Retrofitting University Learning Spaces

8 key principles to guide the redevelopment of university learning spaces
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In recent years, significant resources have been allocated to the design, development and evaluation of next generation learning spaces designed to support a range of existing and emerging approaches to learning. While adopting a range of innovative design strategies, the high cost of many of these facilities limit the construction of ‘high tech’ spaces to a few institutions. The reality for most students and academics is that their formal learning activities occur in rooms “configured for a teacher to be seen and heard and for students to take notes” (Van Note Chism, 2002, p. 9).

What is needed is an integrated set of principles that allow for the most effective redevelopment of a broader spectrum of existing spaces in universities and the development of classrooms that are usable for future needs.

Based on a review of the literature and consideration of the perspectives of key stakeholder groups associated with the use and management of learning spaces – students, academics and professional and support staff, a set of 8 principles have been identified as key to the redesign of existing spaces. It is hoped that the principles presented here are consistent with academic and student ambitions in terms of learning outcomes and are coherent to those responsible for the design, development and ongoing management of learning spaces.

At the simplest level, the challenge of designing effective learning spaces is a classical usability and utility problem. A range of frameworks already exist in the fields of product design that offer a useful way of considering this set of principles. The LUCID framework, for example, suggests that the design of any interactive product requires attention to four key characteristics: Engagement, Empowerment, Ease-of-Use and Trust (Kreitzberg 2008). With minor amendments to this last item, it is possible to overlay this framework on the PST framework (Radcliffe, et al., 2009) and develop a model that brings together a range of different aspects of learning space design and use.

![E3C Model for Learning Space Design](image)

The following takes each of the main elements of the model in turn and briefly discusses the learning principles associated with that domain.
Principle 1: Spaces should support a range of learners and learning activities

Key words: agile, dynamic, adaptable, inspiring, stimulating, challenging, engaging

Research has shown that deeper learning occurs when academics and students are engaged in an active learning process as partners. As a consequence learning spaces should support engagement through easy facilitation of activities like team based collaboration, idea generation, brainstorming, problem exploration and decision making, and artefact generation that extends beyond simply text and image creation.

To be able to facilitate such a broad range of activities, spaces should be agile enough to support a range of current and emerging pedagogies that span a range of related domains from academically directed to student led learning; from individual to team based learning; from theoretical analysis and critique to authentic and work integrated learning. Space design (and associated support activities like timetabling) needs to accommodate learning modalities that extend beyond the dominant lecture/tutorial model to models that emphasise a precinct type approach to space utilisation supporting access to a range of related spaces in varying time modalities.

Spaces should utilise appropriate elements like colour and art works to encourage creativity and a sense of excitement as well as stimulate and challenge learners. Student feedback regularly indicates how much they notice the aesthetics of spaces.

Principle 2: Spaces should provide a quality experience for users

Keywords: usable, comfortable, bright, spacious, attractive, fun

Learning environments should actively promote learning excellence. Spaces should be inviting and welcoming with comfortable furnishings. Spaces should have plenty of natural and variable light, good ventilation and good quality acoustic treatment.

The design of learning spaces should include consideration of student access to comfort elements, including food and beverage. Students are increasingly involved in learning activities that take place over long periods of time or occur in the evenings and on weekends. For this reason it is important to recognise their need to access adequate sustenance to ensure they have the mental capacity to continue their engagement with the learning activity underway. While this can be met in part by on campus cafes and restaurants, access to these resources outside normal hours also needs to be considered.

For similar reasons, the location of learning spaces also needs to give due consideration to safe and easy access to bathrooms, parents’ rooms and relevant student and staff support resources. With learning spaces now being used for longer hours and in more intensive modes, access to these sorts of comfort facilities is increasingly important to the student experience.
Principle 3: Spaces should help foster a sense of emotional and cultural safety

*Keywords: welcoming, inclusive, nurturing, supportive, secure, positive, safe, motivating*

Learning needs to occur in an environment where learners are free from any concerns about their physical and emotional safety, where they feel welcome and included.

Most universities articulate capabilities for their graduates that include social and ethical responsibility and an understanding of Indigenous and international perspectives. Learning spaces and university campuses that avoid all sense of cultural identity do not assist students in developing these capabilities.

In creating a safe and inclusive environment, it is important that learning environments still encourage learners to consider their role in the global community and aid the discovery and development of a broader sense of cultural awareness in students.

A sense of physical safety is created for academic and student users of learning spaces through high levels of lighting and activity in and around learning spaces. Proximity to security services, the lack of obvious vandalism and graffiti, and the cleanliness of spaces and related services like bathrooms all contribute to creating a sense of safety.

Principle 4: Spaces should enable easy access by everyone

*Keywords: accessible, learnable, locatable, navigable, findable*

The location, design and configuration of learning spaces should be undertaken cognizant of the broad range of capabilities of potential users. This consideration should range from the more obvious requirements like ensuring that spaces can be adequately accessed and used by students with a range of disabilities through to more subtle requirements like making it easy for students to find a learning space and be able to successfully transition between relevant spaces within the timeframes that their timetable requires. The same principles apply to the technology utilised in learning spaces. The design, placement and control of systems need to accommodate a wide range of potential users.
EASE OF USE PRINCIPLES

5 Principle 5: Spaces should emphasize simplicity of design
Keywords: functional, learnable, efficient, user centred

The intended use of a space, furniture or technology in a space should either be self evident to users or require minimal specialist training to utilise. It is important that the design elements in any space are easy to identify and use as intended. This can be assisted by having familiar look and feel approaches to room design, common standards for information technology and audio visual systems and simple and clear signage that indicates the role and purpose of any additional classroom element so that they can be utilised safely and with confidence. Support services should exist that can respond rapidly to problems in learning spaces to avoid major interruption to any learning activity, something which can be difficult given the extended time in which learning spaces are now in use on university campuses.

Modern learning spaces often incorporate such an extensive array of information technology and audio visual solutions that many users often feel overwhelmed.

Learning spaces need to make it easy for students to connect with the world beyond the classroom and easily bring relevant resources back to use as part of their learning activities. Many of the psychological principles of learning spaces promote the sense of students and academics being involved in an active community of learners. Strictly speaking, they belong not to a single community of learners but a number of often overlapping communities that draws in the broader university, their discipline and even the broader society.

Students need to move about a range of spaces in order to undertake different aspects of a single learning activity. It is important to ensure that learning spaces do not impede this movement or introduce elements that require distraction from the learning activity during the flow of activities. Technologies like wireless should be activated in all informal spaces like coffee shops, gardens and other outdoor areas as well as in formal learning spaces and where possible the infrastructure should allow seamless movement without the need to log off and log on each time a student moves. Simple technologies like mobile whiteboards or writeable surfaces should be utilised to allow students and student groups to break out of formal classrooms to engage in learning on the move.

The technology systems in any learning space must be simple to use, reliable and supportable by technical personnel so that problems do not distract students or academics from the task at hand. The technology in learning spaces should accommodate a wide range of literacy levels in users i.e. it should be easy for a novice user to learn and for an experienced user to utilise its advanced functionality. Care should be taken to introduce applications and control systems that echo interfaces that may already be familiar to users. Simplicity can also be a product of making conscious choices about what elements not to include in the design of a learning space.

6 Principle 6: Spaces should integrate seamlessly with other physical and virtual spaces
Keywords: blended, ubiquitous, temporal, social, connected

The design of university campuses, buildings and learning spaces needs to support opportunities for accidental or serendipitous interaction between students and academics. Educational research suggests that considerable learning takes place informally and incidentally, beyond the explicitly designed activities of the classroom. Learning occurs in casual contacts with faculty and staff, peers, and in the broader context of university campus life.
Principle 7: Space should be fit-for-purpose, now and into the future

Keywords: sustainable, maintainable, robust, agile, cost effective

Learning spaces need to be robust and fit for ongoing use. In order to support a focus on learning, most staff and students suggest that learning spaces and the technology in them needs to be available where and when they need them. Put simply “they just need to work”. To enable this, building fabric, furnishings and technology utilised in learning spaces should be durable and robust enough to support active use and possible reconfiguration over a period of time. Care should be taken when introducing elements into a learning space that introduces any undue maintenance burden or items that can be easily stolen or removed. The use of remote monitoring systems to monitor learning space technology can also support a more proactive approach to support and rapid response to faults.

In addition, learning space installation standards should be developed and adhered to allowing ongoing understanding of the maintenance requirements of complicated electrical, acoustic, audio visual, networking and computing installations. Similarly, the timetabling of learning spaces needs to adequately provide for suitable maintenance and refresh periods.

Principle 8: Spaces should embed a range of appropriate, reliable and effective technologies

Keywords: reliable, appropriate, effective, extensible, social, mobile, trustworthy, responsive, current

Technology in learning spaces should be designed to allow students to easily interact with classroom activities and with each other. Technology for technology sake should be avoided and the focus turned to technology that enhances learning and supports the social and interactive nature of modern pedagogies. Technology should be available to allow students to easily access existing resources and knowledge; generate new ideas or knowledge and to capture classroom activities allowing easy play back and review by students at the same time or for upload to personal learning environments (PLE's) or e-portfolio systems for review at a later time. A combination of institution provisioned technology and applications and student provisioned technology and applications should be supported that encourage student communication, collaboration, brainstorming and decision making.

In an environment where technology is constantly changing, institutions cannot hope to ever supply all the solutions, systems and hardware that academics and students might want to use in their learning activities. As a result it is important that those solutions that it does provide integrate well with the broader array of solutions and environments available. This means a conscious avoidance, where possible, of solutions that require a particular hardware platform or configuration, applications that require platform specific client software or specific browsers, and infrastructure elements that restrict academics and students from utilising appropriate solutions provisioned outside the institution. While complex, this ambition becomes progressively more critical when we observe the increasing array of laptops, net books, smart phones, and other mobile devices regularly being used by a broad spectrum of students.

For more information about how these principles were derived or practical advice on how they might be implemented, please visit the ‘Retrofitting University Learning Environments’ project website at http://learnline.cdu.edu.au/retrofittingunispaces/index.html