What is it?
For a number of years, universities in Australia have rung with the sound of the construction of new buildings or the refurbishment of old or dysfunctional spaces. Driven by a range of factors that include increasing student enrolments, the ageing cycle of existing stock or just a general strength in the economy, many universities are looking to modernise or develop their buildings and spaces.

In 2004, Griffith University in Brisbane, Australia, started on a process of reinvigorating library spaces. Following some experimentation, it was decided to refurbish spaces to reflect the major components of intellectual activity including quiet research, group work, multimedia work and presentation preparation. While it could be argued that this thinking is becoming increasingly common in many library spaces, the Griffith refurbishment considered this change in the context of three frameworks when thinking about users and their space. These included:

(i) Principles espoused by Jamieson, Dane and Lippman, (2005) for development of on-campus teaching and learning facilities;
(ii) The characteristics of modern students that influence our learning spaces as articulated by Lomas and Oblinger (2006); and
(iii) Key characteristics of well-designed architectural space that enhance ambience and shape behaviour.

Principles for the Built Campus Environment
Jamieson et al. (2000) proposed a set of principles for designing built environments. These principles were “based on an emergent idea of student centred, flexible learning … [and were] … intended to result in facilities which are less prescribed and function-specific than is presently the case. Their application is intended to foster a sense of ownership by individual communities created through the use and occupation of specific locations on-campus.” (Jamieson et al., 2000, p.227) These principles included:

- Design space for multiple uses concurrently and consecutively.
- Design to maximise the inherent flexibility within each space.
- Design to make use of the vertical dimension of facilities.
- Design to integrate previously discrete campus functions.
- Design features and functions to maximise teacher and student control.
- Design to maximise alignment of different curricula activities.
- Design to maximise student access to, and use and ownership of, the learning environment. (Jamieson et al., 2005 p.18-20)

Why is it?
Changes in pedagogy have also influenced changes in the physical infrastructure of learning spaces and buildings. Pedagogy has moved a long way from the traditional ‘chalk and talk’ approach to embrace a variety of teaching methodologies and practices. For example, most curricula, certainly at a post-graduate level but increasingly at an undergraduate level, now incorporates a variety of teaching and assessment approaches that include inter alia; formal lectures, group work, practical demonstrations, student delivered presentations and multi-media content. These approaches to teaching and assessment may be delivered in formal classrooms, laboratories, tutorial/seminar rooms and in some cases are blended in the physical and virtual environment. In order for these approaches to be effective, some thought needs to be given to the design of both the delivery spaces and the environments students and staff may use to prepare for these activities.

While significant attention has been devoted to the delivery spaces, there is increasing interest being devoted to spaces that support the learning endeavours such as libraries and computing labs. This paper will describe an attempt by Griffith to develop the Library space as a support space for student and academic approach to learning. It will discuss some of the frameworks utilised for development and evaluation of this space.
What happens here?

Student Characteristics

Lomas and Oblinger (2006, p.5.2) have identified “five... [student] characteristics... [that]... seemed particularly applicable for learning spaces”. These characteristics include:

- **Digital**: adopting digital technology to engage with the world for both work and pleasure.
- **Mobile**: using a range of devices to bring their preferred digital environments to campus with them.
- **Independent**: “Individuals surf the Internet to uncover facts, chase down links of interest, and then aggregate and synthesise information. This self reliance reveals that many of today’s students are self-directed, internally motivated, and inquisitive.” (2006 p.5.2)
- **Social**: students are comfortable to engage in loosely formed groups that change as their needs change.
- **Participatory**: students often engage in using a range of communication technologies and mediums to contribute to corporate good. Examples of this may include blogs, social networking websites (such has Flickr, Facebook and mySpace).

How is the Space Used?

Our final framework was based on a distillation of literature in architecture, design, social psychology, psychiatry and marketing and promotion. From our reading, we believe the dominant factors that needed to be considered in maximising the ambience or shaping learning behaviour in any space would include:

- **Maximising natural light** -- ensuring all spaces that are to be used for any length of time have as much ambient, natural light as possible.
- **Bringing the outside in** -- related to light, Griffith has significant natural bush assets, so attempts were made to engage the users of the space with the outside natural surroundings.
- **Zoning of activity** -- using zoning to identify behaviours or activities appropriate to the space (e.g. quiet zones, mobile friendly zones, noisy zones etc).
- **Declaration of function** -- the notion that a student could identify behaviour appropriate to the space as they approach it from the outside rather than relying on signs to inform or influence their behaviour.
- **Use of colour** – using a range of colours in spaces to influence the mood and/ or behaviour of the users in the space.
- **Use of textures and materials** -- to control sound, lighting and to give tactile feedback.
- **Using familiar objects (or props)** to establish standards of behaviour or use -- e.g. having lounges and bean bags in more casual areas and study carrels in quiet study areas.
- **Flexibility of function** to allow spaces to change and adapt to different uses dependent on the time of the semester or group that was using the space.
- **Providing technology** to support a range of behaviours in the environment -- ensuring access to necessities to allow students to maximise the use of the environment including wireless network, power, whiteboards, A. M. X. panels etc.
The Griffith Zones

Using these frameworks Griffith has built a range of formal and informal zones in its libraries. The three formal zones include a ‘Collaboration Zone’, a ‘Research Zone’ and a ‘Learning Zone’.

Collaboration Zone

Firstly, this zone is designed as the space for users to congregate in groups to collaborate on work, study or projects, or just to meet in preparation to go elsewhere as their work/study/learning needs dictate. This zone contains a mixture of seating, including beanbags, wheeled chairs, light movable chairs, tables and whiteboards and lounge furniture. This furniture can be moved to facilitate the formation of transient groups and activities. In addition, these zones contain DVD players and large flat panel screens where students and staff can watch DVDs for coursework or research or other significant events such as the recent Olympics. This space is often noisy and filled with undergraduate and postgraduate student users. Users in this area are more likely to be a younger population (Gen X or Gen Y).

Research Zone

Secondly, this space is designed as a more traditional library space for users who wish to use more specialised equipment (such as microfiche on microfilm), non-networked databases (such as early CD ROM based ABS statistics or specialist databases) or library reference materials. This zone contains more fixed furniture and larger desks (to allow clients to spread materials out), and more single workspaces. It is a quiet study area and is inhabited more frequently by postgraduate students or more mature students and staff.

Learning Zone

Thirdly, this zone is designed to provide an easier interface between students and library teaching and support staff (such as Learning Advisors and Computer or Information Literacy Specialists). This space contains a mixture of study booths that will seat up to eight people, larger four person movable tables and presentation practice rooms. Along the sides of this zone are the offices for library teaching staff and more specialised training rooms (including dedicated training computer labs). This space is not intended to only be used by students who wish to see our staff but it is attractive to students waiting for workshops or individual appointments. This space encourages quiet conversations not noisy interactions. During SWAT and exam periods this area becomes a silent study zone.

Informal Zones

The informal zones include our library collections area and a quiet study zone.

Collections Area and Quiet Study Zone

Griffith has also standardised some features of its library layouts. In our multi-floor libraries, we have separated the noisy areas (including Collaboration Zone, entrances and print areas) from the quiet areas (such as collections and quiet, individual study spaces). On all three campuses where we have multi-story buildings, the entrance floor is a
Table 1. (Jamieson et al., 2000, 231-232) Space Design Principles Evaluation.

<table>
<thead>
<tr>
<th>Principle</th>
<th>Provision for and some early experiences with refurbished library spaces</th>
</tr>
</thead>
</table>
| 1. Design space for multiple uses concurrently and consecutively. | Provision: spaces should be able to be adapted to fit the needs of multiple student groups to support their learning styles.  
Experience: The furniture, props and zoning of spaces allow students to arrange the study space, according to the individual or group’s needs. Students are able to assemble tables/chairs/beanbags/two-way whiteboards/ to meet their preferred approach to practice in the collaboration and learning zones. The Library, more generally provides spaces that allow for a range of study modes, including quiet study, (collection and quiet zone), Research (Research Zone), and group work (Collaboration, Zone). A significant number of loan laptops have been made available in the many of the libraries. |
| 2. Design to maximise the inherent flexibility within each space. | Provision: Learning and Research zones contain a range of movable chairs/tables/beanbags/whiteboards that maximise flexibility.  
Experience: As indicated in Principle 1, students can manipulate props to fit appropriate study styles. During different parts of the semester, students may move furniture to allow for larger study groups and projects, while during SWAT, they may form small study cells. |
| 3. Design to make use of vertical dimension in facilities. | Provision: where possible, walls have been used to extend the workable space by a flat screen monitors, whiteboards and data projected images.  
Experience: whiteboards and flat screen TV monitors have been used extensively for both study person purposes, entertainment (screening Olympics) and messaging by students. |
| 4. Design to integrate previously discreet campus functions. | Provision: multimedia content developed for a range of university services are played on flat screen panels in the Library.  
Experience: the university services are played on the library flat- screen panels. An evaluation of the impact of promotion of services will be conducted in early 2009. |
| 5. Design features and functions to maximise teacher/ student control. | Provision: Spaces are made available for the library user to adapt to meet their needs. Props are portable where possible and users are given access to control electronic equipment in the environment.  
Experience: Users move furniture and other props around the Library. Extensive use is made of whiteboard spaces and flat panels are used with limited staff intervention. |
| 6. Design to maximise alignment of different curricula activities. | Provision: All refurbished libraries have space to support aspects of academic activity including research, group work, individual study and multi-media work.  
Experience: All refurbished libraries have spaces for group collaboration, multi-media computer labs, a quiet research area and individual study. Our most recently refurbished library at the Gold Coast has a presentation practice area. |
| 7. Design to maximise student access to, use and ownership of, the environment. | Provision: All areas are available for the students to use and manage themselves.  
Experience: Students are able to use any of the areas set aside for their use at any time the Library is open. |
### Table 2. Student Characteristics and how our library spaces support them. (Adapted from: Lomas and Oblinger's 2006 p.5.2)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Provision for support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital.</td>
<td>All Griffith libraries have ubiquitous wireless access, good mobile phone coverage, and computing labs to allow students to be constantly connected to access material for both study and personal interest.</td>
</tr>
<tr>
<td>Mobile.</td>
<td>All refurbished libraries in addition to the above facilities have free laptop loans available for students as well as a significant number of power outlets to keep devices charged.</td>
</tr>
<tr>
<td>Independent.</td>
<td>All libraries offer courses and training programmes to support students develop an independent, self-regulated approach to learning.</td>
</tr>
<tr>
<td>Social.</td>
<td>The Collaboration Zone has been designed to allow a broad range of groups to function based on the student needs at different times of the semester.</td>
</tr>
<tr>
<td>Participatory.</td>
<td>As indicated above, extensive services have been implemented to allow for ubiquitous access to a broad range of work and social networking opportunities.</td>
</tr>
</tbody>
</table>

### Table 3. Dominant Factors designed to increase ambience of refurbished spaces.

<table>
<thead>
<tr>
<th>Dominant Factors</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Light.</td>
<td>All spaces/rooms have outside windows with natural light in at least some part of the space.</td>
</tr>
<tr>
<td>Outside In.</td>
<td>All spaces/rooms have outside windows that afford a view outside in at least some part of the space.</td>
</tr>
<tr>
<td>Zoning of Activity.</td>
<td>The Library has a range of zones that reflect each of the dominant activities of the curriculum.</td>
</tr>
<tr>
<td>Declaration of Function.</td>
<td>All areas afford an entrance area or a transition space outside the area that allows users to stop and observe the appropriate behaviour expected in the area. Limited numbers of signs exist to reinforce behaviours where necessary.</td>
</tr>
<tr>
<td>Use of Colour.</td>
<td>The Library has adopted a vibrant range of colours that vary between zones based on expected functions.</td>
</tr>
<tr>
<td>Textures and materials.</td>
<td>Textures and materials vary around the zones dependent on function. High pile carpet has been used in quiet areas to reduce noise of ambient traffic. There is a range of soft furnishings available to users based on availability and preference.</td>
</tr>
<tr>
<td>Familiar Props.</td>
<td>Large tables with multiple chairs have been used in areas where noise and collaboration is sanctioned. Specially designed seating, general power outlets and boutique tables have been installed in areas where high laptop use is expected. Single study booths and tables with limited chairs have been provided in areas where quiet study is expected.</td>
</tr>
<tr>
<td>Flexibility of Space.</td>
<td>See point 2 in Table 1.</td>
</tr>
<tr>
<td>Provide spaces to Support Technology.</td>
<td>The Library has ubiquitous wireless access. General power outlets have been installed extensively to recharge portable devices. Presentation practice rooms are equipped with technology consistent with their use.</td>
</tr>
</tbody>
</table>
Evaluation of spaces against the principles

Using the framework adopted by Jamieson et al., 2000 Table 1 outlines how experiences align with the espoused principles.

Reflections on the Approach

The use of this simple, tabulated approach has helped Griffith to focus on some key driving principles in designing a space to support the teaching and research functions of the university. These frameworks were used extensively in our discussions with architects and builders and assisted in supporting our decision making processes as the “Design and Construct” process evolved. The frameworks enabled all those involved to understand the key principles and to have a common understanding of the design objectives of the space. We also believe it helped in clarifying to all parties the criteria we would use to judge the refurbishment a success.

Obviously these were not the only inputs to design and will not be the only criteria for evaluation. We also sought (and received extensive) input from students/users (through the use of suggestion boards painted on walls in the refurbished library, a mySpace page and food for comment deals), and engaged a marketing researcher to undertake a qualitative study of student perceptions and desires prior to refurbishment. Following the refurbishment, we also intend to conduct student surveys and focus groups to solicit input on satisfaction, functionality and ambience. We are also proposing to undertake video surveillance and areas to assess use and observe user activity patterns.

Conclusion

In this paper we have described Griffith’s development of the Library space as a support space for student and academic work. The designing of the space was premised on supporting the key activities of teaching and learning and research in the university and informed by some key frameworks we used for development and evaluation of this space.

References

