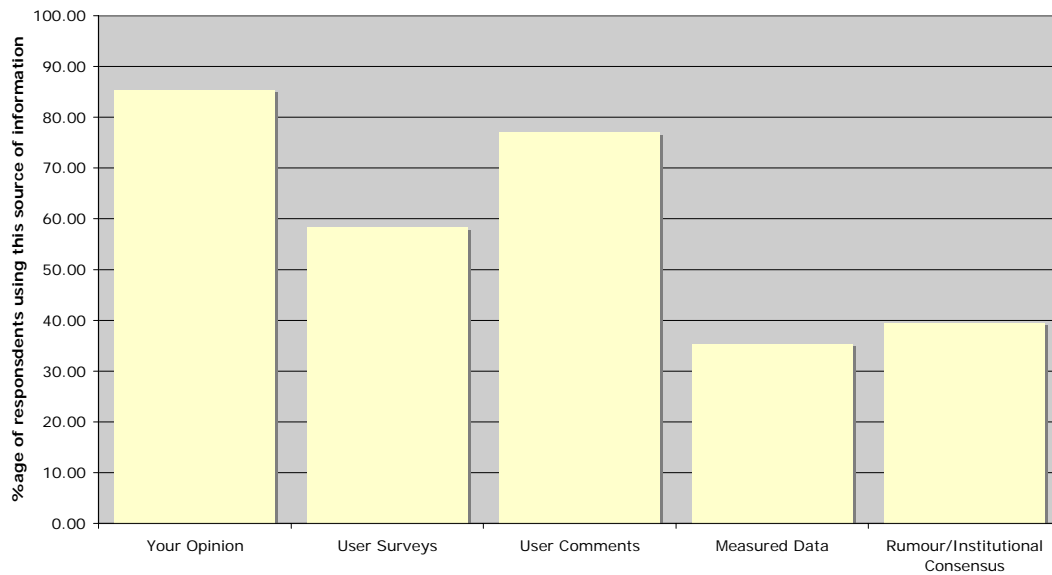
The picture provided by both Table 4 and Chart 1 above masks however a wide variety of other experiences covered by the survey. The scatter graph (Chart 2) below gives some idea of the extent of this variation. The chart shows each institution that took part in the survey as a dot on the chart. The vertical axis is the percentage of issues that the institution has which was obtained by simply converting the issues rating, derived as described above, to a percentage of the maximum of 27. From Chart 2 it is clear that there are a number of institutions that have few issues, or manage them out – those in the bottom quartile of the vertical axis, which possibly represent some of the good practice in the sector. There are also clearly some facilities that are highly problematic across the range of factors included in this survey (those in the top quartile of the vertical axis) and which provide some important pointers to what should be avoided. Both these best and worst-case scenarios have informed the conclusion of this report and the management guidelines section.

Chart 2 overall 'issues rating' by institution



The chart above requires a word of caution and also draws attention to some other issues worth noting: whilst the data gives some useful pointers it must be taken first of all as a guide rather than an absolute, since, as the questionnaire shows, the data originates from a wide variety of sources (as in Chart 3 below), a substantial amount of which is personal opinion and institutional rumour. This raises an important issue with regard to the development of improved facilities across all educational institutions, namely the lack of good, objective data on the performance of different buildings and in particular new "experimental" facilities. It is important that managers realise that judgements about the success or otherwise of a space are often based on subjective judgements that are propagated through conversation. There is a view that organisations are no more than "managed conversations" <sup>[5]</sup> i.e., that they are in a sense virtual, based on a collective perception rather than observed fact. And further that "Business is fundamentally an extended conversation – with colleagues, customers, partners, and the unknown future emerging around us. Unfortunately many conversations fail"<sup>[6]</sup>. Failure therefore to manage the conversations about, and the expectations for, new spaces and to promote their strategic and educational purpose or identify their successes leaves a vacuum to be filled with subjective judgements that, once established, are difficult to erase. It is important therefore to manage the development of any project such that its intentions are appreciated and its inevitable compromises are understood. It is with the process of developing user requirements and shaping the design that a sense of ownership can be engendered.

Chart 3 - source of opinion on issues with open plan technology rich learning space



## 5.2 The Telephone Interviews

Telephone interviews were undertaken with the institutions listed below. The interviews were carried out as a ‘free form’ conversation around the data provided in the questionnaire responses as a starting point for discussion and culminating in an opportunity for the interviewee to provide information on additional issues peculiar to the space being discussed. The purpose of these interviews was to explore with respondents what strategies were in place for the management of the issues that they had outlined in the questionnaire and how these were being operationally managed. The interviews also helped to identify institutions that would provide case study examples.

The institutions that were interviewed were:

- Accrington and Rossendale College
- University of Cumbria
- De Montfort University
- University of East London
- Harrogate College (Leeds Metropolitan University)
- University of Hertfordshire(Blended Learning Unit)
- Leeds Metropolitan University (Civic Quarter Library)
- Liverpool John Moore’s University (The Automatic)
- Loughborough University
- Newcastle University
- North West Kent College
- University of Northumbria
- College of Richard Collyer
- University of Sunderland
- Sussex Downs College
- Walsall College
- University of Wolverhampton

The interviews confirmed that the top issues for the managers of OPTRL&TS were heating and ventilation – not just the inadequacy of most systems but also the frustration at lack of local control. This was often articulated as a tension between the managers of the space and the estates or facilities department that managed the system and highlights the importance of achieving a common understanding between all departments involved in making OPTRL&TS work.

Other issues that arose during a small number of the telephone conversations were the inadequacy of floor boxes for power distribution, security, and managing food and drink and the associated litter.

### **5.3 The Visits and Case Studies**

From the interviews it was clear that the top concerns were those of heating, ventilation, noise and behaviour that had been identified in the original questionnaire as few other significant issues arose. It was also clear that the open plan facilities in use were extremely diverse in nature and that each institution "had a story to tell". Case study visits were then undertaken to follow up many of these telephone contacts resulting in the production of the case studies companion publication to this report. In selecting institutions to visit, care was taken to provide a mix of institutions by type (pre and post '92 in the case of Universities) and by age of building in which the space had been created. A range of types of space were also covered from large to small, including IT, information and social types of "commons". The institutions that were visited were:

CASS Business School  
University of Cumbria  
De Montfort University  
University of East London  
Glasgow Caledonian University  
Harrogate College (Leeds Metropolitan University)  
University of Hertfordshire (Blended Learning Unit)  
Leeds Metropolitan University (Civic Quarter Library)  
Loughborough University (Open 3)  
University of Northumbria  
University of Sunderland  
Walsall College  
University of Wolverhampton  
Aberdeen University  
St Andrews University  
University of Glasgow  
Edinburgh University  
Banff & Buchan College  
West Lothian College  
Telford College  
Lauder College  
Adam Smith College  
John Wheatley College  
Aberdeen College

These visits all contributed to the ideas in this report and some resulted in the case studies that can be found in the accompanying publication to this report.

## 6.0 ISSUES

In analysing the responses to questionnaires and subsequent telephone conversations and site visits, various issues appear as critical in the successful design and management of open plan, technology-rich spaces. Some of these relate to the physical make-up of the building, others might be described more in terms of the psychological impact of the total building, albeit as a result of the physical make-up of its pieces. Thereafter there are issues relating to the management regime within the building.

### 6.1 Issues - Physical

#### 6.1.1 Heating / Cooling / Ventilation / (Humidity)

<b>Percentage of respondents</b> (reporting this as an issue)	<b>Ventilation</b>	<b>62%</b>
	<b>Heating</b>	<b>57%</b>
	<b>Humidity</b>	<b>40%</b>

The importance of heating / cooling / ventilation as a **pre-requisite** for generating a favourable response to a learning opportunity has already been stressed.

**Heating / cooling / ventilation tend to be linked** although in building systems terms they can equally be provided independently. It is important to recognise that physical and psychological responses to the one can be affected by the performance of another. Thus air movement and the provision of fresh air affect responses to temperature. Air movement affects the sensation of air temperature on the skin and provision of adequate fresh air is critical to mental alertness and concentration. Furthermore, there is also a psychological component that can apply to each. In other words it can be difficult to be precise as to what is required and what is being experienced. This can of course lead to confusion and sometimes mistrust (of those who operate, designed or installed the system). There is clearly then considerable difficulty in providing air temperatures, which are acceptable to everyone as different **individuals respond differently**. For example it is acknowledged that women are generally more sensitive to cold than men.

Open plan areas work on the principle, generally, of there being uniform temperatures across the total space. Temperatures at the perimeter of a large space (where there is going to be the greatest heat loss and heat gain and sudden changes in outside temperature) will be more variable and might not be able to be fully compensated for by a uniform air conditioning / ventilation system.

Ideally air conditioning / ventilation systems should be designed with **considerable variability in mind** (by providing zones which can cater for locally changing conditions). This does however make them more expensive and, sophistication in air conditioning is often first to be trimmed from the cost plan in the mistaken notion that open plan spaces will remain simple and "open plan".

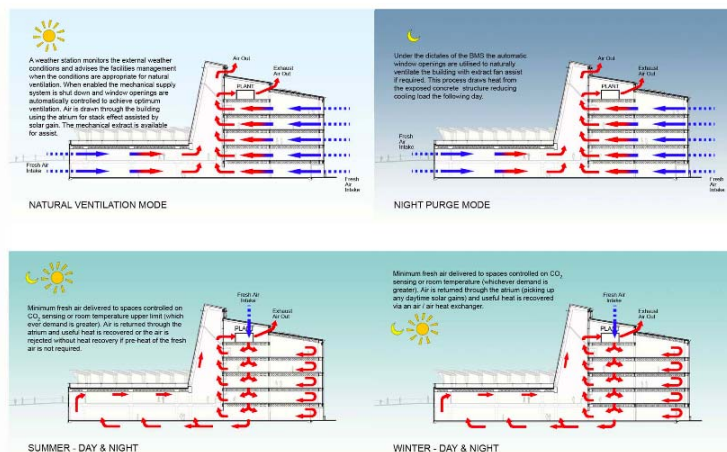
It was noted in the survey that complaints to do with heating/cooling and ventilation most often came where changes in air pattern appeared to have occurred through unplanned-for changes to the internal partitioning. The fact that internal changes will occur should therefore be taken as fact and as an essential requirement for flexibility within a building. **Economies to the air conditioning design would appear almost always to prove to be false economies, resulting in the greatest reason for user dissatisfaction.**

Small spaces with windows to the outside can, by definition, be dealt with by natural ventilation. **Large open plan spaces, by contrast, are more difficult, usually calling for artificial systems.** Some of these might constitute full “air conditioning” (which implies modification of the quality of the air in terms of fresh air content, temperature and humidity). More often than not however what might be called “air conditioning” involves little more than “comfort cooling” i.e., re-circulating and cooling the internal air. This is sometimes provided in the theoretical belief that it will be combined with openable windows, which will provide the fresh air component. In practice however the external windows prove difficult physically or managerially to open, resulting in a dearth of fresh air. Such environments feel stuffy and result in a loss of concentration. Even with a better quality air conditioning system responsiveness to individual requirements will be limited, resulting in the **frustration of the building occupants**, or their impatient tampering with controls thereby upsetting the system’s balance. This in turn often results in the deliberate removal of local control, further aggravating user frustration. It is significant to note that **an important factor in the analysis of “Sick Building Syndrome” was found to be lack of personal control.** As a result of this the re-introduction of openable windows and thermostatic radiators has become a more familiar feature of modern buildings, being considered preferable to the centralised control and uniform provision of full air-conditioning.

Locally openable windows are not to be confused with the concept of **passive heating and cooling**, although they might constitute an element of this. “Passive” systems are similarly not synonymous with the notion of “sustainable” systems, although might well constitute part of such systems.

**Sustainability** is a critical feature of any modern design but to what extent it comes in contradiction with that other essential feature of modern buildings, namely flexibility, is not always clear and deserves therefore to be examined with caution. **Within this present study a majority of new buildings were found to compromise flexibility, or alternatively, were resulting in unacceptable internal environments as a result of the internal reconfiguration that had taken place.**

In discussing systems in general terms, there is the danger of over-simplifying what is taking place, however in describing passive heating and cooling the following general operating principles might be said to apply: The provision of air movement comes as a result of exploiting the “stack” effect generated by rising warm air and / or the entrainment of air, resulting from the differential pressures at the outside of the building. In general this implies the movement of air across clear spaces and against the exposed thermal mass of the building in some pre-determined manner that allows air movement and consequential heating and cooling to be modelled and directed in advance (see diagram below).



Example of modelled air flows at different times of the year (courtesy bdp)

Where this implies air movement across open plan floors and up through an open atrium, the detrimental effect of closing off some of these floors or part of the atrium is obvious. **It was noted that more than one building example was encountered where this principle underpinned the building design.** In these cases noise, smells, variations in temperature, and the inability to adapt the building were starting to render the building unusable and were clearly an unacceptable price to pay in the name of sustainability. In other buildings where the large air movement was contained within non-usable spaces (like a chimney space against a glazed façade), and where the feeder air routes could thereafter be adapted or modified through the use of mechanical fans, or where certain special spaces were dealt with by localised artificial systems, the designs offered far greater flexibility and were found to be far more successful. **Such “mixed mode” or “blended systems” were therefore considered to be infinitely preferable to designs where sustainability was taken as an absolute priority.** So limiting was the operation of some of the buildings visited, that it was concluded that sustainable design should be treated with extreme caution at the early stages of any project.

### **Summary**

**From the survey these are the most problematic factors identified in the operation of OPTRL&TS. Systems should be designed with considerable variability in mind. Acknowledge that individuals respond differently to these environmental factors, and provide, if possible, a degree of local control over them. Economies made in the systems installed to control these environments are false economies.**

## 6.1.2 Lighting and Glare

<b>Percentage of respondents (reporting this as an issue)</b>	<b>Lighting</b>	<b>32%</b>
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The provision of **adequate and glare-free artificial lighting** is relatively simple, but providing good lighting and maximising natural lighting is far from easy. This ease of provision of adequate lighting may be behind the fact that lighting appears to be less problematic from the survey results.

However "adequate lighting" which merely permits easy reading of text and computer screens but which is otherwise **uniform and dull** can kill the liveliness of any space. So important is this that recent revisions to the building regulations have called for an upward component to lighting to enliven an otherwise dark and uniform ceiling. This is a start, but it was concluded that good lighting should provide considerably more than this, with variety and modification, in support of the essential concept of a modern workspace, which recognises the importance of different types of space, of movement and change.

The psychological benefit of **natural lighting** (sunlight and reflected daylight) is widely accepted. In terms of management however it can pose difficulties. It can be too bright and can imply glare which makes it inappropriate for computer screens or even conventional text reading. It requires to be used in combination with blinds therefore or (preferably) external fixed or movable louvres where the shading provides the additional benefit of minimising heat gain. External systems are more expensive however, more difficult to maintain and difficult or inappropriate to retrofit to an existing building. Very often therefore best use has to be made of internal blinds. The most effective approach is to deal with the problem / opportunity at the level of **space planning** where the quality of daylight can be combined with the provision of circulation spaces or social areas.

**Differences in personal requirement** with respect to lighting can be relatively easily dealt with at the level of 'task lighting' – and are therefore **less of an issue than dealing with localised requirements for heating or ventilation.**

In general **'problems' were not voiced when it came to lighting.** In making the building visits however where **spaces were full of uniform lighting, deadness was too often the general impression.**

A particular facilities management issue arises with respect to lighting and in the need to have **easy access** to light fittings to be able to change light bulbs. This can tend to be a problem specifically with feature lighting where it is often combined with double height or atrium spaces. The Construction Design Management (CDM)\* regulations tend to deal with this, specifically with regard to new buildings, but it appeared that the implications of certain designs are not always appreciated in advance.

Where **sustainability** is not already being met by maximising the use of natural light, there is a need to ensure use of low energy fittings. These can have the added benefit of being "long life" thereby reducing the problem of access.

### Summary

**Lighting was not identified as a major issue in this survey, but whilst 'adequate' lighting is relatively straightforward to provide, the aim should be to enhance the space with imaginative lighting schemes if possible.**

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\* CDM regulations cover health and safety on site during construction and design matters affecting access for maintenance work

### 6.1.3 ACOUSTICS AND NOISE

<b>Percentage of respondents (reporting this as an issue)</b>	<b>Noise</b>	<b>59%</b>
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Acoustics in terms of **distracting noise** transferred from one open plan area to another appears to be a major problem for some people, but (in very similar circumstances) not for others. From this one might surmise that the factors at play are not just to do with physical noise levels.

The distracting qualities of noise are well known for being **complex**. This complexity lies not just in the noise itself but also in the attention of the listener, the contrast between intermittent and background noise, and the acoustic qualities of the space. Only when noises become extreme do they obtrude in themselves.

Noise, in terms of eliminating sound transfer from one space to another and in pursuit of **total privacy and confidentiality**, is a relatively rare requirement and unlikely to be an issue within open plan learning spaces, although the **accommodation of traditional didactic teaching spaces in such an environment would appear to be highly problematic**.

The provision of **full physical enclosure** is generally problematic since it inhibits air movement and thereby raises issues to do with heating, cooling and ventilation. Full enclosures also start to create fixes within the working environment thereby inhibiting flexibility. In general therefore if noise can be dealt with at the level of **modulation** rather than elimination it can be far more manageable. This is possible by means of a variety of partial enclosures which can reduce the volume of directly transmitted noise. Other sound paths passing indirectly via the ceiling or off other surfaces tend to mix immediately adjacent noise with other noises, thereby making them less individual, less intelligible and less distracting.

The presence of a partial enclosure, which also removes associated visual distractions, can make a major difference at a psychological level. By contrast there is also the **psychological effect** of people being aware that they are in an open plan space, where they tend to modulate their behaviour instinctively. **Most open plan offices** (contrary to popular theory) **are known for being quiet**, and sometimes call on a degree of 'white noise' (a low level of introduced noise - sometimes the air conditioning) to mask the generation of otherwise distracting, isolated noises.

By contrast however where background noises become too loud, voices have to be raised in order to be heard. This causes the kind of **escalation of noise** that tends to take place at a good party and was observed in this study **where social spaces were set aside to operate purely as such**.

Where part (or complete) isolation of distracting noise is not possible then the **zoning** of open plan spaces to create areas of more or less noise is appropriate. Thus group-working spaces work better when in themselves grouped and separated by a short distance (or by intervening book stacks) from adjacent individual study. At a larger scale apparently incompatible work modes can be separated onto different floors, but this, while dealing with the issue of noise, tends to negate the advantages of blended learning.

It was the experience of several users, when interviewed, that **noise was a 'non issue'**. This begs the question as to whether the layout of the open plan space in these instances was subtly different and therefore successful, or whether a different sort of management regime prevailed which tended to modulate people's behaviour. Where this could be isolated and observed it ironically appeared that **management based on a low-key set of rules**, rather than anything draconian (thereby leaving room for individuals to take responsibility for their own behaviour) worked better or was considered perfectly workable. It was expressed on several occasions that users had "learned to use their space" and that noise had rapidly died down after an initial period of distraction.

In highlighting the possibility of **self-regulation** it became clear that natural behaviour differed considerably depending on the maturity and academic motivation of users, although even here the process of "learning" and "adapting" was once again acknowledged.

### **Summary**

**Noise (and behaviour) was identified as a major issue in the survey. However, in those institutions that had made use of temporary structures and zoning that was developed during the planning stage, it was a 'non issue'. In those institutions where noise was a problem self-policing based on a low-key set of rules appeared to work well.**

#### 6.1.4 Smells

**Percentage of respondents  
(reporting this as an issue)**                      **Smells**                      **not known**

**Smells** emerged as a slightly unusual cause for concern amongst some users and raised the sister issues of the acceptability of admitting **food and drink**. The fact that free air movement means that **smells are rapidly and indiscriminately dispersed** means this very intrusive factor immediately permeates the space of others. So unacceptable was this and so difficult to limit through physical means that almost without exception it was found that the introduction of hot food was banned in working areas by means of a management regime.

The exceptions to the above illustrated interesting issues relating once again to the **psychology of user expectations**. In one instance it was found that after 7.30pm and then through the 'back end' and night shift of learning resource opening hours a rather different set of relaxed user expectations prevailed and that management had found it acceptable to waive their hot food rule. Similarly where pre-dominance was quite clearly given to food, drink and socialising (as in a learning café), user expectations were once again different, but that this did not mean that "serious" work could not take place along with socialisation and consumption.

In other instances **zoning**, combined with good extract ventilation at the point where hot food was available was found to be quite sufficient and this, together with natural behaviour, meant that social spaces could blend unobtrusively with areas given over to group work and individual study.

Moving to the wider issue of general food and drink, **strongly differing opinions** were encountered. Points of objection related to the potential damage to books and equipment from spilled food, to the mess that this creates, as well as to the distraction it might cause. In those places where food was apparently successfully admitted attention was drawn to the working conditions that the same books and equipment would surely encounter when taken out of the learning resource centre. **In the most permissive learning spaces it was reported that virtually no damage had in fact been recorded** and, balanced against the relatively negligible cost of replacement compared with the cost of running the facility as a whole or the huge opportunity cost that might be incurred by putting off certain users from using the facility in the first place, making food and drink available seemed an acceptable strategy overall.

With respect to the potential behaviour of one group of users compared with another and their related expectations, it was acknowledged that **different social groups undoubtedly responded differently** and that what might be successfully operated in one situation might not be feasible in another. However **the way in which the attitudes of management in turn affected the attitudes of some users** was also acknowledged. Thus school children treated as school children continued to act as school children, whereas those treated as adults moved gradually to act like adults.

#### **Summary**

**Smells were not highlighted as a problem in the survey but can be an issue for some users of OPTRL&TS. Clearly this is an issue linked to the food and drink policy for the space and the attitudes and expectations of management need to be clearly articulated on these issues. Again a low-key approach seems to work best.**

### 6.1.5 Maintainability

**Percentage of respondents (reporting this as an issue)      Maintainability      39%**

An aspect of the food and drink debate causing particular concern related to the problem of **cleaning**, where spilled food and drink could undoubtedly ruin carpets or make spaces temporarily unpleasant to occupy. A first practical step was to specify **easily cleanable floor coverings** especially in those areas where food and drink was allowed, although these, being harder, had a detrimental effect on noise. Cushioned vinyl appeared a useful compromise in some situations. A second step (and preferable to generating an image of institutional practicality) was to address the problem via different **aspects of management**, where previous comments relating to a low profile, responsibility-generating approach would seem to apply. In one situation, The Information Commons at the University of Sheffield, where the infiltration of food and drink during the 24 hour “back shift” sessions appeared to be inevitable the management response was that the practice should be managed rather than forbidden. Having first of all budgeted for additional cleaners, management discovered that students responded to the situation themselves. So, while there were pizza boxes in the morning, they were neatly piled up and made simple to remove. This experience would appear to be in line with station, airport and public concourse experience where investment in extra cleaning appears to generate a positive response on the part of users.

Numerous aspects relating to fabric maintenance, from changing light bulbs to cleaning toilets, come under a “**facilities management**” heading where excellent experience has been built up regarding the appropriateness of certain materials over others. Here again however, **the general experience of good on-going, locally controlled and flexibly organised maintenance and cleaning (with generally a positive user response) over centralised, once-in-a-while attention appears to show greater benefit in the long run.**

An important aspect of maintainability relates to the day-to-day, moment-to-moment issue of **tidiness** which brings together once again physical provision and psychological response. Immaculate open plan spaces provide little opportunity to hide clutter and often call for perfect maintenance of simple surfaces. Against this much of the ‘oomph’ factor and feeling of accessibility comes from the simplicity and open-ness that “open plan” implies. Once again a subtle balance is called for in the design, which can provide some means for the accommodation of clutter and a management regime that regulates behaviour without imposing excessive control.

Management depends on people and the individuality of the situation, it can be assisted however by subtle aspects of the physical design. Thus the kind of visual hierarchy created by the dominance of some visual elements over others or the dominance of certain strong colours over others can serve to detract from imperfections elsewhere or the inevitable positioning of signs and notices that were not originally foreseen as being necessary.

How maintenance and management is organised raises the larger issue of where **responsibility for a particular building or facility lies**. In general split responsibility or “absentee landlord” types of responsibility seemed to generate deep-seated resentment and ultimately expensive problems.

#### **Summary**

**Maintenance of OPTRL&TS was not an issue from the survey. However the need to provide a degree of local control is a factor to be considered.**

## 6.1.6 Security

Percentage of respondents (reporting this as an issue)	Security	not known
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There is possibly nothing specific about open plan spaces that makes them different to other spaces in terms of security, other than the **atmosphere** they are trying to create.

Any space can be contained at its perimeter by a security system of some sort and all spaces are unfortunately subject to the same kinds of security threat from petty pilfering to terrorism. What is different is how obvious an organisation might want its security provision to be.

One aspect of the "new learning space" (as exemplified by the term "commons") is that it should be **freely accessible to all** and get away from the notion of learning as a privilege for the elite. To this extent several colleges' facilities are shared with the local community and places like the Saltire Centre at Glasgow Caledonian University permit anyone to walk off the street and make use of the facilities inside. For such organisations even barriers such as turnstiles represent a psychological barrier to learning which is better avoided if at all possible. John Wheatley College in Glasgow for instance is happy if old people choose to use their centre as a place to come in from the cold and the rain.

All organisations contacted (including those mentioned above) had **active security systems in place** from the use of "rfid" (radio frequency identification) tagging on all of their reading material (which also permitted the self issue of books), to perimeter alarm systems. They also applied the threat of withholding degrees from those who failed to return loaned laptops.

Various organisations also had interesting statistics to offer indicating that loss of book stock was **virtually negligible**, registering at an annoyance level rather than as a serious cost, and suggesting thereby that encouraging students into the building was more their focus than preventing goods from leaking out.

It can also be assumed that the more that material is held electronically the less emphasis is required on physical containment.

An element of security is the serious need in all buildings to recognise the possibility of **fire**. This is something sufficiently basic to be dealt with by the building regulations and any building management system, but its overlap with day-to-day management cannot be ignored. Thus separation at certain points is essential for smoke and fire control but an interesting development in technology is the way in which such separation need now only come into play in the event of fire, rather than having to be breached constantly and inevitably by building usage. Thus it is now possible, and preferable, to provide door closing devices that are activated by smoke or fire, in place of door closers that are inevitably propped open by the adjacently positioned fire extinguisher.

In addition to this however are the continuing responsibilities of management to keep fire corridors clear and "protected routes" free of combustible material. This can become difficult where the boundary between workspace and circulation space becomes blurred. To maintain or even promote this ambiguity is essential however to the whole concept of ubiquitous, flexible learning. Reversion to "corridors" would be detrimental to an overlap between activities and would incidentally turn currently "usable" space back into expensive "non-usable" space.

### Summary

**Security was raised as an issue by a small number of respondents. Clearly security must be maintained in OPTRL&TS as in other facilities but consideration should be given to subtle systems rather than overt policing.**

## 6.2 Issues – Psychological

### 6.2.1 IMAGE

While image might seem **slightly superficial** compared with the serious pursuit of knowledge, it was emphasised by several respondents that, like it or not, we lived in a world of material goods and market competitiveness and that lifestyle and image was likely to feature highly in students' lists of importance (see Watson L.<sup>[7]</sup>). For less academically motivated students especially, the attractiveness of the facility was likely to make crossing the threshold that much easier.

The 'oomph' factor highlighted by SCONUL therefore requires to be taken seriously, at the level of architectural drama, but more seriously also at the level of **generating a sense of inclusiveness and vibrancy**. The danger of the 'oomph' factor taking over however has also been highlighted. It has already been stressed that good learning centres are all about offering **choice**, ranging from quiet seclusion to noisy socialising. It was interesting to observe however that in almost all centres visited the spaces that were most popular were the most overtly social. This might be expected except for the fact that there was more than ample evidence that serious work was being carried on in these spaces. Partly these spaces appeared attractive for being informal and offering a greater proportion of active socialising, but significantly they also suggested that they were **"owned"** by the students themselves. This did not of course mean that staff were not welcome in these spaces or that "teaching" could not be carried out, but rather that there was a **subtle change in the power structure** operating.

In terms of management the point to be made about the above type of space was that **"everything neat and tidy, books kept on the shelves" was not the priority**. In other spaces by contrast it was quite clear that **if a bright and attractive architectural image was to be maintained it was all about maintenance and management**, albeit subtly carried out.

Much can be done to create image through the use of graphics which are relatively inexpensive and, more importantly, temporary. Graphics can create life, and interest, and also inform. The graphics need to be of a visual and physical quality not to become dated or tatty, but it is important also that they remain temporary. Witty graphics can very quickly become tedious and informative graphics can become invisible after a short time. A containment system (sometimes just a visually distinct zone) which can accommodate changing information of all sorts might therefore on occasion prove more useful than something over developed and designer-led.

There are various other characteristics of new learning spaces that might mark them out as essentially different from those other quieter spaces, more suitable for individual, reflective learning. These all tend towards the informal, comfortable, fun end of the spectrum which might start to suggest that their purpose is not serious. **In the words of one particular vice principal "what is the point of creating another students' union?"** The answer to this possibly lies in the degree of learning opportunity that such spaces provide. It might be suggested rather that the union has every opportunity to become more like the Learning Resources Centre, and might possibly so benefit.

## 7.0 ORGANISATIONAL REQUIREMENTS

Organisational requirements are always specific to a particular situation, the surrounding conditions, the persons involved, the opportunities and constraints of site and budget.

If there is an opportunity to generalise at all however with regard to Learning Centres and the opportunity for them to reach where learning has not reached before, it is in facilitating group working and creating opportunities for blended learning. **There appears to be a development path for these spaces from a first stage focused on providing access to computers and the internet, through to a second stage that recognises the added value of discussion and higher level use of information.**

This still means that different institutions are likely to have a slightly different slant on whether their need is for more computer access (the IT commons) or project work (the social commons). It has been suggested that **choice** is essential to meet the need of 'personalised' learning. It is also inevitable that, whatever the emphasis, this will need to change over time.

Several institutions were either at the stage (or had recently been through the stage) of experimenting as to what seemed most appropriate for them. In some of these cases there had been **genuine experiment** and the impression was that there had been a willingness to be surprised by what happened. In other cases it appeared that resources were either so tight or there was such cautiousness that the rate of change was bound to be slow.

In conventional project management terms it is appropriate for the client to establish in advance a "**brief**" or a set of "**employer's requirements**". This might be necessary at some stage to clarify what needs to be delivered within a specific budget or time-frame. However the dilemma is that to do so too early is to close down the learning opportunity of working with the design team. It might be deduced that those pilot studies where new ideas are genuinely tested, offer the best opportunity for the brief to be developed and understood. Such pilot studies however, have to be of sufficient scale and configuration so as to genuinely model the issues in question.

**Scale** and the effect it has on the appropriateness of one solution over another, is always difficult to appreciate in advance. To this extent some institutions visited were definitely more successful than others despite the good intentions that lay behind them. This is where choice can sometimes be an undoing. Too much of "this and that" can lack focus and lack conviction. Thus some learning centres with a sprinkling of different furniture types failed to really understand the different work modes that the facility was trying to cater for or did not have enough of any one thing to really allow the regime to work. On the other hand, however, one particularly successful example (Open 3 at Loughborough University) consisted of a conversion of an existing building which recognised the strength of the original architecture and had then provided only a very simple arrangement of group working tables that students adapted to their own purposes. A few traditional, mobile whiteboards were sufficient to demarcate one working space from another.

In terms of successful outcome therefore, drawing up a **definitive list of organisational requirements is likely to be less than helpful in the first instance**, or at least within a pilot study. For the development of any large new build the situation is somewhat different calling for a clear understanding of the remit of the project in the initial stages and a greater degree of ongoing project control. The more that can be expressed in terms of **performance specification** however rather than a pre-determined solution, and the more time that can be allowed for testing alternatives the better the eventual result is likely to be in terms of student learning. Rather than creating a list of specific requirements it might be appropriate to begin by listing **objectives** and the kinds of **issue** which are regarded as important. These can then be responded to in building terms at the start of a client / design team conversation.

## 8.0 BUILDING STRATEGIES

Building construction has at its disposal a variety of different means to accommodate human activity. Some of these come at the level of overall building configuration, others can be thought of in terms of internal fit-out and yet others at the level of furniture and decoration. What is important is to appreciate that each of these has an impact in terms of time, total cost and ongoing change.

### 8.1 Layering

This **hierarchy of building strategies** has been described by DEGW\* (and others in roughly similar terms) as “shell”, “scenery” and “set” or, recognising the increasing importance nowadays on the usability of the basic building of the services infrastructure, as “shell”, “services”, “scenery” and “set”. The building “**shell**” relates essentially to its basic structure and configuration which, once decided, will be difficult to change and will influence the opportunity of accommodating each of the following sets of building element. The “**services**” strategy and installation similarly enables and limits what comes next. “**Scenery**” refers to what can be installed and taken down with relative ease to meet changing circumstances, like partition walls; “**set**” might refer to the particular arrangement of furniture required to meet an immediate need.

From the above it can be seen that **the flexibility of the building is underpinned by those building elements higher up the hierarchy** and the more that the elements lower down the hierarchy are kept separate from the physical envelope and servicing strategy of the overall building, the more opportunity they have to **change**. For example ventilation systems which depend upon the specific arrangement of internal walls (or lack of them) can sabotage the possibility of organisational change.

### 8.2 Building Elements

Reverting to the lessons to be learned from commercial office design, considerable work has been done (British Council Offices – Best Practice Guide) to appreciate the significance of different depths of internal space, linked to different servicing strategies, to understand what opportunities they allow for easy sub-division and organisational change. Similar work has been done<sup>[2]</sup> in understanding the flexibility of different fit-out elements, partition walls, ceiling systems, secondary services and delivery systems. Significant advances have similarly been made in **recognising the part to be played by furniture systems and the way that furniture can take on some of the ‘building’ functions of environment modulation and services delivery**, thereby freeing up the constraints otherwise imposed by the “building”.

### 8.3 Learning Spaces vs. Office Environment

While learning spaces are not the same as commercial office working environments most of the requirements of lack of disturbance, balanced with social interaction, flexibility and maintainability are exactly similar to those cited within section 5 and are directly transferable. **The differences lie, if they lie anywhere, in the character of the environment overall**, but even here office environments are becoming more informal and some learning spaces specifically seek to imitate the world of work. **Both offices and Learning Resource Centres increasingly seek to provide the ‘oomph’ factor**, but both offices and Learning Resource Centres have started to find to their cost that gratuitous ‘oomph’ when not tested against the need for continuous change (including the creation of new, enclosed spaces) can be seriously expensive across the life of a building. Severely odd shapes when built into the fabric of the building, or environmental control systems dependent upon a particular arrangement of internal sub-division and building usage are likely to be paid for heavily over time.

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\* Architectural practice DEGW – originally Duffy, Eley, Giffone, and Worthington

#### 8.4 Subdivisibility / Zoning

**A flexible envelope of space is not one where only an open plan environment can be accommodated.** It pre-supposes by contrast that walls will require to be erected and enclosures created or that special environmental requirements might have to be catered for. The answer to this universal sub-divisibility can start however to become expensive (as the discussion on the design of ventilation systems has suggested). It can also start to be a recipe for repetition and similarity which, in today's pursuit of change and individuality, can prove stultifying. A balance of priorities can therefore possibly be found in the strategy of **zoning** or, ironically, providing a building which is not uniform but offers opportunity for different spaces to be colonised in different ways.

Greatest sub-division will occur when different functions are put on different floors. At some point this is inevitable and separation can have its advantages, as has been suggested. **But separation comes at the expense of overlap** and this is where visual connectivity across an atrium starts to become attractive, not just for the sake of 'oomph', but to provide that psychological awareness of possibilities not immediately to hand. But atria can be difficult to manage and an easier balance possibly occurs with alcoves of space opening off a common "street" thereby generating a natural hierarchy of shared space at one level, tailing off into remoter quiet, private space.

#### 8.5 Building Configuration

What building configuration strategy is appropriate in what situation will depend on many factors including, most importantly, the site itself. But in either of the above strategies (or any other), the set of user opportunities set by the overall building configuration ultimately steps down to rely upon strategies for internal fit-out and furniture selection. **Understanding what can be done *within* a particular envelope of space is therefore the level at which most management has to operate.**

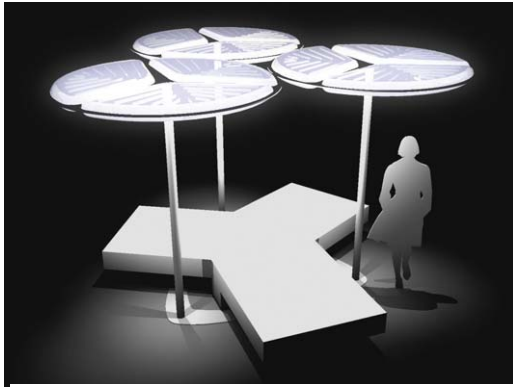
#### 8.6 Walls and Partitions

Erecting full-height partition walls, as has been suggested, can be problematic and should therefore be avoided unless fully necessary. **Only a full height wall will provide full acoustic separation, and, where this is necessary, the process has to be followed through completely.** In other words walls should be sufficiently solid and walls should penetrate both the ceiling void and the floor void and wall penetrations, like ventilation ductwork, should be fitted with sound attenuators. As can be seen costs can mount up and benefits have to be clearly articulated in order to be justified.

Drawing once again from the experience of commercial offices, a lower specification is acceptable in many instances, meaning that walls do not necessarily have to pass right through the ceiling or sound attenuators have to be fitted, which makes the cost of installation more acceptable and the process of removal easier. In such situations however, ventilation and temperature control will still require to be adapted, sometimes with regard to the new and enclosed space and sometimes (and more seriously) with regard to the remaining open plan space.

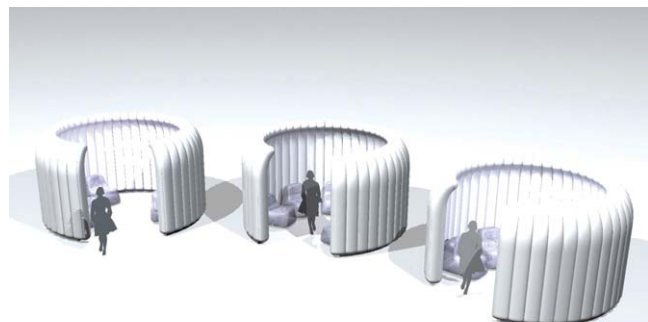
## 8.7 Partial Enclosure

With considerable cost and disruption being inevitable, (even with the provision of imperfect sound separation) **it must therefore be asked whether full height walls are necessary in the first place.** The benefits of only partial enclosure, which continue to allow full air movement, must therefore be examined. Attention has already been drawn to the possibility of “modulating” noise rather than “eliminating” it and the numerous opportunities for demarcating space, providing visual landmarks, providing protection from immediately adjacent, distracting conversation. In a recent project\* for Learning Teaching Scotland, “open plan” office space was provided which nevertheless included a range of different types of space which could be colonised in different ways at different times. Most dramatic of these semi-enclosed spaces were ‘boxes’, soon to be known as the red and blue “houses” which created landmarks at either end of the open plan floor. What was significant about these “houses” however was that, while having windows, they did not have roofs and that, while feeling like separate spaces (and in this case being designed to accommodate all the clutter of the computer “techies”), they still connected with the life of the office and did so in a cheap and temporary way. In addition they were robust enough to create other spaces behind, in front of, or to the side of them. They structured the space from a space planning point of view while interfering minimally with its flexibility.



Concept for 'umbrellas' at the Saltire Centre

In similar fashion the “printer pods” of Caledonian University’s Saltire Centre contain the noise and untidiness of the photocopy / facility points and create opportunities for a bit of fun and interest on an otherwise open floor. In the same building the inflatable pods and umbrella features on the ground floor provide virtually no separation from the surrounding chatter but create spaces which are recognisably different and which, as their continuous use and popularity suggest, appeal to users in other ways than just their ability to modulate noise. **It is this recognition of the importance of hierarchy in types of space and the ability of structures to start to act as furniture and furniture to start to structure a space like architecture that would appear to provide the greatest opportunity in the design of new open plan spaces.**



Concept for inflatable semi-private spaces at the Saltire Centre

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\* See [www.haadesign.co.uk](http://www.haadesign.co.uk)

## 8.8 Zoning

Something more still requires to be said about the strategy of zoning open plan space. **Zones can and should arise out of the natural configuration of a building** and can thereafter be created by the strategic positioning of fit-out or furniture elements. Furthermore **zones can and should have different characteristics** and can be more or less separated one from another. The correct balance between these different types of zone is something that will come out of the character of the particular building and the educational strategy of the organisation. As has also been suggested what is important is **choice**, providing the kind of flexibility which suggests that people and activities move about the building, rather than that the building has to be constantly physically adapted. Such movement has the benefit of assisting **interaction**; it also militates again **ownership** of different parts of the building by different interest groups.

## 9.0 MANAGEMENT STRATEGIES

### 9.1 Managing Mindsets

In section 2.3 we stated “There is clearly an interplay between the design solution that is developed for a space and the ensuing management issues”. When exploring and explaining the issues in the management of OPTRL&TS therefore we have also covered a range of design issues and solutions that, if deployed, reduce the management issues presented by the space. **In short management issues can, to a large extent, be ‘designed out’ at the outset of space development.** ‘Design’ issues are covered in section 8 above. For example section 8 explores the building design strategies that can be used to create temporary divisions in open plan space. Such strategies are also strategies for managing large open spaces. There is often an assumption that open plan space is unsuitable for many activities in Further and Higher Education, and this report would support this in some cases such as concurrent sessions of co-located didactic teaching (although experience at the University of Sunderland Information Terraces contradicts this general rule). The debate that takes place in institutions around open plan space tends to be an “either/or” one – open plan space or cellular offices/rooms. There is clearly territory to explore here that spans the spectrum from open plan to cellular and includes a wide range of temporary semi-private structures, some still to be imagined.

An important management task is therefore to **challenge the need for cellular space and create new forms of space within open plan that can fulfil articulated needs.** What is not always admitted is that the call for enclosure has more to do with a desire for defensible space than a genuine need for privacy and that the need for full privacy can be provided by relatively few “special” spaces. A successful strategy for internal fit-out, and continued operational management, therefore, has as much to do with managing the conversations with different interest groups as it has with modulating the building’s acoustics. There is an obvious need for mutual respect and understanding of interest groups if new innovative solutions are to be achieved and these conversations should not to be taken lightly since they have everything to do with how positively or negatively users respond to the new space.

The study’s review of different user responses drew attention on many occasions to the importance of the **process** in designing any new facility, where, if anything new was to be attempted of any sort, then time spent in talking through user’s concerns and managing their expectations was essential, and where the definition of “user” had to extend through the wide spectrum of teachers, managers, students, researchers and even on occasions, the outside public. This work in talking through concerns and harvesting ideas during the building development is part of a wider strategy touched on in section 5 where we stated:

“Failure to manage the conversations about, and expectations for, new spaces and to promote their strategic purpose and highlight their success leaves a vacuum for subjective judgements which once established are difficult to remove or correct. Interventions that promote purpose and intention and comment on success are therefore crucial in the management of space projects.”

**This process of promotion through conversation and other channels is an important ongoing management strategy** essential to the survival and success of any innovative open plan space project. It should be started early and continued indefinitely with vigour.

## 9.2 Managing opinion

It is said that people don't like change. It's no surprise then that when it comes to change in learning and teaching spaces it is those most used to the current arrangements and way of doing things that are most opposed to new ideas – note the comment in the case study from Leeds Metropolitan University that resistance from students to new initiatives in the Library is directly proportional to the time that they have already spent at the University. This general rule applies to all members of the University community. In addition to managing the conversation as described above **it is important to collect data that shows evidence of success, as well as legitimate criticism**. User surveys, comments cards and focus groups all serve to ensure a continuing conversation with users and in the long run will pay dividends when support is required for further change.

## 9.3 Managing access

Open plan spaces that provide a wide range of facilities and services for users can be confusing. The aim should be for the space to be 'intuitively understood' by its users. An indication that this has not been achieved is where a space that is littered with untidy instructions, rules and notices blu tacked to walls usually serving to confuse rather than clarify. **A carefully thought through and constructed signage strategy is needed if an open plan space is to work well**. The strategy should make use of electronic signage where possible as this can give dynamic, real time information. Where this is not affordable then simple solutions, such as light boxes or wipeable notice boards, should be used so that when information is changed it can be done easily and still look professional. For more permanent signs it can still pay to have them moveable to accommodate any future reconfiguration of services.

## 9.4 Managing use and behaviour

One of the most common issues raised in this study by respondents relates to **user behaviour**. This includes noisy behaviour, creating litter, or in rare cases damage to the furniture and fittings. One solution, often used, is to develop a **set of rules** that articulate clearly what is expected. Interestingly the Information Terraces at the University of Sunderland used this approach when they first opened (see case study) but have now abandoned it, as there no longer seems to be a need. It is as if over time the population of users has 'learned' the expected behaviour. A similar rules-based approach is being introduced in a number of places (see Leeds Metropolitan University case study) in response to the increasing consumption of food and drink and the subsequent litter problem. A variation of the rules-based approach, which takes a more partnership stance is to develop a **charter of behaviour**, which places responsibilities on both user and management of the space and clearly articulates what each can expect from the other. Many libraries have used this approach successfully.

**The approach acknowledged by most sites visited as desirable was to create a tone and ethos to the facilities that makes them effectively self policed**. Some attempts have been made at a number places to use colour, not just to differentiate between different zones, but to give signals about expected behaviour (for example Glasgow Caledonian's Saltire Centre has 'hot' colours on the interactive conversational floors and 'cooler' colours on the quieter floors. Caledonian also experimented, successfully, with quotations on the walls of the learning café as subtle environmental signals to users). In addition to colour, graphics that create a sense of activity or urgency or conversely serenity, can be used in zones of the space, as can audio signs. These relatively simple strategies can make a great difference to users' expectations and behaviour.

## 10.0 CONCLUSIONS AND OBSERVATIONS

There are many issues of detail emerging from this study that are dealt with in the body of the report and in the guidance provided for managers in a separate document. In this section we draw attention to a number of broad issues that have emerged from the visits and conversations with managers of OPTRL&TS.

We should note that an ambitiously conceived and implemented open plan technology-rich learning space aims to break new ground both in space provision and in use. Such space aims to enable major change in our education system<sup>[8]</sup>. That intent, articulated in the strategies of the organisation, needs to be promulgated widely and understood by all those units that service the space.

There is no doubt that the OPTRL&TS movement is producing some amazing spaces that operate well for those that work and learn in them. The prospects for innovative space development over the next few years are bright.

This study shows us however that basic issues such as heating and ventilation in OPTRL&TS, as in other spaces, are fundamentally important. In spite of the careful planning that goes into the development of open plan space, getting this right seems incredibly difficult. As an issue this is compounded by the fact that individual preferences vary widely, and that working in an environment where the air quality is controlled remotely by others is a source of frustration.

The tension between the ownership of the space (by the local manager) and the central control of heating and ventilation systems was an underlying concern identified in this survey leading to the conclusion that, at the planning stage, more innovative solutions need to be found. Failure to resolve this issue can undermine the overall success of the space.

More importantly, concerns with basic human needs such as heating and ventilation need to be 'satisfied' in order to ensure that they do not impede the understanding of the higher level strategy for the space. If the basics are not working then this will preoccupy those using and managing the space and undermine 'buy in' to the strategic intent.

The other major issue with these spaces was around noise and behaviour. We conclude that carefully planned space making good use of design, colour, graphics, furniture and zoning provides a means of achieving a self-policed space. In existing spaces it is possible to set a 'tone' that ensures responsible behaviour in a number of ways.

If OPTRL&TS is about change, as stated above, then we suggest that there needs to be careful consideration of how we can measure the success of such space. The measures that we have previously used to assess the success of a space, and define our view of its use and usefulness, are, in our view inadequate. Much of the space covered in this study is in Libraries and Learning Centres where there is a strong tradition of data collection on numbers of users and their activities. However, OPTRL&TS is about learning and learning behaviours. In our view behavioural observation and tools such as social network analysis should consequently be used to inform the design and development of these spaces and to evaluate their effectiveness. New measures of success need to be developed that relate to students and their activities and behaviour, communication and connectedness. The danger is that we use the old measures to measure new space and thereby find it wanting.

## 11.0 APPENDICES

### Appendix 1 – The questionnaire

#### Managing Open Plan Technology-Rich Learning Spaces - Questionnaire

Over the past few years, there has been considerable growth in the provision of open plan technology-rich learning spaces. The JISC (Joint Information Systems Committee) has commissioned a study to investigate what issues have been encountered in the management of such space. This questionnaire is the first phase of that study and aims to gather information on the extent of such space in Further and Higher Education in the UK and to identify any common issues that emerge from the use and management of the space and to identify best practice in the sector in dealing with these issues. A later phase of the study will involve visits to a range of institutions with the aim of developing case studies to be included in the final report.

You are invited to contribute to this information-gathering phase of the study by completing the questions below. In addition to such spaces currently in use, we would be interested to hear about space that is currently being implemented or planned. Please respond by **04 May 2007**. The report from this study will not identify institutions without the prior consent of the institution concerned. Your help with this is much appreciated.

#### Les Watson - Lead Consultant

#### What is an open plan technology-rich learning space?

For the purposes of this study we define open plan technology-rich learning space as a space for learning and/or teaching in a university or college that is:

- over 200 square metres in area and/or accommodates over 100 students at any one time
- has a variety of study environments
- which can be used for any or all of the following activities -
  - private study;
  - group study;
  - project work;
  - library activity;
  - IT use
- has comprehensive networking and accessible computers
- is available to students and/or staff and/or members of the local community
-

**What if we have several such spaces in our institution?**

It would help the study if you could complete a separate questionnaire for each space.

**Part 1 - Your Space**

Name of Institution:

Name of the space:

Extent of space (sq metres):

Number of seats in the space:

Please give a brief description of the age of the building in which the space is located and the main construction materials used (e.g. brick, stone, steel and glass):

**Ownership of the space - please select from:**

- Institution
- Faculty/ School
- Community
- Other, please specify below:

Facilities and resources provided in this space (such as café, IT facilities, wired/wireless network, books etc):

**Part 2 - Issues with the management and use of the space**

**Please indicate whether any of the following issues have been a source of concern in the space.**

Steps	Not at All	Minor Issue	Is a Problem	Highly Problematic
Ventilation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humidity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lighting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Noise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staffing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Booking of Facilities and Resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other, please specify:

**Please identify the source of evidence for the ratings you have given above.**

- Your Opinion      Yes     No
- User Surveys      Yes     No
- User Comments    Yes     No
- Measured Data    Yes     No
- Rumour/Institutional Consensus    Yes     No

Other, please specify:

**If in your view any of the above issues have seriously affected the operation of the space please list below and briefly describe the issues arising.**

Issues

**Please describe any solutions that you have tried and the extent to which they have solved the problem.**

Solutions

**Part 3 - Who are you?**

Your Name:

Job Title:

Telephone No:

email Address:

**Please indicate whether you would be prepared to help further with the study through a telephone conversation and/or visit to your institution.**

Telephone:  Yes  
 No

Visit:  Yes  
 No

How did you find out about this survey?

- |  |   |
|--|---|
| <input type="checkbox"/> Personal eMail    | <input type="checkbox"/> UCISA Directors          |
| <input type="checkbox"/> ALT Digest        | <input type="checkbox"/> AOC                      |
| <input type="checkbox"/> JISC infoNet List | <input type="checkbox"/> AUDE                     |
| <input type="checkbox"/> RSC               | <input type="checkbox"/> Higher Education Academy |
| <input type="checkbox"/> SCONUL            | <input type="checkbox"/> AUA                      |

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