

UK Higher Education Space Management Project

Case studies



Space Management Project: case studies

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Executive summary

This report brings together three case studies which explore different aspects of space management in individual institutions. It was prepared for the UK Space Management Project by independent consultants Kilner Planning, with assistance from senior estates professionals from the featured institutions, below. The case studies focus on issues which were highlighted as being of particular interest to many institutions during the survey of space management practice in Phase One of the Space Management Project and in feedback from Space Management Group seminars. They are:

- Queen Margaret University College
– The Relocate Project
- University of Newcastle upon Tyne
– Versatile research buildings
- Sheffield Hallam University
– Promoting effective utilisation.

The participating institutions have wide differences in mission and size. The aim of the case studies is to provide an insight into how each of the three institutions has approached particular space management issues, including the tools and processes employed and what the impact has been of the measures which they have employed.

Queen Margaret University College

Queen Margaret University College (QMUC) is building a new campus at Craighall, on the outskirts of Edinburgh, to replace its existing sites. It is the first new university campus to be built in Scotland for over 30 years.

The current estate is in poor condition, inflexible and not fit for purpose. The new campus aims to have attractive, efficient and versatile space, which is both environmentally and financially sustainable. This is a case study of work in progress. It focuses on the decision-making process leading to relocation and rationalisation. It looks at how the college decided how much space it needs and how it is approaching the introduction of major change and new ways of working.

The new campus is now under construction and it will have over 30 per cent less net internal non-residential floorspace than the existing estate, now spread over three separate sites. The reduction in space is based on the results of a detailed space modelling exercise which generated a predicted profile of future space needs. Projected increases in utilisation are a key driver behind the planned efficiencies in the provision of teaching space.

This case study is likely to be of particular interest to higher education institutions (HEIs) that are considering:

- rationalising all or part of their estates and replacing outdated space with new facilities
- planning future space needs and how to achieve efficiencies in space use
- ways of building versatility into their space to allow for future change.

University of Newcastle upon Tyne

The case study at the University of Newcastle upon Tyne is based on the university's recent experience of planning and managing two new research buildings: the Paul O'Gorman Building, which provides accommodation for the Northern Institute for Cancer Research; and the Devonshire Building, which houses the Institute for Research on Environment and Sustainability (IRES), the Informatics Research Institute and the E-Science Research Centre. Both buildings provide office and laboratory space.

The study may be of interest to HEIs thinking about:

- creating more multi-disciplinary or generic research space which can be used by several different groups at the same time or by successive groups
- how people working in the buildings perceive the impact of their new environment on job satisfaction and research activity
- how to evaluate the effect of new working environments on research output.

The Newcastle case study begins with an outline of the university's estate strategy and space management policy which put both buildings in context. It describes the objectives and critical success factors for each building. Occupier perception surveys provided a useful insight into people's views about the new buildings in terms of comparison with their previous working environments and the effect of the new buildings on their research. The information gained from this type of survey can be used to inform future projects and space management methods.

Sheffield Hallam University

The third case study at Sheffield Hallam University describes how the university adopted a strategy of rationalisation, reinvestment and renewal across the estate. It focuses on two space management methods used: on space charging, and how space utilisation data are collected and used to plan and manage space.

Space charging was introduced as a strong incentive to encourage effective use of space. A large volume of utilisation information is collected on a rolling basis, which provides detailed information on how space is being used and can be used to track the way that space needs are changing. The space charging system means that departments are interested in the detailed utilisation findings, which can help them to decide if there is space which they no longer need, and as a corollary, do not wish to be charged for.

The case study is likely to be relevant to HEIs interested in:

- using space charging as a space management tool
- encouraging effective utilisation of teaching space
- ways of collecting utilisation data
- using utilisation data to assess space needs.

Introduction

This publication is the outcome of research carried out by independent consultants Kilner Planning. The brief was to investigate general or specific space management topics through case studies at individual higher education institutions (HEIs).

The research is part of Phase Two of the Space Management Project. The project is under the direction of the UK Higher Education Space Management Group (SMG), supported by the four UK funding bodies for higher education: the Higher Education Funding Council for England, Scottish Funding Council, Higher Education Funding Council for Wales and the Department for Employment and Learning (in Northern Ireland).

This report brings together three case studies which explore different aspects of space management in individual institutions. The case studies focus on issues which were highlighted as being of particular interest to many institutions during the survey of space management practice¹ and in feedback from SMG seminars. They are:

- Queen Margaret University College
– The Relocate Project
- University of Newcastle upon Tyne
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Overview of the UK Higher Education Space Management Project

All published reports are available on the web at www.smg.ac.uk under Reports/tools.

Phase One	Review of practice	<i>July 2005</i>
	Drivers of the size of the HE estate	<i>July 2005</i>
	The cost of space	<i>July 2005</i>
Phase Two	Promoting space efficiency in building design	<i>March 2006</i>
	Impact on space of future changes in higher education	<i>March 2006</i>
	Managing space: Review of English further education and HE overseas	<i>August 2006</i>
	Space utilisation: practice, performance and guidelines	<i>August 2006</i>
	Review of space norms	<i>August 2006</i>
	Space management project: case studies	<i>September 2006</i>
	Space management project: summary	<i>September 2006</i>

¹ Findings from the survey are contained in the SMG report, 'Review of Practice', available on the SMG website at www.smg.ac.uk

The Relocate Project

Queen Margaret University College

Introduction

Queen Margaret University College (QMUC) is building a new campus at Craighall, on the outskirts of Edinburgh, to replace its existing sites. It is the first new university campus to be built in Scotland for over 30 years.

The current estate is in poor condition, inflexible and not fit for purpose. The new campus aims to have attractive, efficient and versatile space, which is both environmentally and financially sustainable. This is a case study of work in progress. It focuses on the decision-making process leading to relocation and rationalisation. It looks at how the college decided how much space it needs and how it is approaching the introduction of major change and new ways of working.

This case study is likely to be of particular interest to HEIs that are considering:

- rationalising all or part of their estates and replacing outdated space with new facilities
- planning future space needs and how to achieve efficiencies in space use
- ways of building versatility into their space to allow for future change.

Overview of QMUC

QMUC is a small institution. In 2003-04 it had a headcount of around 4,000 students (3,377 full-time equivalents, FTEs) and 500 staff FTEs. Its turnover was in the order of £21 million. The college has two faculties: Health and Social Sciences, and Business and Arts. Each faculty is made up of two schools. The Faculty of Health

and Social Sciences includes the School of Health Sciences and School of Social Sciences, Media and Communication; while the Faculty of Business and Arts contains the School of Business and Enterprise and School of Drama and Creative Industries.

There are also a series of research centres including the Scottish Centre for Research into Speech Disability and the Centre for Nutrition.

The college is currently based on three campuses in Edinburgh. It has a total of 26,519 m² of net internal non-residential floorspace (net internal area, NIA, or 32,980 m² gross internal area, GIA).

It moved to the Corstophine site in Edinburgh in 1969-70 into what was then new, purpose-built accommodation. At that time, there were around 500 student FTEs. Most of them were studying hospitality courses and the campus was designed with a high proportion of specialist accommodation, such as teaching kitchens. There were some additions to the Corstophine site in 1980. Otherwise it has remained substantially unchanged, although by the mid-1990s, student numbers had grown to around 3,000 FTEs, and the course profile had diversified into health and drama.

The Corstophine campus



Following growth in student numbers, the college acquired a second site in Leith in 1993. This was a secondary school, and the main building is listed. The Faculty of Health and Social Sciences is split between Leith and Corstophine.

The Leith campus



The third site is called the Gateway. It is a former theatre, and it was taken on in 1997 with the expansion of the college's drama and theatre arts. The School of Drama and Creative Industries operates from both the Gateway and Corstophine sites.

The profile of the broad categories of accommodation within the non residential estate is shown on Figure 1.

The decision to relocate

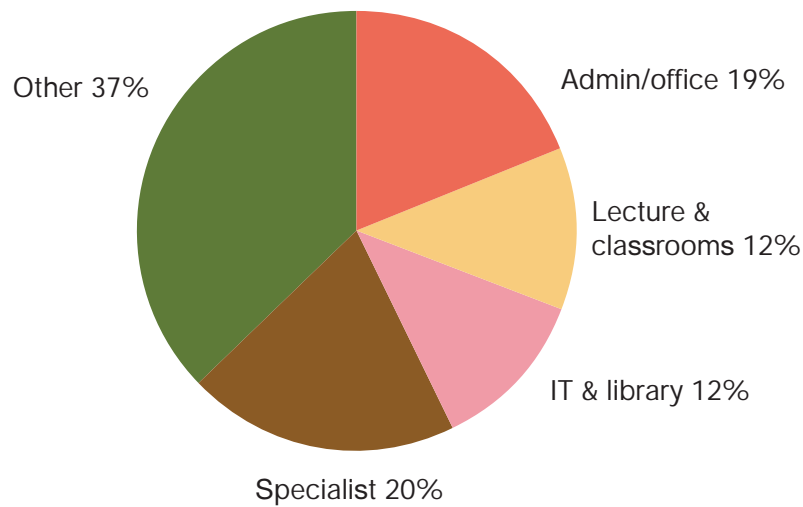
Problems with the estate became increasingly evident during the 1990s. These were:

- a. The very poor condition of the estate at Corstophine – the college found that its estate performed worst in a sector-wide condition survey in Scotland.
- b. There was a mismatch between room sizes and types available at Corstophine and what was needed for the current and planned portfolio since the campus had been planned primarily as a base for catering and hospitality courses, and these specialist spaces were unsuitable and difficult to alter for health and drama uses.
- c. Condition was not such a problem at the Leith site but the age and listed status of the estate meant that it was inflexible in terms of space use.
- d. There was duplication of facilities because the faculties and schools were split across sites.
- e. Utilisation surveys reported consistently low levels of utilisation, but there was a shortage of the type of facilities needed to meet the college's teaching and research needs.
- f. The amount of space per student FTE was generous across the estate, but given the inflexibility of much of the accommodation, it was difficult to remodel to achieve higher rates of utilisation.

In 1997 the college's estate strategy concluded that it would not be cost effective to invest in the existing estate and that it would be preferable to consolidate the activities of the two main campuses in a new location. The desire was to have an estate which was smaller and more flexible.

It was also important to the college that the new estate would be environmentally and financially sustainable. Financial sustainability was necessary in terms of the initial capital cost, because the new campus would be largely funded from the disposal proceeds of the Corstophine and Leith sites. But it was also important from the point of view of the future recurrent costs of running the estate and being able to keep the new campus fit for purpose and in a sound state of repair.

Figure 1: Profile of the estate



Studies conducted in 1997 concluded that it should be possible to substantially rationalise, and reduce non-residential floorspace by around 35 per cent. This would change the student:floorspace ratio from around 10 m² of net internal non-residential floorspace per student FTE to some 5.6 m². The main levers for achieving this change were anticipated to be: a move to open plan offices for many academic and administrative staff; a significant increase in utilisation especially of general purpose teaching space; and making specialist teaching areas as flexible as possible to accommodate a range of uses.

QMUC began the process of finding a suitable site for relocation, planning the size and composition of the new campus, seeking funding and starting the development. Four sites were shortlisted in 2001 and evaluated against a range of criteria. Staff and students were given the opportunity to visit each of the sites. The site at Craighall was selected as the best performing. The aim was to begin building in 2005 and to occupy the new premises in time for the 2007-08 academic year. Dyer Associates was selected as the architect for the masterplan and the design of the new campus buildings.

The Gateway campus was originally excluded from the relocation project on the grounds that the School of Drama and Creative Industries needed specialist facilities, including theatre space, and would benefit from remaining in a city centre location. But this decision was revisited in 2005 when a condition survey found significant deterioration in the fabric of the buildings and services on the site. There were also serious problems with legislative compliance. Further option appraisals were carried out, taking account of the condition findings, the valuation of the site and existing and future space needs and allocation.

It was decided that the best option would be to minimise any further expenditure on the Gateway campus and to relocate the School's activities to the new campus at Craighall. This decision was made on the condition that the move would be cost neutral at worst with the Gateway sale proceeds covering the capital cost of the relocation and replacement facilities. It also had to have minimal impact on the brief for the new campus which by that time was already well advanced. The relocation from the Gateway meant that all QMUC's existing sites would be vacated and that all the academic schools would be based on the new campus.

Design concepts in the brief for the new campus

From the outset, QMUC wanted the new campus to embody a series of design concepts, including the following which are particularly relevant to space management.

Integration

QMUC is a small, professional, high quality, accessible institution at the leading edge of interdisciplinary education. The campus masterplan should reflect this integration and move away from the compartmentalisation of the current campus.

Flexible

QMUC is a modern, dynamic institution with a progressive academic plan including growth in student numbers, a developing ICT strategy and an ambitious research programme, therefore building design and layout need to consider ease of expansion and alteration.

Maintainable

In designing the campus, careful account must be given to minimising future costs of operating, maintaining and repairing the accommodation. Specifications for building structure, fabric and services should provide measurable value for money for the life expectancy of the accommodation.

Environmental considerations

The campus will be the first new university campus in Scotland for 30 years and must give priority to environmental considerations.

Space utilisation

The design of the campus and the internal layout of the buildings should be such that they optimise utilisation and maximise efficiency in use. This should be considered as a key priority in relation to environmental efficiency in that efficient use of the buildings themselves minimises the build requirements.

QMUC will operate a central timetabling and room booking system within the new campus responsible for management of all space other than office facilities.

Classroom/lectures

Accommodation models should provide modular teaching spaces closely related to average class sizes, with the capability of addition or subdivision to suit changes in class sizes as well as variations in teaching techniques. A 300-seat lecture theatre is envisaged but current utilisation figures suggest that for this to be sustainable it should be designed for multi-purpose activities.

Specialist space

A number of departments utilise specialist labs, studios and training rooms for core course functions. In the new model, specialist space should be generic by nature, capable of more than one activity with sharing potential. It should, where possible, be utilised for interdisciplinary, integrated activity.

Admin/office/support

A cultural change will be required with the development of academic and support staff accommodation. Areas of open plan space should be introduced particularly in support staff areas. These flexible working spaces can be supported by meeting rooms, study space, social space and group storage.

IT/library

These functions will be combined to form a new learning resource centre suitable for traditional learning but primarily organised for the development of electronic learning. This will be situated at the core of academic activity and this QMUC resource should be utilised for both formal and informal learning activities. Formal learning should be provided within quiet study space and informal learning located in open plan areas.

Expansion and alteration

Higher education is ever changing, is influenced by many external factors and needs to react to market changes and government policy. The new campus buildings must be designed to facilitate these strategic changes through flexibility and expansion both internally and externally.

Space management policy

A college-wide space management policy was introduced in 2004. It was decided that this was needed to provide a consistent and transparent basis for allocating and managing space pending relocation. It also paved the way for the much greater degree of central control of space management that will be operated on the new campus.

The college looked at the proportions of different types of space across the estate and concluded that the proportion of centrally bookable classrooms and lecture spaces at 12 per cent was low compared with sector averages, whereas the amount of specialist space at 20 per cent was high. A central objective of the policy was to increase the amount of space included in the central timetabling system.

The current space management policy

Strategic planning	Emphasis on accurate and detailed data on future growth to enable space management to be targeted to optimum effectiveness.
The timetable	A reduction in the number of specialist rooms, combined with the extension of the central timetabling system to cover all teaching spaces. An increase in the number of utilisation surveys to one per semester. The calculation of a cost per hour per room which could be levied where booked use is not reflected in actual use as recorded in surveys.
Space standards	Introduction of space standards for office accommodation to be applied when alterations and refurbishments are not carried out (intended as guidelines not entitlements), including: <ul style="list-style-type: none">• heads of subjects/senior lecturers/assistant heads – individual offices at 11.5 m² per person• lecturers – shared offices at 7.5 m² per person• administrative staff – 7.5 m² in open plan areas or individual offices at 9 m² per person.

Modelling future space needs

The decision to relocate was underpinned by the assumption that it would be possible to achieve a substantial reduction in space on the new campus. The original assumption back in 1998 was that consolidation of the Corstophine and Leith campuses could generate a space saving of at least 35 per cent and that the reduced area would still provide enough space to accommodate strategic plan growth projections. This was based on a review of the profile of existing space and how it was used. The review proposed that the space reduction would be driven by a series of principles:

- Eliminating duplicated space:** the removal of duplicated space from the Corstophine and Leith campuses, e.g. boardrooms and faculty support areas.
- Rationalisation:** classroom and lecture theatre provision to reflect planned class sizes and likely reductions in contact time and consequently hours of use of teaching rooms. There could be scope for reductions in the amount of specialist space with the provision of multi-disciplinary laboratories and centralised servicing on a single campus. Administrative and academic office space could be reduced with different types of working areas and an element of open plan working.
- Utilisation:** achieving significant increases in the utilisation rate of general purpose teaching space and some increase in specialist space would reduce the overall amount of teaching space needed.
- Maximising space efficiency through space relationships and academic groupings:** having a central core of administration and meeting rooms; having a central teaching facility with lecture and classrooms grouped together; having laboratories and other specialist areas and their support services grouped together; co-locating IT and library faculties in a learning resources centre.

These principles were worked through in detail for different types of space.

Teaching space

QMUC carried out a detailed analysis of general purpose and specialist teaching space needs. However, instead of relying on externally derived or sector-based norms, QMUC went back to the first principles of what type of teaching space would be needed, for how many hours, at target utilisation rates. This approach is similar to the method of calculating teaching space needs used by the Learning and Skills Council (LSC) in the further education sector in England. It also has similarities with the guidance to assessing space need given in the Space Management Group report, which reviews the role of space norms ('Review of space norms' available at www.smg.ac.uk/resources). The exercise was led by the vice principal (learning and teaching) and the estates and facilities department, supported by an external consultant, Stellae.

The exercise calculated on-campus teaching space needs during the core day time period of 0900-1700, on the grounds that if the day time peak load could be accommodated, it would also be possible to meet the less intensive evening requirements as well. Assuming the core day time period of 40 hours per week for 30 teaching weeks in a year meant there were 1,200 hours of core on-site day time hours available for teaching over the academic year. This was the framework within which teaching space needs were to be accommodated.

The next step was to collect categorised data to build up the space needs profile:

- hours of teaching, broken down by type of activity (the number of contact hours on courses multiplied by the number of students)
- a breakdown of those hours by different types of teaching space
- area per workplace in different types of space
- target utilisation rates for different types of space.

A change in any of these variables would affect the predicted amount of teaching space. For example, an increase in contact hours would

generate a greater demand for space, or the larger the area assumed to be provided per workplace, the greater the area predicted. Conversely, the higher the target utilisation rate, the smaller the area of space that would be generated.

QMUC already had some of these data to hand. Because the college had carried out detailed space utilisation surveys, it knew the number of workplaces in different types of teaching space and the area per workplace in general purpose teaching rooms and in specialist spaces, such as laboratories and studios. It also had information on what levels of space utilisation were found in practice and how these varied between general purpose and specialist rooms. It could identify the differences between actual use and timetabled use.

However, it did not initially hold all the information needed on hours of teaching in different types of space centrally. It was difficult initially to get full details of the on-site day time class hours per student for each module and the class contact hours per member of staff. The college knew what was timetabled, but not all the teaching space was included in a centralised system, nor did the college know how closely the hours that were timetabled matched the hours making up individual courses. In addition, it was planning for the future and it did not want to rely solely on a space prediction based on existing teaching practices. The strategic plan envisaged increases in student numbers, and changes in the portfolio and course delivery. It was important that the space needs assessment captured the combined impact of these changes.

In this context, the exercise looked not only at what was timetabled, but also took a strategic view of how patterns of teaching might change across the curriculum. Space needs predictions were also crosschecked against the space need calculations derived from actual observed use moderated with assumptions about levels of non-attendance. The assessment was then refined through detailed discussions with individual schools.

On working through the other variables, the college found that there were unlikely to be any significant space savings in terms of areas per workplace. These were averaging around 2 m² per workplace across general purpose and specialist space. In fact in some specialist space, it was concluded that the areas should be increased.

However, the results from utilisation surveys highlighted potential scope for space efficiencies. Average levels of utilisation were running at around 18 per cent, but some rooms were recording rates above 30 per cent and a smaller proportion exceeded 40 per cent. The fact that relatively high rates of utilisation were already achieved in parts of the estate was seen as evidence that more intensive use of space could be feasible, subject to effective timetabling and planning the right match of room sizes and group sizes. It was assumed that average rates of utilisation in general purpose rooms would rise from less than 20 per cent to over 40 per cent. In specialist rooms the target utilisation rate was set at 30 per cent.

Different scenarios were modelled and reviewed with the schools. The final profile was based on a mix of general purpose room sizes. Most had a capacity of either 30 or 60 people, with three 150 seat lecture theatres and one 250 seat lecture theatre.

Following the decision to include the School of Drama and Creative Industries in the relocation project, space needs had to be recalculated. In general purpose teaching space, this was done by loading the additional student class teaching hours onto the previously modelled number and sizes of rooms. It was found that projected frequency rates were getting to the point where there were concerns about whether they would be sustainable. There followed a period of iteration for room sizes and frequency rates to determine which was the best balance.

The move of the School of Drama and Creative Industries from the Gateway to Craighall will lead to a range of savings in teaching related

space. When the use of existing space at Gateway was analysed, it was found that some specialist types of space which occupied large areas of floorspace had low levels of utilisation, such as workshops and production space. Given the principle that the Gateway relocation had to be cost neutral, it was decided that the theatre would not be replaced. Instead, the school would lease or hire facilities for productions as needed, and production support to cover props and wardrobe would be provided in leased space off-site. The result of these decisions, combined with new layouts for staff offices and fewer support spaces generated a reduction in the space needed on the new campus. There is just over 4,000 m² existing space at Gateway which will be reduced to some 1,800 m² including the off-campus production support warehouse (but excluding any production space which will be hired as needed).

Overall, even with planned growth in student numbers, the effect of this space modelling process and in particular, the impact of increased utilisation assumptions, was to reduce the total amount of teaching space on the new campus by over 25 per cent. The total amount of teaching space is now around 8,265 m², and this is projected to reduce to some 5,963 m².

Learning resource centre

Conversely, the college is proposing an increase in learning resource centre floorspace from 3,715 m² in the existing estate to 4,442 m² on the new campus. It will consolidate all the learning spaces in a central wing of the new academic building. The learning resource centre combines the library, academic computing services and audio-visual services. The proposed space allows for increasing proportions of non-contact time on courses.

In keeping with the campus philosophy, the building is designed to be sustainable, with low running and maintenance costs and to be adaptable in the future to allow for changes in function and technology.

Office accommodation

Office accommodation is an area where space efficiencies are planned for the new campus. At the present time, QMUC has around 5,300 m² of office space. In total, there are about 420 FTE office-based staff (academic and support), giving an average area per FTE of 12.6 m², while the actual space per person is very variable. The layout and standard of offices vary across the three sites, and office areas are difficult to remodel given the inflexibility of the existing buildings. As a result, some people have a generous allocation of space and others are very cramped. Most academic staff have their own individual offices.

Office provision has been one of the most contentious aspects of the design of the new campus. In the early stages of the design process, different options were considered for new office layouts. With growth in staff numbers, initial calculations of total space needs based on individual cellular offices generated a total office space requirement that was greater than the amount of space now used as offices on the existing sites. This was not affordable within the budget available for the development, and alternative open plan, flexible spaces were considered. These were also felt to support the twin design philosophies of wanting to encourage academic integration and provide spaces which could be easily adapted to accommodate changes in the future.

There have been a lot of discussions with staff about how the new types of office space could work in practice. A range of different scenarios was developed for consultation. The final choice is to have a layout where almost all office accommodation is provided in one wing of the building which is separate from other uses, such as teaching areas. Feedback from consultations showed that staff were keen to keep areas for concentration and areas for collaboration separate. The layout includes some quiet booths for concentrated study, meeting rooms and informal meeting areas. Most of the office

workplaces will be provided in an open flexible area (over 300), although there will be a small number of individual cellular offices (about 13). The great majority of staff will have their own dedicated desk with just a few people, mostly visiting lecturers, using hotdesking arrangements.

Space allocations vary in the new layout, but the average will be substantially less than in the existing estate. Within the open plan flexible spaces, the area per workplace will average around 6.5 m². The area for the cellular offices is generally around 9.5 m² per room. Meeting rooms are additional to this.

Versatility

QMUC recognised throughout the design stages that given the rate of change in higher education, it was very likely that the new campus buildings would need to be adaptable. It sought to build in flexibility in terms of office staff layouts so that numbers could vary without structural alterations being needed and in the way in which the main building could be extended if necessary.

A test of the concept of versatility has arisen already with the late decision to bring the School of Drama and Creative Industries based at the Gateway site into the project after the schedule of accommodation to provide for the relocation from Corstophine and Leith had been agreed and the design for the building was complete. The necessary changes were achieved by extending the area of flexible office accommodation and adding the additional general purpose teaching demand onto the stock of rooms already planned and allowing for increase in the total area of general purpose space. Performance studios were located with sports facilities.

Sustainability

Sustainability, both environmental and financial, was an important concept in the design of the new campus.

The long-term financial sustainability of the campus was also important from the outset. One of the reasons that space efficiency was a critical

success factor was that the new estate needed to be affordable not only in terms of its initial construction but also in the longer term.

Recurrent costs are likely to be lower as a result of the planned reduction in the size of the estate. Other factors such as the energy efficient design of the campus will also play a role, but QMUC recognises that there will not necessarily be a reduction in the on-going costs per square metre. This is due to the fact that in the past 35 years, since the college first moved to Corstophine, expenditure on the estate has not always been at the level needed to keep it fit for purpose and in good condition. The plan for the future is to continue to use the estate efficiently and thereby maintain a higher level of income generation per square metre, which in turn will support the investment needed to upgrade the estate on a regular basis.

The college has assessed its existing estate and the new campus in the context of the SMG model for benchmarking the size of the non-residential net internal floor area (SMG Model of the Affordable Estate at www.smg.ac.uk/the_model). The current estate has 26,519 m² of net internal non-residential area. The model predicts that on average, given QMUC's profile of drivers and current use of space management tools, it could have an estate 13 per cent smaller than its current one. If the college started space charging and had 100 per cent of its teaching space centrally timetabled, the predicted estate size using the model falls to 17,581 m². The model's prediction is close to the planned size of the new campus, of 18,379 m².

Summary

- a. The new campus now under construction has been planned to deliver a significant reduction in the total net internal non-residential area. It will have over 30 per cent less space than the existing estate which is spread over three separate sites. This is very close to the initial targets set when the decision to relocate was made in 1998. The area per FTE student will reduce by over 40 per cent.
- b. The reduction in floor area will generate a higher income per square metre, which in turn will help to support a financially sustainable estate.
- c. QMUC went through a detailed space modelling exercise to generate the predicted profile of future space needs. This is still being fine tuned. The college went back to first principles to assess how many hours of teaching activity would be needed in different types of space at target levels of utilisation. Such an approach is similar to the method recommended by the LSC.
- d. Projected increases in space utilisation are a key driver for achieving planned efficiencies in the provision of teaching space. The timetable will be central to the effective delivery of the predictions.
- e. The current estate is highly inflexible, and the need to build in versatility to the design of the building as a whole and to the layout of individual spaces within was viewed as vitally important from the outset. The new building has already had to change at a late stage in the design process with the decision to incorporate the college's third site into the relocation project. So far, the QMUC project team believes that the design concepts underpinning the new campus are proving to be robust.

An impression of the new campus at Craighall



Table 1: Changes in space allocations at QMUC

This table shows how the college's space is projected to change with the move to the new campus.

Type of space	Current estate (m ²)	Proposed new campus (m ²)	Difference (m ²)	Difference (%)
Total NIA	26,519	18,379	-8,140	-30.7
Total GIA	33,046	24,165	-8,881	-26.9
NIA space per student FTE	7.9	4.5	-3.4	-43.0
GIA space per student FTE	9.7	5.9	-3.8	-39.2
Some space categories				
Teaching	8,265	5,963	-2,302	-27.9
Learning resource centre	3,715	4,442	727	19.6
Offices	5,282	4,511	-771	-14.6

Versatile research buildings

University of Newcastle upon Tyne

Introduction

This case study is based on the University of Newcastle upon Tyne's recent experience of planning and managing two new research buildings: the Paul O'Gorman Building, which provides accommodation for the Northern Institute for Cancer Research; and the Devonshire Building, which houses the Institute for Research on Environment and Sustainability (IRES), the Informatics Research Institute and the E-Science Research Centre. Both buildings provide office and laboratory space.

The study is likely to be of interest to HEIs thinking about:

- creating more multi-disciplinary or generic research space which can be used by several different groups at the same time or by successive groups
- how people working in the buildings perceive the impact of their new environment on job satisfaction and research activity
- how to evaluate the effect of new working environments on research output.

It begins with an outline of the university's estate strategy and space management policy which set the context for both the Paul O'Gorman and Devonshire buildings and describes:

- the objectives and critical success factors for each building
- the characteristics of the spaces that people have moved from

- people's perceptions of the effect of the new environments on research
- the perceptions of people working in the buildings and their views on how the new space matches or differs from their expectations.

Strategic context for the new buildings

The university wanted to secure an affordable estate which is financially sustainable in the long term. The objective was to reduce the size of the non-residential estate and to provide better quality, fit for purpose space.

The overall target was to reduce existing gross internal non-residential floorspace by over 10 per cent (some 35,000 m²) through a disposal/rationalisation programme. There was the recognition, however, that in some areas loss of poor quality space would be partly offset with new fit for purpose accommodation capable of being used more efficiently and effectively.

University space management policy

The university first adopted a space management policy in 2002. It has been applied widely across the estate, including in the planning and management of research buildings such as the Paul O'Gorman Building and the Devonshire Building.

The policy states that a series of criteria will be taken into account in making decisions on space allocation and investment across all types of space:

- a. As a general rule, space is to be flexible, multi-user, shared, large, open plan and non-specific to individuals or individual activities as far as possible, in order to 'future proof' the investment against change. This is more applicable and easily achieved in new builds or major refurbishments, but even cellular space should be shared wherever possible.

- b. Space is to be shared both within, and if appropriate, outside the university.
- c. Users who demonstrate good space utilisation and long-term strategic thinking in terms of space use will receive preference when investment and space allocation decisions are made.
- d. Space objectives are to be critical success factors for estate investment projects. Space efficiency should be an objective of new build developments.

In 2005, research space comprised 42 per cent of all net usable non-residential floorspace across the university. It is a strategic objective in the space management policy to use research space more efficiently and effectively. For research space, the space management policy's general principles are:

- a. Open plan space is preferred for purely research space, to achieve integration and a lively 'buzz'. Where space is for shared research and other academic use, although open plan offices are preferred, sufficient quiet offices are needed to interview students in private.
- b. Laboratory space should not be converted to other uses, such as office use, without careful consideration, owing to the investment made in services.
- c. Researchers should not hold duplicate space in schools if they also have space in an institute, for example in the Devonshire Building.
- d. Duplication of research facilities is to be avoided where they can be shared between groups or faculties.
- e. Investment in new or refurbished laboratories should be directed towards the largest and most flexible multi-user facilities possible to ensure that they remain fit for purpose into the future.
- f. Write-up/office space in research institutes may not be required to be cellular and dedicated if staff/research students spend most of their time in the lab. Open plan

hotdesk arrangements are more economical and should be considered. Space for new research staff must be planned and resourced properly and in adequate time to design and procure it.

- g. The desire for the co-location of activities needs to be justified and balanced by the added value that will result. Diversity of interaction is required rather than a 'silo' approach, and flexibility is required to deliver the research strategy.

The following sections discuss the Paul O'Gorman and Devonshire Buildings in turn.

The Paul O'Gorman Building

The Paul O'Gorman Building is a new research facility occupied by the Northern Institute for Cancer Research. The building was designed by architects, Faulkner Brown. It was completed and first occupied in 2004. The opportunity to consolidate and provide new space for the cancer research teams was made possible through funding from Science Research Investment Fund, Cancer Research UK and the Foundation for Children with Leukaemia.

A series of critical success factors for the building was identified at the design stage:

- the institute must aid and promote cross-group working to enable research to be of world class standards
- the institute must be recognised by government, the medical profession and the Medical Research Council as well as potential benefactors as a place for high quality medical research
- the building must encourage interaction with the commercial world
- the building must be flexible in terms of its structure and services design to facilitate day to day changes in research group configuration.

Previous accommodation

The building was designed to replace outdated facilities dispersed over separate locations.

People were working in cramped conditions in rooms which were often cold and with little natural light. Some of the space was extremely poor in terms of condition and has since been demolished.

In the old accommodation, each research team had its own individual laboratory. Some were located close together, and the research groups in these had a history of collaborating and sharing expertise and equipment. In other cases, teams were used to operating independently.

Staff had their own allocated spaces in offices and write-up areas. Senior laboratory-based staff had their desks in shared offices next to the laboratory where their research team was based. Other laboratory-based staff had their own individual carrels at one end of the laboratories.

Ways of working in the Paul O’Gorman Building

The building was designed to provide spaces which would be shared by different research groups in order to encourage an increased awareness of each other’s work, an interchange of ideas and sharing of expertise. The central

objective was to create large high quality shared laboratory space. Office and write-up space was provided as open plan areas, partly to encourage mixing between research groups and partly for space efficiency reasons driven by the amount of funding available for the building.

It is a three-storey L-shaped building with a net internal area of 2,235 m². The ground floor is mostly made up of meeting rooms, the entrance and reception. The top two floors of the building have research laboratories on one side and office areas on the other. Laboratories and ancillary space account for 1,270 m² of space within the building. Office areas comprise 540 m². Other uses include a coffee area, meeting rooms and storage. The number of occupants in the building varies from time to time. It is currently around 125 people.

There are two large laboratories on the first and second floor. These main laboratories are shared between research groups. As groups expand or contract, they can have more or less laboratory space without the need to reconfigure the building. There are also smaller specialist laboratory areas.

The Paul O’Gorman Building



Within the office areas, some desks are allocated to senior research and administrative staff. They have their own desks around the edges of an open plan office area. They also have their own set of storage drawers known as 'knowledge lockers' for all paperwork and a dedicated laptop computer for their use. In all, somewhere around 20 per cent of occupants have their own desk.

The majority of laboratory-based staff share write-up desks in open plan office areas. They have a single drawer in a knowledge locker which is on the same floor as the laboratory in which they work and close to their research team leader. They can use any write-up desk. Additional storage is provided off-site. As with the laboratories, the office areas do not need to be reconfigured as individual research groups grow or contract.

Meeting rooms are provided for discussions. There are several large meeting rooms on the ground floor, one of which is also a coffee area. There are also small meeting rooms within the office areas, which are intended to provide spaces for people to move into when they want to have a confidential conversation or a discussion without disturbing other people.

As yet, there is no written space management policy for the building, although the open plan areas need active management. There is a no talking rule within the office areas to minimise disturbance, and write-up areas should be cleared at the end of each session.

Occupier perceptions

An occupier perceptions survey of the new building was carried out by Mary Lou Downie and Peter Fisher from Northumbria University and SEA Consultants². It provides an insight into what people thought the new building was going to be like before they moved in and how they actually found it once they occupied the new

space. It also provides information on how people feel the new environment affects research and what they think about the different types of space within the building.

A sample of staff was interviewed before and after moving into the building, followed by a questionnaire of all staff a year after the move. There was a 73 per cent response rate to the survey covering a range of different job categories, including management, researchers, students, support staff and technicians.

The study set out to explore the relationship between new working practices and the type of space provided, and to consider the impact this has on research success. It explored questions such as:

- how do shared laboratories contribute to or impede research?
- how do research staff use open plan office areas?
- how do research staff use hotdesk facilities?
- how does the nature of the work influence staff perceptions of the space's suitability?

When the interviews were carried out before people moved into the building, there was some anxiety about how the new office and write-up areas would work. People were moving from private working areas into open plan spaces, and in many cases, they would no longer have their own desks. Some people did not want to move. Interviews at this stage found that staff had low expectations of their current working environment. Their priorities were commitment to their research and team cooperation, and they expressed little dissatisfaction with the quality of their accommodation, even though in some cases it was very poor, as it was cramped and had little natural light.

Despite the concerns about how the new space would work, a year after the move, the

² 'The Paul O'Gorman Building, The Northern Institute of Cancer Research, Occupier Perceptions Survey', M L Downie and P S Fisher, School of the Built Environment, Northumbria University and Dr C A Rose, SEA Consultants, January 2006

conclusion from the occupier perceptions survey was that it was a highly successful building in terms of occupier satisfaction. Some of the detailed findings are set out below.

Perceptions about the building's contribution to research

There was strong support for the idea that the move had increased people's research networks and the majority of occupiers surveyed thought the building had helped them to make new links and generate new research ideas. However, the most significant factor was considered to be the fact that the building brought previously dispersed groups together under one roof, rather than the particular characteristics of the new space.

Just over half of respondents believed the building helped to retain staff, and two-thirds felt that it contributed to their job satisfaction.

Perceptions of working in the laboratories

The new building provided for laboratories to be shared by research teams which had previously had their own separate laboratories. The survey found that 65 per cent of respondents agreed that bringing together different research groups in large shared laboratories works well.

The survey asked occupiers questions about the main laboratories and the specialist laboratory areas. Just over 50 per cent of respondents agreed that the main laboratories helped them to do better research. Most of the rest were neutral on the issue. There was strong support for the range of facilities and the working environment in the specialist laboratories.

The characteristics that people liked most about working in the laboratories were the level of natural light, the amount of workspace and access to the right equipment. Very few suggestions were made for improvements to the laboratories. Those that were made focused on storage issues.

Perceptions about the office and write-up areas

Before moving into the building a large number of people had expressed reservations about how the open plan offices and shared write-up areas would work. A year after occupation, the survey found that two-thirds of respondents felt that the office areas met their needs, with one-fifth disagreeing and the rest remaining neutral.

People working in the building were split between those who found the new office arrangements conducive to concentration (45 per cent) and those who did not (34 per cent). Although most people agreed that there was co-operation to keep noise to a low level, there were still concerns from some about disturbance from people moving about the building and from other people's telephone conversations. Conversely, others found it hard to concentrate, because it was too quiet. In some cases, a distinction was made between the levels of concentration needed for writing up papers and theses and for more routine laboratory work.

Among people who used the hotdesks, the survey found that one in five always used the same desk and one in three usually did so. The main reasons for choosing a particular desk were first of all, proximity to their laboratory, and then to friends and colleagues.

Overall, the majority of respondents considered the allocation of desks and the use of write-up areas to be well-managed, although some dissatisfaction was expressed. Some people reported that moving desks and paperwork regularly was disruptive, and others were concerned that it was inappropriate that a number of desks were always taken by the same people. They felt that there should be a stricter policy to prevent this.

Perceptions about meeting rooms and other spaces

The survey found concerns about the adequacy of small meeting rooms within office areas to meet the needs of people for short discussions and meetings. They were conscious of inadequate sound proofing, which was a problem for the people using the meeting rooms and for the occupants of the adjacent office areas.

The coffee room, which is also used as a meeting room, was intended to provide a space for work and social interaction, but little evidence was found from the survey that this space is felt to help with the exchange of research ideas.

Other perceptions

Respondents' views on a range of issues associated with working in the new building are summarised below.

In addition, the view of the director of the institute is that both internally and externally the building has a positive impact on how the institute is perceived by people from outside, and that it promotes the reputation of the institute.

The Devonshire Building

The Devonshire Building houses IRES, the Informatics Research Institute and the E-Science Research Centre. It was designed by architects, Dewjoc, and was first occupied in 2004. Since then, it has won many awards including the Royal Institute of Chartered Surveyors (RICS) award for sustainability and for building of the year, a Royal Institute of British Architects (RIBA) award and a BRE Environmental Assessment Method (BREEAM) award.

It shares a number of characteristics with the Paul O'Gorman Building in that it was designed to bring researchers together and to create an environment where different research groups could share similar types of space which would be flexible enough to accommodate changes in the size and composition of research teams.

Views of people working in the Paul O'Gorman Building

General building issues	Summary of responses
'The building's open plan layout helps me to get to know people.'	55% agreed with the statement, 15% disagreed and 29% were neutral.
'The lack of privacy concerns me.'	25% disagreed, with the balance split between those who agreed that it was a concern and those who were neutral.
'I feel safe in the building.'	92% agreed, one person disagreed and the remainder were neutral.
'The building is flexible and can accommodate change.'	15% disagreed, with others split between those who agreed that it was flexible and those who were neutral.
'The good quality environment helps attract and retain staff.'	Just over 50% agreed, less than 10% disagreed and the remainder were neutral.
'The building contributes positively to my job satisfaction.'	Two-thirds agreed, less than 10% disagreed and the rest were neutral on the issue.

Data provided by the 'Occupier Perceptions Survey' by M.L. Downie and P.S. Fisher of the School of the Built Environment, Northumbria University and C.A. Rose of SEA Consultants, January 2006.

The Devonshire Building



There are also differences. The people who moved into the Devonshire Building came from a much wider range of backgrounds. It brought together people from different schools and subject areas across traditional sciences, e-science and social science. They were based in numerous locations across the university. In some cases, it was one or two people from a department, whereas in others, such as biology, large groups relocated, which freed up substantial areas of poor quality

accommodation which in turn would permit scope for rationalisation and disposal.

The number of people working in the building fluctuates. There are currently around 150 who use the building as their primary workplace with more people using it from time to time on a hotdesking basis.

Objectives and critical success factors

The Devonshire Building was designed to facilitate cross-disciplinary working and deliver cultural change in the way that research is undertaken. It was based on the philosophy that physically bringing people together in places where they can share and exchange ideas would foster creativity and communication. In turn, such interaction would improve research. The university already had a strong reputation in environmental research across a number of schools. The intention was to create a critical mass of research staff engaged in this area within a single building.

During the design stage, a series of critical success factors was defined through workshops and interviews with key stakeholders.

Critical success factors identified at the design stage

Cultural change	The building must facilitate cross-disciplinary working and enable cultural change resulting in improved research output. The building must act as a hub with spokes reaching out into faculties.
Research output	The building must result in the creation/winning of new research initiatives and projects i.e. additional research grants. Facilitated by the building, less experienced staff must develop and improve their profile/research experience.
Flexibility	The building must be flexible in terms of its structure and services i.e. able to be reconfigured quickly and cost effectively to meet changes in future user requirements.
Image	The building must enhance the university's campus and create a good image to industry and the public.
Operational	The building must represent good space management. Space utilisation across the university must not be adversely affected by the building i.e. users must not operate two offices or laboratories – there must be no unnecessary duplication of facilities.
Research output	The building must be recognised by government and industry as a place for high quality environmental/e-science research. The building must encourage interaction with the commercial world.
Environmental	The building needs to be demonstrably 'green' i.e. meet best practice in environmental standards.
Extendibility	The building should interface appropriately with the rest of the development site as well as the existing buildings around it, as a further building is intended to be developed on the site at some time.

Composition of the building

The building provides 3,290 m² of net internal non-residential floorspace arranged over six floors around a central atrium. The ground floor has the main reception, a management suite, conference centre, virtual reality centre and café. This floor was designed to encourage stronger links with business.

On the upper floors, there are open plan office areas on the south side of the building and modular laboratories on the north side. The office areas were designed for hotdesking. In total, there is some 1,230 m² of laboratory space, 900 m² of office area and nearly 400 m² of meeting and conference rooms. On each of the upper four floors there are six single offices with areas of around 7-8 m², and a small number of pod offices which can be shared by groups, but almost all the office area is open plan. There are 40 open plan desks per floor within areas of around 160 m².

Ways of working in the Devonshire Building

A separate space management policy was developed for the Devonshire Building which is in Annex 1. The policy sets out the research vision and occupancy plan as well as the space management principles to be applied in the building. Researchers wishing to occupy the building must satisfy criteria relating to evidence of research excellence, and continued occupation will be linked to annual reviews of research outcomes.

The policy emphasises that the integrity of the open plan design is to be maintained with no alterations to be carried out to create more cellular offices. It also states that multiple offices will not be allowed, in terms of staff having an allocated office space in the Devonshire Building as well as an office in their school. If they wish to retain their school office, they must hotdesk when they work in the Devonshire Building.

Occupier perceptions

A study of occupier perceptions of the Devonshire Building based on a postal questionnaire sent to all users of the building was commissioned by the university's director of estates and conducted by a team from the university's School of Architecture, Planning and Landscape assisted by Mary Lou Downie from the University of Northumbria³. Its aim was to assess how the critical success factors which had been set at the beginning of the project were being achieved. There was a 32 per cent response rate to the questionnaire.

The study was carried out within a year of first occupation. As such, the findings were therefore recognised as being an interim result and that perceptions may continue to change with increased length of occupation of the building and as its management evolves. It focused on assessing people's reactions to the building as a place to work and how these were changing as the project was developing. In particular, the study looked at:

- whether people liked open plan spaces
- whether people preferred the new building or their previous accommodation
- whether occupants felt that the building had or would facilitate:
 - interaction between disciplines
 - new research
 - new collaborations
 - additional research proposals
 - more effective use of resources and equipment through shared access
 - more pooling of finance to buy equipment
 - better productivity.

³ Devonshire Building, User Perspective Survey, University of Newcastle Upon Tyne March 2005

The study concluded that there was positive movement towards achieving the critical success factors, but that some aspects of the working environment, such as hotdesking and noise levels, needed careful management to enable it to fulfil more of its potential. When asked what things people liked best about the new building, the most common answers were good lighting, lots of other disciplines occupying the space and it being an environmentally friendly space. Among the unpopular aspects were noise, lack of storage space and privacy. The other findings were as follows.

Perceptions about the building's contribution to the research profile

There was agreement among a majority of respondents that their network of research contacts had increased, but this varied between different categories of staff. There was stronger agreement from academic staff and technicians than from researchers, while PhD students did not think that their networks had increased.

There was also general agreement that the building has a high profile and that it enhances the university's campus. The majority agreed that the building has great potential to create a multi-disciplinary culture and to be an exciting place to work. Most respondents were proud to be associated with it but were uncertain that it made a contribution to their research activities.

Perceptions of the laboratories

Most respondents preferred to use a laboratory space designated for their group and did not think that using laboratories on each floor would help them to make new research contacts. There was agreement that there should be more sharing of research equipment.

Perceptions about the office areas

Most respondents worked in the open plan office areas. In general, the longer respondents had been in the building, the more positive they were

about the office working environment. The majority considered desk space and space for meetings to be adequate, but there was some dissatisfaction about levels of noise and lack of personal storage space and privacy. Hotdesking was generally unpopular and where possible people liked to use the same desk in the hotdesking areas.

Summary

- a. Both the Paul O'Gorman and Devonshire Buildings have created new types of working and research environments within the university.
- b. Similar objectives and critical success factors were defined for each building at the design stage. They included promoting multi-disciplinary, integrated research, fostering success in winning research funding, and creating flexible buildings which could respond to future change.
- c. Occupier perceptions surveys were carried out to seek the views of people working in the buildings. It is recognised that views are likely to continue to evolve, and as such the surveys give a snapshot of 'work in progress'. Nevertheless, they have been valuable in providing insight into people's thoughts about how the buildings work and the effect they think it has on their research. It has also been helpful to get feedback from a cross section of users, rather than just managers or the design team. Information from surveys such as these can help to inform future projects and space management methods.
- d. In both cases, the surveys found that the majority of people agreed that it had increased their research contacts and that the buildings enhanced the research reputation and profile of their institutes. But they were less certain that there had been an impact on research activities.

- e. Indeed, it is difficult to get any firm evidence of a link between the new buildings and research funding. Partly, this is because it is still quite early days, but also because there is a range of variables affecting the receipt of funding, many of which depend on factors which are not only external to the building but to the university.
- f. The buildings were planned in the context of the university's estate strategy. The link to the strategy is easier to track with the Paul O'Gorman Building since it was always a more self-contained project. It met the objective of vacating poor quality space, some of which has been demolished, and consolidating into new fit for purpose space. With the Devonshire Building, people moved from a wide range of locations, often from small pockets of space within much larger buildings. In many of these cases, scope for rationalisation can only be realised in the longer term.
- g. Both buildings have followed the principles of the university's space management policy, and an additional policy has been developed for the Devonshire Building. It has been found that the more shared space that is created; the more important it is to have an active policy to manage the shared space.
- h. In addition, the process of introducing changes in the type of working environment is almost as important as the new type of space that is provided.
- i. Both buildings required local administrative resource to help manage them.

Promoting effective utilisation

Sheffield Hallam University

Introduction

This case study looks at space management methods at Sheffield Hallam University. It focuses on space charging and how space utilisation data are collected and used to plan and manage space.

The case study is likely to be relevant to HEIs interested in:

- using space charging as a space management tool
- encouraging effective utilisation of teaching space
- ways of collecting utilisation data
- using utilisation data as a tool for assessing space needs.

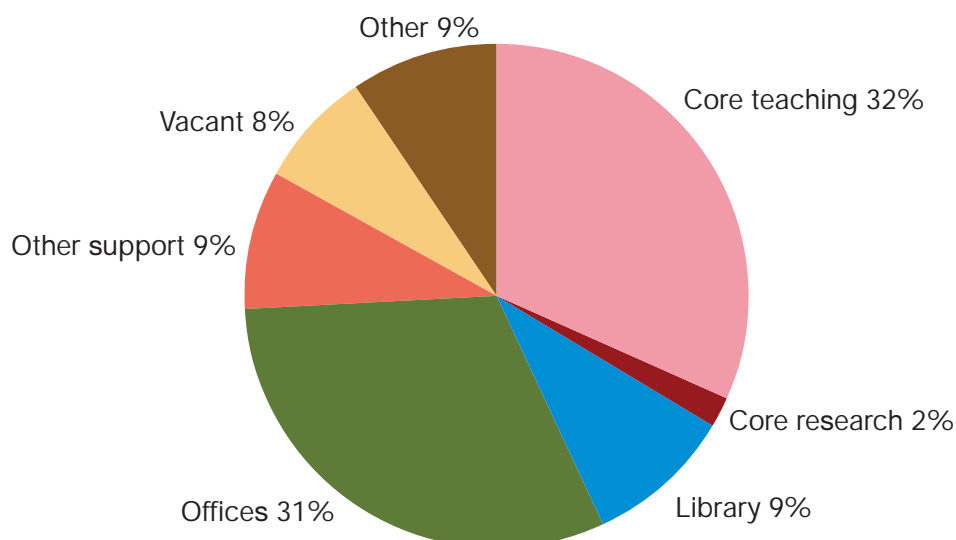
In order to set the context for the discussion of space management methods, the case study begins by outlining some key statistics about the university and its estate, and it describes how the university adopted a strategy of rationalisation, reinvestment and renewal across the estate.

Overview

Sheffield Hallam is a large university. It has nearly 22,000 student FTEs and 2,700 FTE staff based on campus. The university has an annual turnover of around £150 million. It is based on three sites: the City campus in Sheffield city centre; the Collegiate campus in the suburbs; and a smaller site in the city at Psalter Lane.

The non-residential estate has a gross internal area of 157,490 m² and a net internal area of 112,707 m² (as at 2005). The proportions of different types of space are shown in Figure 3. The proportion of vacant space includes space awaiting refurbishment.

Figure 3: Estate profile by space type



Information from the 2006 Estate Management Statistics (EMS) Report shows that Sheffield Hallam's income per square metre at £1,280 is nearly 15 per cent above the median of £1,116. It has 5.2 m² of net internal area per student FTE compared with a sector median of 8 m², an average of 9.6 m² and lower quartile of 5.8 m². The core teaching area per taught student FTE is 1.7 m². The sector median is 2.7 m², the average is 3.6 m², and the lower quartile is 2.1 m².

The SMG model can be used to compare the size of the university's estate with what might be predicted on average given factors such as its income, the size and composition of the student body, its location, how much core teaching space is centrally timetabled and whether or not it charges for space. Sheffield Hallam currently centrally timetables around 30 per cent of its teaching space and it operates a comprehensive space charging system. The results from the model indicate that the university has substantially less space than might be predicted given its current use of space management tools. In particular, the amount of core teaching space and research space are less than predicted.

Table 2 sets out summary utilisation information. Sheffield Hallam's space utilisation ratios are all based on surveyed use rather than planned or timetabled use.

Background

The university has pursued a strategy of estate rationalisation for over 10 years. On incorporation in 1992, Sheffield Hallam inherited a mixed property portfolio. Much of it was in poor condition. Some was historic, and part was leased with some of the highest rents paid in Sheffield. In total, there were around 120,000 m² of net internal non-residential space over five sites. The academic vision was to increase student numbers and to provide a robust breadth of course provision. Major restructuring was planned to change from 26 departments to 12 schools.

Estate strategy

The university formulated its first estate strategy and looked at whether it would be cost effective to move everything to the Don Valley. Other options were either to focus on a few campuses in the city or to spread out across a number of smaller sites. The decision was made to concentrate on a small number of city-based campuses. Total relocation was an attractive option but ruled out because it was unaffordable.

Some of the university's governing body and senior management had first hand experience of how problems in heavy industry in the region

Table 2: Sheffield Hallam's utilisation ratios compared to the sector

Teaching space utilisation ratios	Sheffield Hallam (%)	Sector lower quartile (%)	Sector median (%)	Sector upper quartile (%)
Utilisation rate	37	19	26	36
Frequency rate	59	47	54	64
Occupancy rate	62	41	49	63
Proportion of core teaching space to which rates apply	80	25	80	83

Source: EMS Report 2006

had resulted from lack of investment and forward thinking. They did not want to see the pattern repeated in higher education. Their objective was for the university to have a programme of reinvestment in infrastructure, and to make sure that the investment would be able to deliver the type of higher education needed in the future. As such, it was not just a matter of updating and modernising, but of deciding what higher education should be like in the future and how best the vision of growth could be achieved. This included a hard look at what should be taught and how it should be delivered. This had important implications for the estate, not only in terms of the amount of space that was available, but also its quality, fitness for purpose and flexibility.

Reviewing space needs

The next step was to work through the space needs of the restructured schools and assess what would be required to accommodate the planned growth. This was done through a detailed dialogue with the schools.

It soon became apparent that each school wanted to grow and to have improved facilities. In order to meet everyone's aspirations, the university would have doubled in size. This was not viable. There had to be a rethink. The university went back to first principles to find what the schools really needed, as opposed to what they wanted, to deliver their teaching and research. This was detailed work. The starting point was collecting data on the amount and composition of the space that schools were occupying as well as timetabling and utilisation information. It also involved getting information on what courses consisted of in terms of numbers of hours of teaching and other activities and what types of facilities were required.

A key source of information was course validation material. This provided the basis for discussions with staff which covered what type of student experience the university wanted to provide and how methods of delivery might change in the future, and in turn how this might have an impact on amount and type of accommodation.

Example: the School of Engineering

The School of Engineering is an example of how this approach was taken forward. It was one of the earliest major projects. The objective was to bring together two engineering groups which were in separate buildings on the same site. Initial discussions about what would be needed in a consolidated location suggested that the amount of space would have to increase very substantially. Not only was this unaffordable, but staff also had widely differing expectations, for example in terms of office accommodation. It was difficult to get some to take a broader view of what engineering needed as a whole rather than concentrating separately on individual areas of activity.

The university decided that the way forward was to talk to academic and administrative staff to identify what was wrong with their existing space, what worked well and whether there were aspects of poor practice hampering the way space was used. Were custom and practice leading to missed opportunities for using space effectively?

A lot of the discussion centred on the way that specialist space was used. Much of this space contained large pieces of equipment. Course validation material showed that teaching practices were changing. Different engineering courses varied, but in general, the number of taught hours per week was falling. The main impact was on hours of teaching in specialist facilities. These findings were reinforced by the results of utilisation surveys, which revealed that large areas of specialist space were not often used. There was also a need to incorporate computer taught elements in courses and new technological developments which were replacing more traditional styles of teaching. The utilisation data together with information on the type and numbers of hours of teaching to be delivered provided the basis for a review of whether facilities were essential, or whether some of the teaching activities and equipment could be relocated to share space with other uses. Where some types of specialist space were used very infrequently, there was a discussion of whether staff and students could use alternative off-campus facilities.

This exercise helped build a profile of space needs for engineering in the consolidated location.

Wherever possible, large multi-functional spaces were provided, with glass panels in the walls with the corridors. The main purpose of the glass panels was to make the process of teaching and learning more open and visible, but it also had the benefit of making the rooms easier to manage. Engineering experienced a marked increase in recruitment following the opening of the new facilities, and in general the feedback from students about the accommodation was enthusiastic. Overall, there was a reduction of 40 per cent in the space occupied.

This approach has been applied widely to other projects across the university. The university's strategy of progressively renewing and upgrading space is implemented chiefly through a series of project boards. These are usually led by a pro-vice chancellor with membership drawn from academic, finance and facilities staff. The objective is to have an open process working through what space is needed and whether it is affordable.

The process is supported by the availability of robust information on the performance of space, including extensive space utilisation data, and through a full awareness of the costs of space driven by the space charging system. Space charging and the role of space utilisation are discussed in turn below.

Space charging

Space charging has been in operation at Sheffield Hallam for nine years. It is a key space management tool for the university. It encourages academic schools and departments to think carefully about how much space they need. The cost of space forms part of annual business plan discussions. When members of staff consider new initiatives, they can build the projected space costs into the business case and decide whether or not it will be financially feasible; if not, the facilities directorate can work with them to look at alternative solutions which could be affordable.

The charge is calculated annually as a total cost which covers:

- the actual operating costs
- a sinking fund for renewal and replacement (depreciation)
- debt repayments.

For 2005-06, the three components amounted on average to £150 per m² of net internal non-residential area.

There is a weighting according to type of space. The categories represent different capital and running costs:

- general purpose teaching rooms
- offices
- 'light' laboratories
- 'heavy' laboratories
- teaching kitchens.

The charge levied is also weighted by campus to reflect the average quality of space in each location. The charge for space at the City campus is 100 per cent. It is 95 per cent at Collegiate campus, and 90 per cent at Psalter Lane.

The charge is levied at a departmental level. Departments are charged for all the space they have, for example for departmental offices and specialist teaching space. There are no discounts for bad fit: nor are there premiums for new buildings. They are also charged for their share of central space. The charge for central space is made using a series of drivers. For example, the costs of the learning resources centre are charged on the basis of the number of student FTEs by department. The costs of central administrative functions, such as human resources, are apportioned by the numbers of staff in each department, and the charge for pooled teaching space is done on the amount of time the space is booked (not used) by departments.

Annually, each department is provided with details of how much space they occupy and what the charge will be for the coming year. If departments have a need to review their space to meet changing academic requirements, this is generally assessed as part of the annual business planning cycle and is a matter for negotiation. Data from utilisation surveys are taken into

account in considering requests. Space that is returned to the university must either be suitable for an alternative use or capable of being mothballed without having an impact on other areas. Occasionally, when space is left vacant as a result of this process, it is then no longer charged to the department which vacated it. Instead, its costs become part of the overhead which is recharged across the university.

Space charging is also linked to delegated budget management and the cost of space is an overhead like staff salaries and linked to income from students, research and consultancy. A significant effect has been the way that staff review space held against needs and actively plan to make better use of the resource. A key impact has been a more responsible and proactive approach to the business portfolio. New business streams will often be weighed up against space and staff costs to review viability and impact. Space charging, along with the briefing process, has led to an increase in the amount of flexible space across the institution.

Space utilisation

The university uses space utilisation data to inform space management and allocation and to help to plan space needs for new projects.

Method

The university has collected utilisation data for over 10 years. Over that time, there has been an increase in the number of rooms audited. Now, it regularly collects data on over 500 rooms. All pooled teaching rooms and most specialist teaching space are audited. Rooms are added as requested by departments. Offices have been surveyed occasionally, but they are not done on a regular basis. The learning resources centre is not included, since its use is monitored and reported on as part of the collection of the Society of College, National and University Libraries' (SCONUL's) annual statistics.

Surveys are carried out very frequently. In the first semester of 2005-06, a total of 557 rooms were surveyed and some 95,000 checks were made 0900-1700 Mondays to Fridays. This is an average of over four weeks' data for each room, although in practice some rooms were surveyed more often than others. On the City campus, some data were collected nearly every week. Audits took place over seven weeks at the Collegiate campus and over a one-week period at Psalter Lane. A breakdown of the scope of data collection over the semester is given in Table 3.

The university finds that collecting the data so frequently builds up a clear picture of how space

Table 3: Breakdown of data collected by Sheffield Hallam

Campus	Type of space	No. of rooms	No. of checks	Days audited	Weeks audited	Possible number of checks	% achieved
City	Pool	111	24,286	55	11	48,840	49.7
	Specialist	165	33,736			72,600	46.5
City totals		276	58,022			121,440	47.8
Collegiate	Pool	70	14,725	36	10	20,160	73.0
	Specialist	88	19,258			25,344	76.9
Collegiate totals		158	33,983			45,504	74.7
Psalter	Pool	4	99	5	1	160	61.9
	Specialist	119	3,060			4,760	64.3
Psalter totals		123	3,159			4,920	64.2
Grand totals	Pool	185	39,110			69,160	56.6
	Specialist	372	56,054			102,704	54.6
Overall		557	95,164			171,864	55.4

Source: Sheffield Hallam University Room Use Audit Report Semester One 2005-06

is being used. It also helps to avoid the argument that the week selected for the audit is unrepresentative for some reason.

The surveys are organised by the facilities directorate. Students are employed as surveyors. The university has switched from a paper based system of recording the results to using handheld computers and downloading the data into a database for analysis.

Using utilisation data for space management and planning

The facilities directorate produces a detailed, factual report on the results each semester. The results are made available to all departments, and they are now provided electronically so that they can be used interactively. A new timetabling system, to be introduced shortly, should also allow for improved data comparisons.

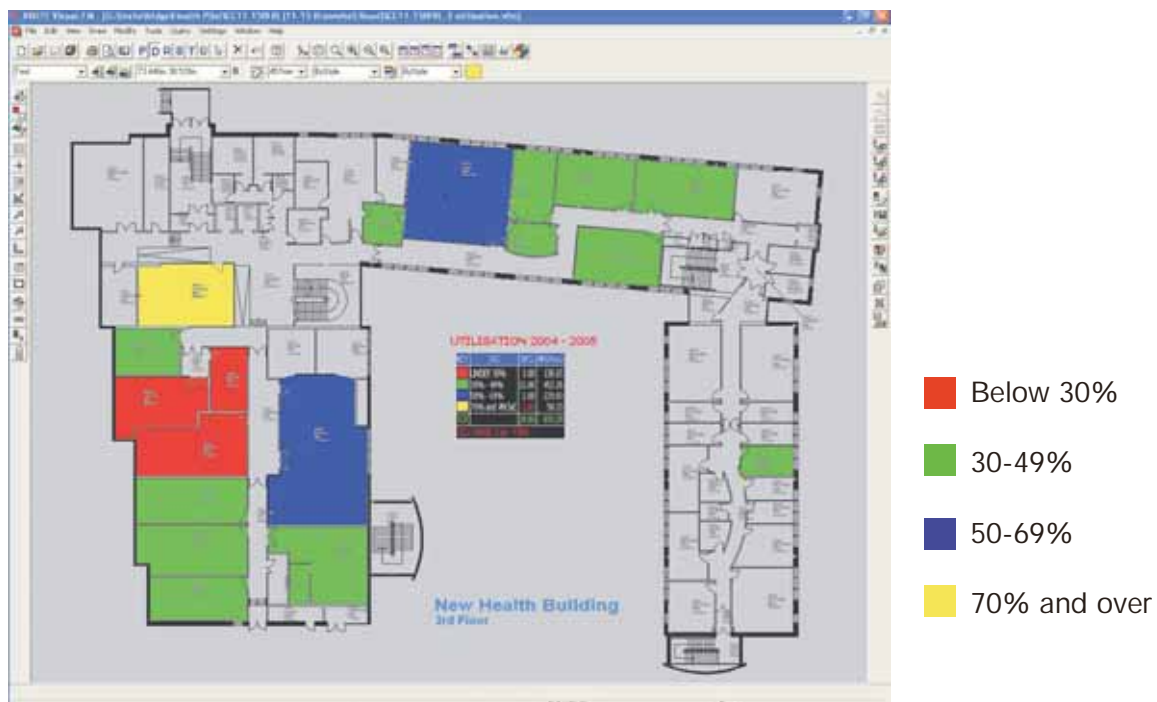
The information can also be presented visually, which provides a useful way of highlighting differences between areas of relatively high and low utilisation. It shows the different sizes of rooms and the patterns of utilisation rates within buildings. Figure 4 illustrates an example taken

from the Health Building. It shows which rooms were covered by the audit and the relative rates of utilisation recorded in them.

The facilities directorate considers that the investment in collecting utilisation data has been well repaid by the insight it gives into how space is being used across the university and the way that patterns of use change over time. The data help to show the effect of changes in teaching and learning practice. In some departments, student numbers have gone up, but utilisation levels have gone down, reflecting reductions in class contact time. In other instances, rooms are found to be in use at times when they are not timetabled, often by students engaged in self-directed learning.

When requests are made for additional space, the data provide a benchmark for evaluation. They enable 'what if' scenarios to be developed where schools have initiatives for growth and a key question is whether or not that growth can be accommodated in existing space. Back in 1999, the university avoided replacing 25 rooms in a leased building after analysing utilisation data and setting targets for increased utilisation. As

Figure 4: Health Building utilisation rates



student numbers have grown in some parts of the university, there have been requests for corresponding increases in space, particularly specialist space. By tracking the actual patterns and intensity of use of facilities, however, utilisation data have demonstrated that these perceptions may not be borne out. In another example, a request was made from the architecture department for an additional 400 m² of specialist space. The utilisation data were used to inform changes to the timetable, and it was found that it would be possible to meet the department's needs without increasing the amount of space and the corresponding space charge.

There is also an important link with timetabling. The semester reports include information on the use of pooled rooms by school. Survey results are compared with the predicted use from the timetable to identify the scale and pattern of differences. The information can be fed back to timetablers to assist in planning the timetable. This helps to minimise the gap between timetabled and observed use. The gap between the two rates is usually less than 10 per cent.

Summary

- a. Sheffield Hallam University has a longstanding strategy of rationalisation, reinvestment and renewal of its estate.
- b. Space charging was introduced as a strong incentive to encourage effective use of space.
- c. There is a regular dialogue between the facilities directorate and departments about their space and how teaching and learning patterns are changing the types of space which are needed. This is informed by the detailed and up-to-date information on utilisation collected on a regular basis.
- d. The space charging system means that departments are very interested in knowing the detailed results of utilisation surveys as these help them to decide if there is space they no longer need and, as a corollary, do not wish to be charged for.

- e. The volume of utilisation information which is collected provides a robust and rolling picture of how space is being used. In turn, this means that it is generally trusted and rarely disputed.
- f. The information forms an essential part of the briefing process for projects and the basis for a review and dialogue about the suitability of space for specific purposes.
- g. When new academic initiatives are planned or departments request additional space, the proposals are evaluated to see if they are affordable in terms of the cost of space. They are also reviewed in the context of utilisation data and timetabled use to explore the scope for consolidating existing space without compromising academic quality.

Annex 1: The Devonshire Building space management policy

The university has an adopted space management policy which provides the context for the space management of the Environmental Research Institute in the Devonshire Building. However the institute has particular circumstances pertaining to the way its research is to be managed, which are reflected in the design and layout of the building and require it to have its own space management policy and means of space allocation and review.

1. Research vision and occupancy plan

Separate documents set out the terms of reference for the institute as a centre of excellence both in its research activities and as a hub of high quality facilities to support spokes of research elsewhere. The vision is that the building is occupied on a project basis by research groups led by individuals who have RAE grade 5 and 5* ability, operating at the highest international level. The rationale behind the concept is one of cultural change and creating a new collaborative way of working. It is not therefore to be used as a decant building to re-house groups or in order to facilitate moves elsewhere. The focus must always be on quality of research activity.

Researchers wishing to occupy the building must satisfy certain criteria. A business case approach will be taken to assessing eligibility. This must demonstrate evidence of research excellence (with scientific validation) and willingness to engage with the scientific research vision of the institute, including commitment to its collaborative atmosphere and space management principles. Research outcomes will be reviewed annually by the Faculty of Science, Agriculture and Engineering) and continued occupation will be linked to on-going excellent research projects.

2. Space management principles

The management of the space in the building is key to the institute's success as it will be used as a control to achieve the scientific research objectives. It is suggested that a group acts as

gatekeeper to allocate and review space occupation and enforce the following principles.

The integrity of the open plan design is to be maintained, with no alterations to be carried out either to existing cellular offices or to create more cellular offices. The environmentally friendly aspects of the building are to be maintained.

Only core research staff leading research groups will be allocated cellular offices.

Lead research staff allocated cellular offices must give up their offices in schools. Multiple offices will not be allowed. If the researcher wishes to retain an office elsewhere, then they must hotdesk in the institute. Schools must undertake to find an office for the researcher as and when their project is completed and they need to return to the school.

Research teams will occupy open plan offices and shared laboratories. 'Hot labs' will house 16 individuals per floor while there are 40 open plan desk spaces per floor. As an example of how this will work, in any one group of say 10-15 individuals at any one time it is envisaged that five-to-six may be working on experiments and the rest may be checking data or working in the office.

Staff will be able to continue to occupy the building while they have productive research projects as assessed in the annual review.

A clean desk policy will be operated for hotdesks. Staff will be randomly co-located to maximise research collaboration possibilities.

The meeting room and pods will be used for meetings to minimise disruption to others in open plan offices. There will be one meeting pod per floor.

Staff personal storage is envisaged to be lockable cupboards with perspex doors to encourage active management of possessions.

3. Space allocation and review group

This is suggested to be:

- the Director of the Environmental Research Institute
- the Director of Estates
- the Director of Business Development.

The group will be responsible for approving initial space allocation on a business case basis against clear criteria and also for annual and rolling review of continuing occupation. It will be supported in its annual review by the annual faculty review of research outputs. The rolling review will consider the status of groups as current projects come to an end and decide on the position with regard to continuing occupation, with reference to the academic projects plan as set out by the institute's management and strategy board.

4. Occupation criteria

- group leaders to be of RAE Grade 5 or 5* ability
- group members may be RAE Grade 4 if led by 5/5*
- independent scientific validation of research excellence is required
- a business case must be made for occupation of institute space
- projects must accord with the institute's science vision and business plan
- projects must be financially viable
- researchers must be willing to engage with the collaborative ethos of the institute and abide by its space management principles and policy.

