

Technology-Rich Physical Space Design

An overview of JISC activities

Briefing Paper

January 2008

Good design and effective management are fundamental to the success of a new-build or refurbishment project. With the chance to influence the future direction of learning and teaching in an institution, much is at stake for directors of estates, project managers, academic and library staff embarking on a large capital project.

Since 2006, JISC has been helping institutions develop physical spaces that anticipate the pervasive use of technology in learning and teaching, enable innovative, learner-centred pedagogies and inspire and motivate wider participation in learning.

JISC resources support each stage of the journey towards a successful project – from determining the vision for technology-enhanced learning spaces to exploring the processes behind successful outcomes. The most recent include an investigation of the design and management issues associated with open-plan spaces and video case studies of the impact on practice and culture of five technology-rich new-build and refurbishment projects.

This paper provides an overview of JISC activities to date and outlines the most recent work in more detail.

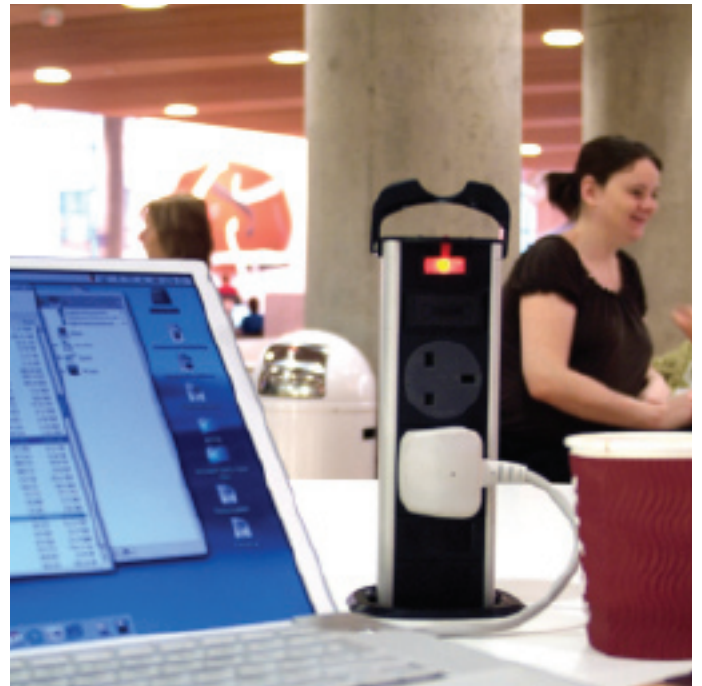
What does JISC offer on learning space design?

Clarifying the vision

- *Designing Spaces for Effective Learning (2006)* – an introductory guide to designing technology-rich spaces

Implementing and managing new designs

- *Case Studies of 21st-Century Learning and Teaching (2007)* – five video case studies exploring the implementation of technology-based designs for individual spaces and whole campuses
- *The Design and Management of Open-Plan Technology-Rich Learning and Teaching Spaces in Further and Higher Education in the UK (2007)* – a report on the operation of open-plan spaces, with case studies and guidelines for senior managers



Guidance for each step on the journey

- *Planning and Designing Technology-Rich Learning Spaces (2007)* – an applied infoKit following the life cycle of a project from vision to post occupancy, with an image gallery, virtual campus tour and links to related resources

What is the rationale for the work?

With significant recent investment in estates development, there is a need for resources that demonstrate how technology can be effectively integrated into the design of learning spaces to add value to institutional provision and enhance the learner experience.

Too often, the potential for technology is imperfectly understood, resulting in designs that reflect patterns of usage from a pre-digital age, or run into difficulties in practice. JISC resources have been helping to find a synergy between aspirations for innovative 21st-century learning and teaching and physical space designs that can motivate learners and teachers and function effectively.

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Parallel research by JISC into the learner's perspective on e-learning has revealed widespread use of personal technologies on as well as off campus and a growing requirement for spaces that facilitate collaborative and social learning. Giving an indication of how learning spaces might evolve during the next decade, JISC research shows learners seeking more control over the technologies they use, blending informal and institutional technologies in ways that support their individual needs.

In a period of rapid change, it is not easy to anticipate such changes. Through a spectrum of research activities around the role of technology in learner-centred learning and teaching, JISC is continuing to keep the sector informed on issues of importance in this field.

Our work has complemented research undertaken by the UK Higher Education Space Management Group, the Higher Education Academy and the HEFCE Centres for Excellence in Teaching and Learning (CETLs).

What have we learnt?

The Design and Management of Open-Plan Technology-Rich Learning and Teaching Spaces (Watson, L. et al, 2007)

The most recent JISC-funded report on physical learning space design investigates issues associated with large open-plan spaces designed for technology-enhanced learning and teaching. The report and associated case studies explore strategies for containment of noise, management of environmental controls, maintenance issues and user behaviour.



'The evidence indicates a mixed degree of success in the design and operation of this type of space'

Overall findings

The growth in the power and availability of technology has had a considerable impact on the physical estate. With increasing recognition of the social origins of learning, many institutions are now developing large-scale learning centres equipped with IT in addition to libraries – the earliest known examples of open-plan learning spaces.

Such spaces are often known as social or information commons. Typically, they:

- Are open plan, exceeding 200 sq m in area

Case Study 1

Establishing a culture

The Information Commons at the University of Sheffield is a social and collaborative learning environment opened in 2007 to provide 1300 learning spaces in addition to those available in the university library.

As a brand new facility, the Information Commons has no established patterns of use. Guidelines for learners have been introduced to encourage positive behaviours – litter, noise and prolonged ownership of computer spaces were initially recorded as problems. Students have started to take ownership and responsibility for the space by establishing their own Information Commons group on Facebook.

Background

Underpinning data for the study were obtained from more than 40 institutions via a questionnaire, telephone interviews and site visits, supported by desk research.



- Support both private study and group project work by means of zones or partitioned areas
- May be used by members of staff and the local community as well as enrolled learners
- Primarily offer access to digital resources via institutionally owned technologies, but increasingly make provision for learners' personal devices

The evidence indicates a mixed degree of success in the design and operation of this type of space. In some cases, open-plan spaces have been in operation for some time, resulting in modifications, such as the enclosure of parts of the space, which have had a detrimental effect on temperature and air quality.

The report distinguishes between strategic, design and operational issues. The main recommendations from the study are summarised under these headings.

Strategic

- The format of a new space and its approach to technology should reflect the strategic intent of the institution

Case study 2

Refurbishing existing space

A low-cost project, Open3 at Loughborough University, is a dedicated refurbished area within the existing university library. Different types of use are allocated to different floors of the building to avoid disturbance.

Food and drink are permitted in the group working area adjacent to the café, but are banned elsewhere. The vertical zoning on different floors has enabled such policies to be established with relative ease and the need for monitoring has declined over time.

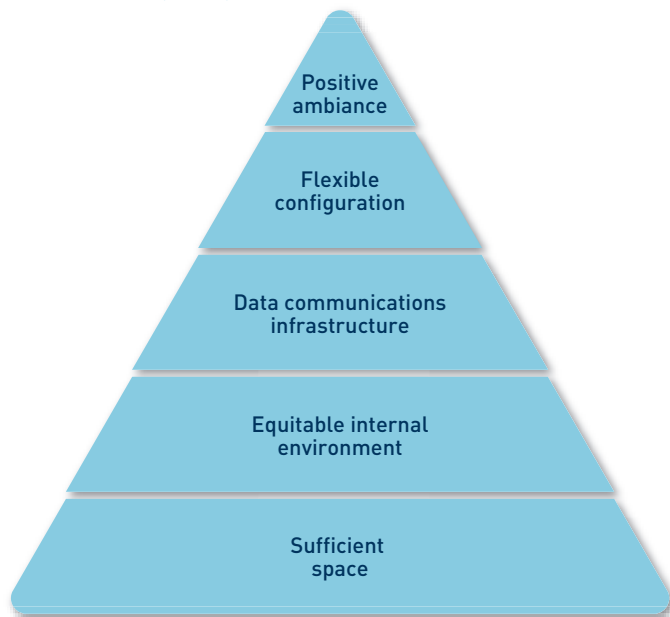
- All involved in the design, management and use of the space – from senior managers and subject faculties to IT services, estates and facilities teams – need to fully understand the strategic objectives of the new space
- Users also need to be informed about the project's development and to be consulted on its operation
- Failure to successfully manage users' expectations of the space will create a vacuum in which subjective, ill-informed opinions may take hold
- A marked increase in student ownership of technology indicates a likely shift towards a service-based rather than a hardware and systems-based model

Design

- Learning is an activity with many variables. Learners equally hold varying opinions about environmental features such as temperature, ventilation and noise. The most successful designs include a range of micro-environments to suit individual needs and preferences
- Excessive heat, poor ventilation and restricted circulation of air are nonetheless notable problems with this type of space and are exacerbated by changes to the original open-plan design. Systems of heating, ventilation and air conditioning should be designed with the likelihood of later changes in mind, since passive or single-mode systems – often promoted for reasons of sustainability – may compromise the flexibility and performance of the space over time
- Didactic teaching in open-plan spaces is proving unsatisfactory and will increase the complexity of the managerial demands made by the space. However, enclosure of small areas for teaching rooms will restrict airflow through the space
- The 'oomph factor' of iconic designs has a motivational impact on learners, but a balance must be struck between innovative design, user satisfaction and operational effectiveness

Figure 1

Anderson (2007): A hierarchy of design considerations, after Maslow (1943)



Operational

- Good ventilation, temperature and noise control are basic user requirements. Inability to control these features causes frustration and tampering with controls. Localised controls – including openable windows – increase user satisfaction with open-plan spaces
- Active measures to develop a culture of self-regulation, such as user guidelines, help to minimise problems of litter and unacceptable noise levels. Cues for appropriate behaviour, such as graphics, sound and light-touch policing – including the presence of learning guides, assistants and facilities staff – can prove helpful in establishing different types of behaviour in different parts of the space
- Intensively used spaces require increased budget allocation for cleaning. Localised maintenance teams ensure a more prompt, flexible response and are more effective in maintaining standards than centralised facilities

Case study 3

Modifications over time

The Information Terraces at the David Goldman Informatics Centre, University of Sunderland, is one of the longest established open-plan, technology-rich spaces in the UK. Some of the open space has been enclosed for offices and specialist IT functions.

The building has centralised temperature and humidity controls and is actively ventilated. Despite this, enclosure of parts of the space has made temperature control function less well, with hotter conditions experienced at upper levels.

Conclusion and observations

The report concludes that design and management issues cannot be separated, since the ideal solution for many problems is to recognise the potential for disruption in the initial design. Much is asked of these spaces, and the greater their complexity, the greater the management demands will be – these are spaces which have to be 'flexible, blended, variable, accessible, inclusive and exciting, but at the same time utterly practical'.

'New measures of success are needed to test how such spaces support different user activities'

New measures of success are needed to test how such spaces support different user activities. Existing measures of success focus too narrowly on recording footfall and use of resources to fully evaluate the role of this type of space in effective learning.

Guidelines for managers

Over 30 guidelines for managers have emerged from this study, ranging from strategic planning to operational issues. Many relate to the tension between the requirement to preserve flexibility and the pressure to enclose parts of the space:

'The definition of building zones can involve walls, partitions, changes in materials and use of graphics. Each will have a greater or lesser effect on flexibility and modification of acoustic or climatic internal environment. Be clear on the degree of change that is anticipated and the degree of fixity that is therefore desirable.' **Guidelines for managers**



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Case Studies of 21st Century Learning and Teaching

Five video case studies were launched at the 2007 JISC Conference to complement the 2006 JISC publication, *Designing Spaces for Effective Learning*. These explore how five UK institutions and departments achieved their goals and are available online with transcripts for use with a screen reader:

Case Study 1

Changing culture – Edinburgh's Telford College



A new-build project in 2006 enabled a further education college to move into a high-specification campus. With a reduction in overall space, changes were needed to the way staff and students had been working. A senior manager describes the process of change.

Case Study 2

A social and collaborative learning space – The Saltire Centre, Glasgow Caledonian University

The Saltire Centre at Glasgow Caledonian University is a 10,500 sq m innovative learning space at the heart of the campus, providing 1800 study places and a one-stop shop for all student services. Students view the Centre as their space – adaptability to different user requirements has been its selling point.

Case Study 3

A technology-rich space for inquiry-based learning – CILASS, University of Sheffield

CILASS – a Centre for Excellence in Teaching and Learning (CETL) in inquiry-based learning in the arts and social sciences at the University of Sheffield – is using refurbished space in a Victorian building to explore the potential of new technology in student-led inquiry-based learning. The Pro Vice-Chancellor, CILASS director, audio-visual manager, academic staff and students discuss what the space and its innovative technologies mean to them.

Case Study 4

A technology-rich science centre – London Metropolitan University



The new Science Centre at London Metropolitan University combines community resources – such as a sports hall – with a multi-purpose laboratory containing 268 student workstations, each with its own computer. The space is equipped with audio facilities to enable more than one class and subject discipline to be taught simultaneously, making the SuperLab the most flexible space of its kind. Academic staff and students explain how it works.

Case Study 5

A campus for the 21st century – City Campus, University of Wolverhampton

The Pro Vice-Chancellor and Director of IT Services at the University of Wolverhampton describe the long-term vision behind the redevelopment of the City Campus and explain how different types of learning spaces have been developed to match different learning objectives, so enabling the university to meet changing learner expectations and needs.



For further advice and guidance from JISC, see...

Planning and Designing Technology-Rich Learning Spaces

An applied infoKit on learning space design, this resource was launched in 2007 by JISC infoNet. Encompassing detailed advice and guidance for those undertaking large-scale capital projects, case studies, a virtual tour of an imaginary campus and a Flickr-based image library of completed projects to inspire and challenge the user, the infoKit represents an overview of JISC guidance on learning space design.

'As understanding increases of the different ways by which people learn in a digital age, so physical space design in educational institutions will continue to evolve'

Designing Spaces for Effective Learning

A concise, visual publication for project managers, this resource includes prototype floor plans designed by AMA

Alexi Marmot Associates for technology-rich learning in three different types of space. The publication illustrates key points with case studies from further and higher education.

Looking ahead

It is JISC's view that the physical campus will remain at the core of educational provision for the foreseeable future, but that many spaces will not look or function as they have done in the past – nor should they. As understanding increases of the different ways by which people learn in a digital age, so physical space design in educational institutions will continue to evolve.

In response, JISC will continue to monitor the close relationship between physical space, pedagogy and technology to ensure that the design, implementation and evaluation of technology-rich spaces is supported by clear-sighted examination of the issues, with case studies and guidelines for those involved.

This briefing paper has been produced for JISC.

Author: Ros Smith

Theme: Technology Enhanced Learning Environments

Programme: e-Learning

Alternative formats of the briefing paper can be found at:
www.jisc.ac.uk/publications

Further information and resources

This briefing paper draws on a JISC report: *The Design and Management of Open-Plan Technology-Rich Learning and Teaching Spaces* by Les Watson, Hugh Anderson and Katherine Strachan-Davis, available from:
www.jisc.ac.uk/whatwedo/themes/elearning/tele/managinglearningspaces.aspx

Other resources featured in this briefing paper:

Case Studies of 21st Century Learning and Teaching: download in either QuickTime® or Windows Media® formats from:
www.jisc.ac.uk/whatwedo/programmes/elearning_innovation/eli_learningspaces_casestudies.aspx

Designing Spaces for Effective Learning: copies from:
publications@jisc.ac.uk, or download in PDF format from:
www.jisc.ac.uk/eli_learningspaces.html

Planning and Designing Technology-Rich Learning Spaces: view at www.jiscinfonet.ac.uk/infokits/learning-space-design

For further information on the JISC e-Learning Programme, visit: www.jisc.ac.uk/programme_elearning

For further information on outcomes from the JISC Learner Experiences of e-Learning theme, visit:
www.jisc.ac.uk/elp_learneroutcomes