

**Title**

*An examination of the views of key stakeholders on the development of learning spaces at a regional university*

**Author**

Barrie Todhunter, University of Southern Queensland

**Abstract**

*Purpose* – This paper examines the degree of alignment between the views of key stakeholders on the development of learning spaces in a new teaching and learning building at a satellite campus of a regional university.

*Design/methodology/approach* – Semi-structured interviews were undertaken with six stakeholders including senior executives, technical staff, academic staff and students. The interviews were transcribed and the data analysed to identify common and differing themes on the part of the respective interviewees in relation to learning spaces in general and in relation to the new teaching and learning building in particular.

*Findings* – A comprehensive framework should be articulated by the university for its theme of personalised learning so that decisions can be made at lower levels of the university to operationalise the theme across academic and administrative functions. A clear definition of the blended learning pedagogy that is proposed to be implemented as part of the personalised learning theme should be articulated. The implications of the blended learning pedagogy for the design of learning spaces should be identified and clear design guidelines for learning spaces should be articulated. Learning spaces in the new building should be reviewed to achieve alignment with the personalised learning framework and the guidelines for learning spaces.

*Originality/value* – This paper provides valuable insights into how a university's philosophy on learning spaces manifests itself through creation and implementation of high level policy and how that is interpreted and actioned by a range of stakeholders across campuses, including staff and students.

*Keywords* – Learning spaces, higher education, alignment, regional university, satellite campus

*Paper type* - Research paper

## 1. Introduction

In this pilot study, the author examines perceptions of learning spaces held by a small but important cross-section of stakeholders in the context of a new learning and teaching facility under construction on a satellite campus of a regional Australian university. At the time of writing, the new building project had just begun construction and has highlighted the need for greater clarity on the type and nature of learning spaces required for a regional university that specialises in distance education. Semi-structured interviews have been undertaken with representatives of key stakeholders in this project, and the data has been analysed to identify the level of alignment between their views on the nature and role of learning spaces in the context of the new building.

## 2. Research problem and selection of theoretical framework

The new Education Gateway (EDGY) building is in the early stages of construction but there has been little in the way of consultation with, nor input from, stakeholders such as academic staff and students as to what learning spaces will be created as part of this project. However, detailed analysis

of the building design and services does not form part of this pilot study. To examine this issue of alignment of stakeholder expectations, the author has interviewed a small but important range of key stakeholders to ascertain what their expectations are from this new facility, and to determine if those expectations are aligned and consistent with what is likely to be delivered based on preliminary designs that have been made available for the purpose of this investigation. The stakeholders interviewed cover a range from senior executives to academics and students. Because of the small numbers, details of the individuals are not provided in order to protect their anonymity which is a condition of ethics approval and normal research protocols. To carry out semi-structured interviews with the stakeholders, it was necessary to identify a suitable framework for the questions and this section examines the nature of learning spaces, the key outcomes of prior research and frameworks that may be appropriate for this study.

The EDGY building is four storeys containing a central learning commons, library services, collaborative and configurable learning spaces, specialist teaching spaces, individual and group study areas and staff accommodation, and is intended to be a state-of-the-art 5-star Green Star rated building (<http://www.usq.edu.au/springfield/new-build>). The university has approximately 80 per cent of students who study at a distance and the new facilities will cater for face-to-face teaching as well as providing blended learning facilities (Milne, 2006, Keppell and Riddle, 2012). As a specialist dual-mode university, its pedagogy for facilitating an effective learning environment for off-campus students is constantly evolving (Weaver, 2006, Radcliffe, 2008, McLaughlin and Faulkner, 2012) and the new building will have to be sufficiently flexible.

The concept of 'learning spaces' has historically evoked images of physical teaching spaces, predominantly lecture theatres but has broadened to include student-focused learning spaces such as libraries and other informal commons-type spaces, off-campus learning spaces as well as virtual learning spaces (Keppell and Riddle, 2012). This study focuses on how the desire to improve learning outcomes manifests itself in the creation of new learning spaces, and how they can also cater for the needs of students who do not attend on-campus lectures. This is an important consideration in this study as the university has a high proportion of off-campus students.

Campus design has remained largely unchanged throughout the twentieth century with a clear separation of academic staff areas from student learning spaces (Jamieson *et al.*, 2000, Wood *et al.*, 2012). This creates an 'authority structure and power relation that undermines the creation of collaborative learning communities which universities claim in their vision statements' (Jamieson *et al.*, 2000, p. 3). Edwards (2000, cited in Jamieson, 2003, p. 121) adds that 'the university environment is part of the learning experience and buildings need to be silent teachers' (2000, cited in Jamieson, 2003, p. 121). Long and Ehrmann (2005, p. 44) ask 'where does academic learning really take place?' as learning spaces may be seen as all of those spaces 'in which learning occurs, from real to virtual, from classroom to chat room' (Johnson and Lomas, 2005, p. 20). Designers of learning and teaching facilities often make 'critical assumptions about how teachers and students will act' (Jamieson *et al.*, 2000, p. 5) and this can result in the ongoing 'reproduction of the existing architectural-pedagogical paradigm' (2000, p. 5).

Space is neither 'innocent nor neutral: it is an instrument of the political; it has a performative aspect for whoever inhabits it; it works on its occupants' (Pouler, cited in Jamieson, 2003, p. 121). The priority of many higher education institutions undertaking new building projects 'has been to

create architectural icons' (Jamieson, 2003, p. 120), reflected in the design statement of the EDGY building to 'reinforce the 'edginess' and buzz of an iconic hub for innovation in learning and teaching' (University of Southern Queensland, 2010, p. 9). The Space Management Group (2006) has questioned the future relevance of the location of a university's campus and universities may increasingly 'move outside of the physical container of their own buildings' (Harrison & Dugdale, 2004, cited in Space Management Group, 2006, p. 6). To achieve more than just an iconic new building, the university should 'clearly articulate its learning objectives and... curriculum redesign in the planning process for new learning spaces', academic staff 'should play a central, not peripheral, role in planning groups' (Lippincott, 2009, p. 24) and the design of learning spaces should be 'identified as an academic development issue' (Jamieson, 2003, p. 123).

Whiteside et al. (2010, p. 14) indicate that less than four per cent of students' study time was spent in formal classroom environments. Around 60 per cent of time was spent studying at home and around 30 per cent was shared between the library, informal spaces on campus and other learning spaces off campus. Learning is becoming 'more social and informal and less structured' (Milne, 2006, n.p.). The learning space continuum has 'wholly independent self-directed unstructured learning at one end and structured teacher-led didactic learning environments at the other' (Wilson, 2009, p. 20). Strange and Banning (2001, cited in Temple, 2008, p. 236) suggest that universities should provide students with 'a 'socially catalytic' 'third place', neither where you live nor work, a place to 'hang out', where new relationships may be explored and existing ones deepened'. Learning spaces must accommodate the needs of many types of students and should 'support many styles of learning, be versatile, comfortable and attractive, rich with information and reliable technology, maintained and accessible' (Siddall, 2006, cited in Radcliffe *et al.*, 2008, p. 11).

Wilson (2009, p. 20) suggests that 'every coffee shop, every corridor, every courtyard is incorporated into the design' of new learning spaces'. Strange and Banning (cited in Wolff, 2002, p. 51) indicate that the student learning environment should offer a comprehensive range of spaces including 'gathering spaces, planning spaces, resource spaces (e.g. library, media, technology, faculty offices), exploration and discovery spaces, production spaces, practice spaces, presentation spaces, community spaces, direct instructional spaces, informal instructional spaces, and quiet, reflective spaces'. Universities are now providing 'spillover spaces' (Van Notes Chism, 2002, cited in Chang *et al.*, 2009, p. 2) using metaphors such as learning streets, watering holes and caves (Chang *et al.*, 2009, p. 2). Wood, Warwick and Cox (2012, p. 68) developed the 'DEEP' (Dynamic, Engaging, Ecological, Participatory) framework for evaluation of learning spaces which considers the design, evolving relationships and pedagogies related to learning spaces. Wolff (2002) concludes that the following framework and elements must be considered for the optimal collaborative, project-based learning experience: Structural aspects, Functional spaces, Adjacencies, Furnishings, Psychological/physiological support, Group size' (Wolff, 2002, p. 59).

Radcliffe (2008, p. 13) has developed a high-level conceptual framework for learning spaces comprising elements of pedagogy, space and technology (PST) as indicated in Figure 1. The sequencing of the items in the framework – pedagogy-space-technology - is intentional and each of the three elements influences the other. He suggests that 'pedagogy seems to be the logical element to consider first, then space and finally technology' (Radcliffe, 2008, p. 14).

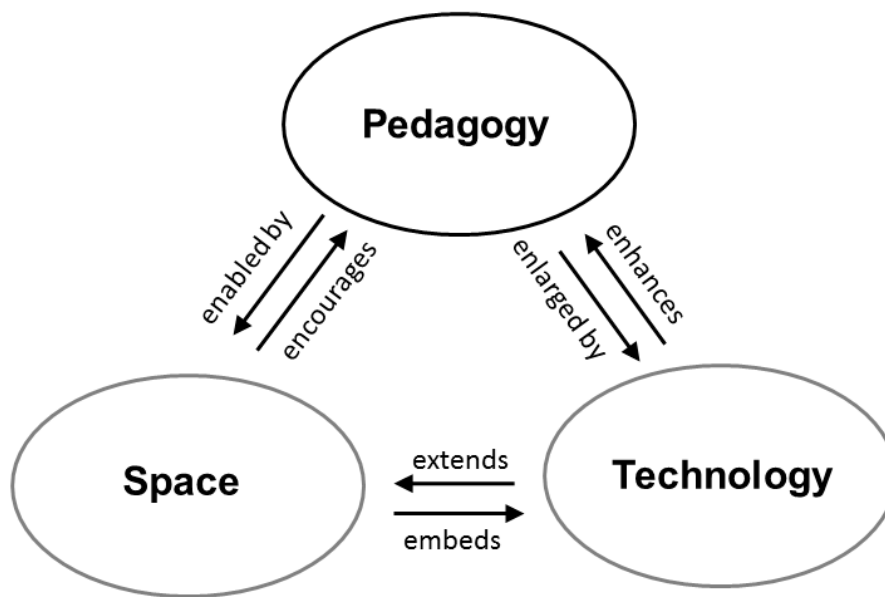


Figure 1: The PST (Pedagogy, Space and Time) conceptual framework for learning spaces  
(Source: Radcliffe, 2008, p. 13)

An expanded theoretical framework based on the PST model was developed for the interview stage of this study and adds consideration of the governance framework within which decision-making on learning spaces takes place, divides pedagogy into the two sub-themes of pedagogical framework and the actual teaching and learning activities, and considers the physical and affective dimensions of space. The modified framework comprises six themes:

1. The **organisational vision, culture and/or values** of the university (not specifically covered by the PST framework) (Values)
2. The **pedagogical** framework (Pedagogy)
3. Learning and teaching **activities and tasks** (Pedagogy)
4. The **physical attributes** of the space (Space)
5. The **affective attributes** of the space (Space)
6. The **technology** infrastructure (Technology)

### 3. Research question and literature review

Based on the framework adopted for this study, the following section examines the theoretical underpinnings of the six dimensions of learning spaces to be explored through the interviews. Each interviewee will be asked about each of the six dimensions in order to determine the level of alignment, if any, between their views and expectations of learning spaces to be provided as part of this project. Senior executive staff at the university have indicated anecdotally that they see the new

formal learning spaces facilitating 'blended learning' where on-campus and off-campus students will engage in learning in a synchronous model. The university has adopted a formal definition of blended learning that provides little clarity on how blended learning will take place and how the new learning spaces will be used. Blended learning is defined as one that 'combines different technologies, in particular a combination of traditional (e.g. face to face instruction) and online teaching approaches and media' (<http://policy.usq.edu.au/documents.php?id=14156PL>). There are few clues nor guidelines as to how the new building project will facilitate learning through creation of informal learning spaces.

### *The impact of the organisational context on learning spaces – the promise, vision, culture and/or values*

The university's USQ 2022 Vision is captured under four themes of personalised learning, focused research, enriched communities and engaged enterprise, and the design of the new EDGY building will reflect the value that the university suggests it places on the importance of learning spaces (University of Southern Queensland, 2012). The promise for personalised learning is to 'partner with learners in the pursuit of their study objectives regardless of their background, location or stage in life' (University of Southern Queensland, 2012, p. 7). The personalised learning promise also includes accessibility and opportunities for engagement, and these have implications for learning spaces and the emerging technologies to be harnessed to enable collaborative learning regardless of location or lifestyle (University of Southern Queensland, 2012).

The design of university buildings expresses 'the mission of the university in built form' (Temple, 2008, p. 230) and McLaughlin and Faulkner (2012, p. 141) suggest that 'learning spaces...indirectly convey the University mission'. Design consultants will rarely have a deep understanding of issues related to higher education and/or individual institutions as few develop a deep specialisation in such sectors. They are caught between competing pressure points and without a precise performance-based design brief from the university, objectives for learning spaces may be compromised. Although universities are seen to hold high values, they tend to adopt practices that 'minimize risk, maintain conformity and thereby inhibit critique' (Rowland, 2001, cited in Jamieson, 2003, p. 126). It remains the university's responsibility to identify and clearly define its needs so that the architect can produce an appropriate design solution that supports the university community and 'fosters its uniqueness' (Wedge and Kearns, 2005, p. 34). The Learning Gateway building at the University of Cumbria is a similar development but 'did not specify the number or size of rooms but instead spoke of interactivity, flexibility, innovation and institutional pride' (Weaver, 2006, p. 114). Practical guidelines were defined in that learning spaces should be 'future proofed' and not dependent on current technology, support students' own technologies, have comfortable seating, and provide access to power and Wi-Fi, flexible access, proximity to food facilities and inclusion of 'sandpit' or experimental spaces (Souter *et al.*, 2011, p. 20).

### *The impact of the pedagogical context on learning spaces*

Space is not regarded as a passive 'container' or mere backdrop to the learning and teaching process (Wood *et al.*, 2012, p. 70), nor is it 'a neutral background for activity' (Westberry *et al.*, 2013, p. 503). Learning and teaching in higher education still remain 'deeply embodied and meaningful social events situated in real places rather than in some dislocated, depersonalised 'non-place'' (Halilovich *et al.*, 2013, p. 175). They reflect the sponsor's and designer's philosophies and pedagogical beliefs

on how learning takes place, but academic staff who are not comfortable with collaborative learning environments tend to revert to old habits and to 'alter the most innovative spaces so that the rooms would have a 'lecture room' feel' (Hunley & Schaller, cited in Brown, 2009, p. 69).

Formal lecture theatres have been described as manifestations of power between the lecturer and student that 'reinforce the use of teacher-centred pedagogical approaches' (Biggs, 2001, cited in Robertson *et al.*, 2012, p. 2), but changes to the design of the learning space can be an effective 'agent for changing those practices' (Robertson *et al.*, 2012, p. 2). Both teachers and students require learning spaces 'within which they co-construct their educational practices through meaningful interactions' Crisp (2012, p. 200), and to motivate learners and promote learning, JISC suggests that learning spaces should be:

- 'Flexible – to accommodate current and evolving pedagogies;
- Future proofed – to enable space to be re-allocated and reconfigured;
- Bold – to look beyond tried and tested technologies and pedagogies;
- Creative – to energise and inspire learners and tutors;
- Supportive – to develop the potential of all learners; and
- Enterprising – to make each space capable of supporting different purposes' (JISC, 2006, cited in Radcliffe *et al.*, 2008, p. 11).

Informal learning results 'from daily, social life activities related to education' (Trinder *et al.*, 2008, cited in Chang *et al.*, 2009, p. 2), and may be intentional or non-intentional (incidental) from the learner's perspective' (Chang *et al.*, 2009, p. 2). Learning is now 'leaving the classroom' (Roberts and Weaver, 2006, p. 97) and 'digital devices can turn almost any space outside the classroom into an informal learning space' (Johnson and Lomas, 2005, p. 16). Contemporary designs for learning and teaching spaces place the emphasis on 'high-quality social space as a central focal point in the building' (Higher Education Funding Council for England, 2006, slide 28).

#### *The impact of teaching and learning activities on learning spaces*

Learning spaces should be mapped to the learning and teaching activities and placed into a social zone, a group collaborative/interactive zone, a group creative/presentation zone, and an individual study zone through which 'learners move from noisy spaces to quiet spaces' (Oakley, 2009, p. 95). Metaphors reflect the nature of such spaces including the Campfire where students can embrace traditional knowledge, the Watering Hole where students can gather informally, the Cave for quiet reflective work, and the Mountaintop as a space for presenting work to others (Souter *et al.*, 2011, p. 20).

The current focus on learning outcomes is on 'what graduates can do, not just about what they know' (Long and Ehrmann, 2005, p. 54) and students spend time 'pulling together the strands of what they have learned in order to tackle authentic problems in their fields' (2005, p. 54). Learning spaces should focus on 'verbs that describe what people should be able to do in learning spaces' (Brown, 2009, p. 65) including thinking/conceiving spaces, designing spaces, presenting spaces, collaborating spaces, debating or negotiating spaces, documenting spaces, implementing/associating spaces, practicing spaces, sensing spaces and operating spaces (Long and Ehrmann, 2005, p. 55).

#### *The impact of the physical environment on learning spaces*

Students and staff experience space at a personal level (Milne, 2006), and more creative designs of room layouts can improve engagement between students and teachers and improve attendance and participation (Space Management Group, 2006). Students report that the 'timetabled facility dictated the teaching style (McLaughlin and Faulkner, 2012, p. 148) whereas learning spaces should 'promote the integration of basic human needs and desires (e.g., eating, drinking, and enjoyment) with learning activities' (Hunley and Schaller, 2009, p. 28). Interaction between students and staff should be encouraged through the location of informal learning spaces close to the offices of academic staff, because where faculty are 'tucked away from students or from one another' (Hunley and Schaller, 2009, p. 32), this can create a sense of isolation which is detrimental to the formation of valuable student and faculty relationships.

The design of 'learning ecologies' (Thomas, 2010, p. 510) is more akin to art than science and there is a need to shift the locus of control 'from the traditional conception of learning space planning as the exclusive province of architects and physical facility planners' (2010, p. 510) to include participation by those engaged in the process of learning and teaching. A previous university project revealed shortcomings in the design of a learning space because 'there was little evidence of consultation with the student body' (Reushle, 2012, p. 93). Fleming and Storr (1999) examined the significance of individual design variables of lecture theatres to students and found that students' top five concerns out of 16 variables were with the quality of audio-visual equipment, desk space, visibility of visual displays, acoustic qualities, and seating comfort. The physical learning space should function 'as a teaching and learning shell' (Jamieson *et al.*, 2000, p. 12) and reflect the pedagogy of the activities to be undertaken. They should allow multiple uses concurrently and consecutively to 'maximise student access to, use and ownership of the learning environment' (Jamieson *et al.*, 2000, p. 6). Effective design of learning spaces necessitates: a clear identification of the institutional context; a clear statement of the learning principles and pedagogy; definition of the learning activities; a defined set of requirements for the physical space; and a methodology for assessing the success or otherwise of the design outcomes (Johnson and Lomas, 2005, p. 28).

### *The impact of affective attributes on learning spaces*

The spaces in which we work, live, and learn 'can have profound effects on how we feel, how we behave, how we perform and can affect different people differently' (Watson, 2007, cited in Souter *et al.*, 2011, p. 7). A synomorphic relationship exists 'when physical and behavioural aspects of a setting are compatible' (Strange & Banning, cited in Wolff, 2002, p. 58), and students react positively to learning spaces 'that treat them with respect, that are serious, and that encourage interaction with other students and faculty' (Hunley and Schaller, 2009, p. 28). In a study of high school students about to enter university, Price *et al.* (2009) reveal the importance of social and networking spaces to these students and reflects their expectations of the learning environment when they arrive at university.

Effective learning environments require input from the disciplines of 'architecture, design, social psychology, psychiatry and marketing and promotion' (Graves and Berg, 2009, p. 68). Learning spaces that consider the emotional dimensions of that space should; have ambient, natural light; engage the users of the space; create zoning to identify appropriate behaviours, activities and noise levels; use colours to influence the mood and/or behaviour of the users; use textures and materials to control acoustics; have appropriate seating arrangements and furniture and study carrels in quiet

study areas be adaptable to students' activities and needs; and provide appropriate technology (Graves and Berg, 2009, p. 68).

#### *The impact of technology on learning spaces*

For networked learners (Steeple et al., 2002), learning spaces should be 'technologically sophisticated and technologically invisible' (Long and Ehrmann, 2005, p. 52). Digital technologies have encouraged students to use digital devices as they 'congregate in every corner of the campus' (Milne, 2007, p. 18), creating a myriad of informal 'digital learning spaces' (Bomsdorf, 2005, p. 6). 'Cooperative buildings' are distributed classrooms where students can meet with academic staff and other students, both on-campus and off-campus (Long and Ehrmann, 2005, p. 50) through inconspicuous web-based connectivity (Souter et al., 2011). This 'building operating system' (or BOS) (Long and Ehrmann, 2005) should include functionalities that: allow real-time recording of informal and formal learning; writable surfaces that allow the capture of everything written on them; classroom chat rooms; dynamically-available bandwidth; ubiquitous access to videoconferencing; real-time capture of asynchronous discussions; and tools enabling ad hoc guest instructors to participate from off-campus (Long and Ehrmann, 2005, p. 46).

'Personalised learning' (University of Southern Queensland, 2012) may be assisted through technologies by 'adapting information they provide to the context of the person' (Hakkinen and Hamalainen, 2012, p. 231). Ubiquitous technologies can help to 'make information available to each learner at any time and place (Hakkinen and Hamalainen, 2012, p. 231), and 'facilitate collaboration, communication, and learning' (Hunt et al., 2012, p. 188).

## **4. Methodology**

The research problem addressed by this study is to investigate the level of alignment, if any, between the views of representatives of key stakeholder groups in the university in relation to a major new teaching and learning building that has commenced construction on a satellite campus of a regional Australian university. The research question is 'What level of alignment, if any, exists between representatives of key stakeholder groups in relation to the provision of appropriate learning spaces in a new teaching and learning building'. To understand the level of alignment between their views, a qualitative approach has been taken using semi-structured interviews. Representatives of key stakeholder groups were identified to gain indicative views of those groups, including senior executive management, facilities management, academics and students. Details of individual interviewees are not provided as it would too easily lead to their identification. External consultants involved in the project were also to be interviewed but the replacement of the original design consultants with new consultants at the time of undertaking the study precluded this. Ethics approval for the research project was gained from the university's research ethics committee and approval was obtained from senior line management to interview the representatives from the respective cohorts.

As described earlier, an appropriate theoretical framework was identified for the study, adapted to suit the analysis and then used to develop a standard set of questions to gain stakeholder views on learning and teaching spaces in the context of the new EDGY building. These six themes have been explored in the interviews as *organisational* context, *pedagogical* context, learning and teaching



*activities, physical attributes, affective attributes and technological attributes.* An initial question was asked to gain insights into participants' perceptions of what the key issues were for the creation of effective learning spaces so these could be checked against the framework that was adopted.

Table 1: Interview questions and alignment to the theoretical framework

Interview question	Alignment to the PST framework
In a general context, what do you think are the key issues for the creation of effective ' <i>learning spaces</i> '?	Not aligned
Now, considering the issue of learning spaces in the context of USQ and the proposed new <b>EDGY building</b> :	
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of <b>organisational mission, vision, culture and/or values of USQ</b> would influence the creation of learning spaces?</li> </ul>	Not aligned
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of a <b>pedagogical framework</b> would influence the creation of learning spaces?</li> </ul>	Pedagogy
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of <b>learning and teaching activities and tasks</b> would influence the creation of learning spaces?</li> </ul>	Pedagogy
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of the <b>physical attributes of the building</b> would influence the creation of learning spaces?</li> </ul>	Space
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of <b>affective or emotional considerations</b> would influence the creation of learning spaces?</li> </ul>	Space
<ul style="list-style-type: none"> <li>In what ways, and to what extent, do you think consideration of <b>technology issues</b> would influence the creation of learning spaces?</li> </ul>	Technology
In summary, what do you think are the key <b>issues</b> that should be considered in relation to the creation of learning spaces in the new <b>EDGY building</b> at the Springfield Campus?	Not aligned

Semi-structured face-to-face interviews of approximately 30 to 60 minutes were then held with four staff members and two students over a period of about two weeks and each of the interviewees was asked the same questions. The sample of the study is small as it is a pilot study and it was never intended to undertake quantitative analysis of the responses. The interviews were digitally recorded with the permission of the participants and the recordings were transcribed by independent research assistants for analysis. Each interviewee was given an individual code in order to ensure confidentiality. The transcripts were sent to the interviewees for comment or amendment where they had requested the right to do so. The recordings and the final transcripts were imported into NVivo for analysis. The data were coded and analysed to identify any key themes that arose and to compare the responses to the questions on the six dimensions of the framework. Alignment or non-alignment of views along those dimensions are presented below. Comments by the respective participants are indicated as follows:

No.	Interviewee	Role
1	ES1	Executive staff 1
2	ES2	Executive staff 2
3	AS1	Academic staff 1

4	FS1	Facilities staff 1
5	ST1	Student 1
6	ST2	Student 2

## 5. Analysis and findings

This section provides the findings from the analysis of the data obtained from the interviews. It provides a summary of the key points for the university to consider, supported by extracts from the interviews.

### *The influence of the organisational mission, vision, culture and/or values on the effectiveness of learning spaces*

Participants presented a range of views on the impact of the university's mission, vision and/or culture on the development of learning spaces, with only a few referring to any of the four pillars in the Strategic Plan. Comments included 'not really too sure it has' (ES1), 'anytime, anyplace, isn't it?' (AS1), and 'I'm finding it hard to really pinpoint a culture because it's so vastly different between external studies through Toowoomba and on-campus study here, if that makes sense' (ST2). A student commented that 'I'm not a hundred percent sure what the overall pedagogical framework of the uni is' (ST1). The culture of the university was seen as being open and inclusive, consistent with the themes of personalised learning and enriched communities in that 'I just like the fact that our staff do have an open door policy'.

The concept of personalised learning was not well understood in that 'what does that mean? I don't really know, it could mean all sorts of...I don't think it's very clearly articulated' (ES1). One respondent thought that personalised learning is 'parallel with flexibility, and about being a mature individual that makes decisions about how they learn best, what strategies they use, how they best access resources and to be proactive about being a consumer of that learning' (AS1). One participant recognised that 'the mission and values of the university emphasise the need to ensure that the student is the number one priority' but commented that 'there is low attendance at those teaching spaces' and asked 'why aren't students coming to lectures?' (FS1). The university has templates for the design of learning spaces but there appears to be little input from the academic community as 'we don't have a lot of engagement with the academic world' and 'we don't get a lot of requests for looking at our learning spaces' (ST2).

On-campus learning spaces raise 'an equity issue if it's only offered to those people who can actually get to those physical spaces. Therefore what virtual space do we provide?' (AS1). In terms of on-campus and off-campus learning, 'there's always this tension with distance education universities; if you do too good a job of your distance provision if you like, you're not getting as many students to the physical environment, that's probably in the back of some people's mind' (ES2). Ownership and access to learning spaces was raised with students having a perception that many spaces were

inaccessible to them because of university rules. The university needs to 'empower the learner to use any space that they're in, or identify spaces that they're in for good learning interactions' (ES2).

### *The influence of the pedagogical context on the effectiveness of learning spaces*

Interviewees agreed that the pedagogical context would influence the design of the learning spaces in the EDGY building, but saw the pedagogical issues from different perspectives. Pedagogical beliefs and personal attributes of the learning facilitator were seen as the most critical issues for learning outcomes, with the actual learning space of minor importance. You can have 'great lecturers teaching in the Dickensian-style buildings and people will still love them and they will still love turning up to class. Why? Because the lecturers are engaging' (ES1). One participant argued that 70 per cent of the learning outcomes relate directly to the quality of the lecturer. There may be value in having 'majestic buildings' but 'some of the best lectures I've ever been to have been in the crappiest classrooms' (ES1).

Facilities staff are conscious of the changing nature of the learning patterns and the pedagogies that evolve to support them. There is an ongoing need for flexibility 'to allow a range of lecturers, academics in their preferred teaching modes to be able to use...those learning spaces in an efficient and effective manner' (FS1). Informal learning spaces were regarded as important, and it was seen to be of value to 'know psychologists... know accountants...it could be good to know all these different people to be able to link in with in the future' (ST1). Students see value in having 'some sort of area...staff are able to come down and just chill with us' (ST1), and 'outside study areas around the building would be good' (ST1). Informal learning spaces were also valued by off-campus students in that 'being able to access them on weekends is really helpful to me – I do use the library resources as well because I do a lot of online learning but I do like books; I do like to be able to hold them' (ST2). Students value informal learning spaces where they can 'put my stuff on the couch, sit on the floor and spread my stuff out on the floor' (ST1).

### *The influence of learning activities and tasks on the effectiveness of learning spaces*

One respondent indicated that in the early childhood sector 'we talk about the environment being the third teacher' (ST2). Lecturers want to use time with students 'not just for shovelling stuff in, but as a place where they're going to come away feeling like they've really engaged with something' (AS1). Some staff are seen to demand access to contemporary collaborative teaching and learning spaces 'and then they chalk and talk' (AS1). Learning activities should encourage 'throwing around ideas and going with it a bit more' (ST1) so that 'trust building collaboration happens' (AS1). Students believe small group activities are valuable because 'sometimes you don't know if you're on the right track until you have that conversation with people' (ST2).

Effective learning spaces must 'enhance engagement and motivate students to learn more' and involve them in 'authentic learning activities' (ES2) as 'classes are becoming more practical and hands on' (ST1) with problem-based learning that engages students in practical activities in an authentic learning environment. One student indicated that 'a lecture style, pure information delivery' is fine in a Harvard-style room with fixed seating, but 'to really...participate in small group work you need to move out of that space' (ST2).

The concept of blended learning was raised frequently and whether the outcomes of group work could be 'shared with other students over the course of the day even by email (ST2). It was seen that convergence of on-campus and off-campus learning activities is 'increasingly going to be the case' (FS1) but the challenge is in that 'you could design a whole thing around that and not have anyone who's got the motivation or the nous to actually make it work' (ES1).

### *The influence of physical attributes on the effectiveness of learning spaces*

If learning spaces are over-crowded, 'it automatically becomes noisy and not conducive to learning' (ST2). The opposite problem is 'where there are about ten of us in the class and by the end of semester there's two of us turning up and we're in this room made for 50 people' (ST1). The university has tertiary sector guidelines but questions arise 'about what size those classrooms should be' (FS1) and 'have we got the way of using those spaces correct?' (FS1). The National University of Singapore was mentioned where 'they've gone from large lecture rooms to smaller – 20, 30 – tutorial rooms' (ES2). The Charles Sturt University learning commons was praised in that they have 'a noisy space at the front which had high ceilings and lots of light, and coffee and so forth...then they had breakout tutorial rooms which are much quieter...then they had right at the back, quiet areas and the roof gradually tilted down to create the cave, so to speak, for the students to do their own work' (ES2).

Recently-constructed iconic learning and teaching buildings on nearby university campuses were criticised in that 'they have a WOW factor and there's no one in them, and why's that...they're fantastic buildings but what's the purpose of being here?' (ES1). 'Challenging environments' are important because universities 'are supposed to be at the forefront of learning and research' (FS1) but the challenge for designers is that 'it's back to that thing of trying to create an architecture that's as changeable as possible within the constraints of acoustic requirements and accessibility' (FS1).

Students value 'close proximity to the teacher' (ES2) and academic staff should be able to 'rapidly change the configuration should they wish to' (ES1) and 'the thing that comes back to me time and time again is how flexible students are in using spaces' (FS1). There is a desire for learning spaces 'where we can just...push stuff out of the way and just get a clear space to be able to move in' (ST1). This desire for reconfigurable learning spaces is tempered by the lack of manpower to 'manage a system where people have... to actually operate these things' (ES1) as 'high acoustically-rated, foldable, bi-fold sort of doors that require a fair degree of technical knowhow to install those, and time, don't work' (FS1). Students find the fully-enclosed large auditorium to be 'quite imposing and quite impersonal' (AS1). Transparent walls create a 'fishbowl' feel where 'everyone can look in and see what's going on' (ES1). A student noted that 'when I walk in I'm immediately conscious of what's in the room...how much natural light is coming in – that's important to me' because 'being able to see outside and to see green outside can be restful' (AS1).

Uncomfortable chairs 'are never going to help you think' (ST1), and 'if the comfort levels aren't there for areas where people are going to spend a lot of time they're not going to learn' (ES1). Students want to 'be able to decorate the walls and do something with the room instead of having it all plain all the time (ST1). Students look for spaces 'where it's just bean bags or stuff where you can just sit on the floor and work' (ST1). Students value 'somewhere dry that you can go and sit and work outside instead of always being inside' (ST1), and it was noted that 'even in Singapore which is a very humid and rainy area they had like picnic tables outside and they had power points covered over so

students could sit out there' (ES2). Where the temperature is uncomfortable 'people switch off because they've become focused on that' (ST2). One student requested kitchenettes and 'more student microwaves and little fridges around the place so that you can just stash your food somewhere instead of having to find your way all the way to student commons all the time' (ST1).

### *The influence of the affective attributes on the effectiveness of learning spaces*

Concerns about affective attributes tied in closely to the physical attributes such as natural light, comfort levels of furniture, the scale of learning spaces, temperature and noise, and it was noted that the University of Melbourne has 'a psychologist within the Vice-Chancellor's office whose sole role is to oversee any design before it goes forward to explore the psychological impact of those spaces' (FS1). Participants indicated a need for 'environments that are very welcoming and in some ways challenging' (FS1). Spaces are sought out 'that are comfortable and non-stressful' (AS1), 'where they can go and just veg out' (ES1). Learning spaces should be inclusive 'in terms of access to people who are disabled, and conscious and sensitive to people who are from different cultures', and which allow students to be 'comfortable both psychologically, physically' (ES2). Students would then be encouraged to spend more time on what are called 'Velcro campuses' (ES2), and this helps with the orientation and engagement of new students through facilitation of social interactions as 'universities can be horrendously lonely places' (ES1).

Students seek out 'a space that I can work in isolation...it needs to be quiet...there can't be any background noise in that space...and I can't have any distraction either' (ST2). Students are 'immediately conscious of what's in the room, how it's set out, how much natural light is coming in...the smell of the room' (ST2). Formal learning spaces should be 'interesting, even exciting spaces to be in, warm spaces that can generate...that you feel good to be within...not an impersonal grey environment that is typical of a classroom of the past.' (FS1). The colour of the paint 'can be a big thing...white can be...such a harsh colour almost' with a suggestion for 'making the colours a bit softer, more inviting' (ST1).

The comfort of the chairs adds to the casualness and helps to create 'an environment that's aesthetically inviting, relaxed because as soon as you sit on that chair you feel less tense' (AS1). Comfort levels were related to food and drink and 'keeping the ability to eat in the library would be awesome' (ST1). Students want to 'bring the coffee, and...we need to ensure our spaces cater for that' (FS1). Conversely, cleanliness and hygiene can be an issue as 'some of the lecture rooms are not particularly clean' (ST2) and that 'some of the other rooms you go in they're quite messy, there's shit all over the floors' (AS1).

### *The impact of technology on the effectiveness of learning spaces*

As for technology, 'fundamentally they all require wireless – simple as that' (ES1) and universities need to take account of the changing world in terms of mobility and globalisation' (ES2). Jobs in the future 'will require people to have high levels of digital literacies' (ES2) but often students do not have the level of technical skills that are assumed – they may have a 'rapport with technology, with the social media, but they have to be taught how to use it for learning and teaching' (ES2). The location of classroom technology is important in that 'if you need to use the computer then you're stuck up the front all the time because that's where the computer and everything is', and then 'I feel I'm preaching at people, talking at people instead of being able to really engage with them' (ST1).

Technology facilitates 'networked learning where they can actually interact with other students, both face-to-face and online' (ES2) but one lecturer is an 'advocate of some classrooms which are completely technology free' to encourage students to focus on their learning 'as opposed to being continually distracted by technology and the bells and whistles' (ES1). Some teaching spaces are 'almost too clever – you need a technician to be able to operate that for the academic' (FS1). Technology costs are a concern because of 'how quickly it goes out of date' (FS1), especially for a regional university that 'prides itself on such a high distant and on-line content' (FS1). Simple things like power points and Wi-Fi 'tend to be the big things we forget about' (ES2) as 'there are nowhere enough power outlets' (ST1).

Being mobile 'is going to become even more important in the future' and 'the blend of that physical, virtual and the blended environment is just going to change dramatically' (ES2). The effectiveness of blended learning was questioned in that 'people can watch lectures live but that's generally not a good experience' (ES1) and there are doubts as to 'whether they will stay engaged in a lecture' (ES1). There is a need for workable solutions to the problem of 'how does a distant student take part in that lecture in real time' (FS1). In the existing collaborative teaching spaces, the university has 'struggled with technology in those new rooms...multiple times screens haven't worked' (AS1) and that before there is investment in new technology it is important to 'ensure that what we already have works' (AS1). Technology only has to 'fail once and it's all over...people will not trust it again' (ES1).

#### *Considerations for the EDGY teaching and learning building - mission, values and pedagogy*

Participants were given an opportunity at the end of the interviews to summarise the key issues that should be considered in relation to the learning spaces in the new EDGY building and these are summarised below under: mission, values and pedagogy; and physical and affective attributes and technology.

The design and usage of the learning spaces must align with the predominant pedagogy to be adopted by the university and by the respective lecturers and students, and it is important 'for those spaces almost to try to be intuitive of what's coming' (FS1). One of the risks for poor utilisation of the learning spaces would be an 'ill-defined concept of blended learning' (ES1) which could tend to 'compromise the on-campus experience' (ES1). Blended learning is seen as 'a continuum that you can blend...you can have 90% face-to-face, 10% online; you could have 50/50; you could have asynchronous/synchronous' (ES2), and the challenge is to have 'the space available to cater to 200 students in a 100-person space' (ES2). Actual usage of the learning spaces is an issue in that 'if people aren't going to change, when they should change, you're wasting your time' (ES1). To gain maximum value from the learning spaces, it was felt that there is a need for 'training course for all lecturers to know how to utilise those facilities' (ES1), both pedagogically and functionally otherwise 'they will keep doing what they keep doing' (AS1).

Learning spaces should be located to encourage informal interaction between students and academic staff but it was acknowledged that those responsible for design and delivery of the EDGY building have not really 'consulted directly with the academic world to see how comfortable that debate is' (FS1). How do we 'encourage social interaction' between and among students and staff to improve learning outcomes (ES1) as face to face interaction is seen as 'so much more a richer experience than the impersonality of online conversation' (ST1)? Students want the ability to 'talk to

your friends and get their ideas of what is going on when you're completely confused...and annoy your lecturers about your 40 bazillion questions' (ST1).

### *Considerations for the EDGY teaching and learning building – physical and affective attributes and technology*

Changes to learning spaces should be possible 'without having to be highly disruptive in the space' (FS1). This necessitates the ability for 'rooms to be reconfigured and IT systems to be reconfigured' (ES1) and 'an architecture that's as changeable as possible within the constraints of acoustic requirements and accessibility' (FS1). Learning spaces must have 'must have lots of power points, Wi-Fi, ability to enable reconfiguration, to be able to embrace many different pedagogies' (ES2).

Students want spaces where you can go 'with the back pack' (ST1), somewhere with a 'quiet and calm ambience' (ST2). Finding an individual study space is 'the big thing because it can just get so noisy sometimes that you can't concentrate and you keep getting interrupted and you don't get anything done' (ST1) and this can simply be 'outside study areas around the building' (ST1). Adjacent to the university campus is a large public park which can be used as an informal learning space 'as they can have internet access anywhere in Robelle Domain' (AS1). Learning spaces are utilised every day of the week as 'our household is busy with children and dogs and neighbours' and 'I come here on the weekends and use the library space...just by myself' (ST2).

## **6. Conclusions and recommendations**

Based on the literature review and findings from the analysis of the interviews, conclusions and recommendations are provided below to ensure that learning spaces for the new building are aligned with the views and expectations of key stakeholder groups including students who study full-time or part-time in off-campus mode. Expectations are that physical and virtual access to learning spaces will be almost seamless and that facilities will reflect what is available in other aspects of students' lives socially, professionally and personally. Increasing use of sophisticated technology and mobile devices will reduce or eliminate the differences between on-campus and off-campus enrolment modes and they will gradually disappear. Learning spaces are seen as ubiquitous and connectivity through technology compensates for any inability to participate in learning activities in face-to-face mode.

### *Organisational mission, vision, culture and/or values:*

- Participants indicated that the university's message related to mission, vision, culture and values is not being articulated clearly in terms that are of benefit in the design of learning activities that reflect personalised learning and blended learning, nor in the creation of spaces that facilitate those learning activities.
- A comprehensive framework and policy should be articulated by the university for its theme of personalised learning so that decisions can be made at lower levels of the university to operationalise the theme across academic and administrative functions for better integration of on-campus and off-campus learning.

### *Pedagogical context*

- Participants at all levels differed in their understanding of what represented personalised learning and blended learning in the context of the university's vision for the integration of on-campus and off-campus teaching and learning.

- A clear definition of the blended learning pedagogy that is proposed to be implemented as part of the personalised learning theme should be articulated.
- This will allow implications for the development of appropriate teaching practices for synchronous engagement of on-campus and off-campus students to be defined, as well as the development of design guidelines for effective learning spaces for this mode of teaching and learning.
- Provision of well-designed and furnished informal learning spaces internally and externally should be incorporated into the design brief.

#### *Learning activities and tasks*

- Participants struggled to articulate what teaching and learning activities would be desirable and/or possible to better facilitate personalised learning and blended learning in the teaching and learning spaces to be provided in the new building.
- Based on the clear articulation of personalised learning and blended learning, academic support services should work with teaching staff to develop learning activities that take full advantage of the capabilities of the new learning spaces and the associated learning technologies.

#### *Physical attributes*

- Participants were consistent in their views that physical attributes of learning spaces should reflect the variety and evolving nature of activities that take place across the campus, both internally and externally.
- Care should be taken to ensure that unintended consequences of iconic attributes of learning spaces such as glazed walls to lecture theatres are not counterproductive and distracting to learning activities.
- Design guidelines for learning spaces should be reviewed to ensure that physical attributes of the learning spaces and furnishings are conducive to achievement of the best learning outcomes from the activities that the spaces support.

#### *Affective attributes*

- Student expectations of the feel of learning spaces are much higher, especially of informal learning spaces where comfortable and flexible social spaces are sought to reflect the collaborative nature of learning activities outside the classroom.
- Design guidelines for learning spaces should be reviewed to ensure that unintended affective attributes of those spaces and furnishings do not impede learning outcomes nor discourage use of those spaces for formal and informal learning activities.

#### *Technology*

- Staff and students have high expectations of technology to facilitate social, personal and learning activities throughout the campus. Informal learning spaces are third spaces to replicate the level of technology that is available at home, at work and in social settings.
- Based on the clear articulation of personalised learning and blended learning, technology requirements should be reviewed and revised where necessary to encourage and support collaborative networking and learning outcomes across all formal and informal learning spaces.

#### List of references

- Bomsdorf, B., (2005). Adaptation of learning spaces: Supporting ubiquitous learning in higher distance education. *Mobile Computing and Ambient Intelligence: The Challenge of Multimedia*. Dagstuhl, Germany.
- Brown, M., (2009). "Inversions", *EDUCAUSE review*, 44, pp. 64-70.



- Chang, R.L., Stern, L., Sondergaard, H. & Hadgraft, R., (Year). Places for learning engineering: A preliminary report on informal learning spaces. eds. *Research in Engineering Education Symposium*, Palm Cove, Queensland, pp. 2009.
- Crisp, G., (2012). Assessment in Virtual Learning Spaces. *Physical and Virtual Learning Spaces in Higher Education: Concepts for the Modern Learning Environment*. IGI Global, pp. 199-218.
- Fleming, D. & Storr, J., (1999). "The impact of lecture theatre design on learning experience", *Facilities*, 17, pp. 231-236.
- Graves, C. & Berg, E., (2009). Supporting Teaching and Learning through the Intelligent Design of Learning Support Spaces: A Griffith University Example. In D. Radcliffe, H. Wilson, D. Powell & B. Tibbetts (eds.) *Learning spaces in higher education: Positive outcomes by design*. University of Queensland: Brisbane, 67-72.
- Hakkinen, P. & Hamalainen, R., (2012). "Shared and Personal Learning Spaces: Challenges for Pedagogical Design", *Internet and Higher Education*, 15, pp. 231-236.
- Halilovich, H., Carbone, A. & Ross, B., (2013). Spaces where learning takes place: rethinking contemporary approaches to learning and teaching. In S. Frielick, N. Buissink-Smith, P. Wyse, J. Billot, J. Hallas & E. Whitehead (eds.) *36th HERDSA Annual International Conference*. Higher Education Research and Development Society of Australasia, Inc: AUT University, Auckland, New Zealand, 175-186.
- Higher Education Funding Council for England, (2006). *Designing spaces for effective learning: a guide to 21st century learning space design*. JISC Development Group: Bristol, UK.
- Hunley, S. & Schaller, M., (2009). "Assessment: The Key to Creating Spaces that Promote Learning", *Educause Review*, 44, pp. 26-28.
- Hunt, L., Huijser, H. & Sankey, M., (2012). Learning Spaces for the Digital Age: Blending Space with Pedagogy. *Physical and Virtual Learning Spaces in Higher Education: Concepts for the Modern Learning Environment*. IGI Global, pp. 182-197.
- Jamieson, P., (2003). "Designing more effective on-campus teaching and learning spaces: a role for academic developers", *International Journal for Academic Development*, 8, pp. 119-133.
- Jamieson, P., Fisher, K., Gilding, T., Taylor, P.G. & Trevitt, A., (2000). "Place and space in the design of new learning environments", *Higher Education Research and Development*, 19, pp. 221-236.
- Johnson, C. & Lomas, C.P., (2005). Design of the learning space: learning and design principles. *EDUCAUSE Review*. 16-28.
- Keppell, M. & Riddle, M., (2012). Distributed Learning Spaces: Physical, Blended and Virtual Learning Spaces in Higher Education. *Physical and Virtual Learning Spaces in Higher Education: Concepts for the Modern Learning Environment*. IGI Global, pp. 1-20.
- Lippincott, J.K., (2009). "Learning Spaces: Involving Faculty to Improve Pedagogy", *Educause Review*, 44, pp. 16-25.
- Long, P.D. & Ehrmann, S.C., (2005). "The future of the learning space: Breaking out of the box", *EDUCAUSE review*, 40, pp. 42-58.
- Mclaughlin, P. & Faulkner, J., (2012). "Flexible spaces ... what students expect from university facilities", *Journal of Facilities Management*, 10, pp. 140-149.
- Milne, A.J., (2006). "Designing blended learning space to the student experience", *Learning spaces*, pp. 11.1-11.15.
- Milne, A.J., (2007). "Entering the interaction age: Implementing a future vision for campus learning spaces", *Educause review*, 42, pp. 12-31.
- Oakley, S., (2009). The Thurgoona Learning Commons. In D. Radcliffe, H. Wilson, D. Powell & B. Tibbetts (eds.) *Learning spaces in higher education: Positive outcomes by design*. University of Queensland: Brisbane, 93-98.
- Price, I., Clark, E., Holland, M., Emerton, C. & Wolstenholme, C., (2009). *Condition Matters: pupil voices on the design and condition of secondary schools*. CfBT Education Trust: Reading, UK.

- Radcliffe, D., (2008). A pedagogy-spacetechnology (PST) framework for designing and evaluating learning places. *Next Generation Learning Spaces*. University of Queensland: University of Queensland, Brisbane.
- Radcliffe, D., Wilson, H., Powell, D. & Tibbetts, B., (2008). *Designing next generation places of learning: Collaboration at the pedagogy-space-technology nexus*. The University of Queensland.
- Reushle, S., (2012). Designing and Evaluating Learning Spaces: PaSsPorT and Design-Based Research. *Physical and Virtual Learning Spaces in Higher Education: Concepts for the Modern Learning Environment*. IGI Global: Hershey, USA, pp. 87-101.
- Roberts, S. & Weaver, M., (2006). "Spaces for learners and learning: evaluating the impact of technology-rich learning spaces", *New Review of Academic Librarianship*, 12, pp. 95-107.
- Robertson, G., Baumann, C., Bilgin, A.A., Bulger, D., Coutts, P.M., Engel, R.M., Giuriato, R., Gudlaugsdottir, S., Rigney, C. & Tomossy, G.F., (2012). The Impact of space on students' perceptions of the value and quality of their learning experience : a case study of the Collaborative Learning Forum.
- Souter, K., Riddle, M., Sellers, W. & Keppell, M., (2011). *Spaces for Knowledge Generation*. Australian Learning and Teaching Council Limited: Canberra.
- Space Management Group, (2006). *Impact on space of future changes in higher education*. UK HE Space Management Group.
- Steeple, C., Jones, C. & Goodyear, P., (2002). Beyond e-learning: A future for networked learning. In C. Steeples & C. Jones (eds.) *Networked learning: Perspectives and issues*. Springer Verlag: London, pp. 323-42.
- Temple, P., (2008). "Learning Spaces in Higher Education: An Under-Researched Topic", *London Review of Education*, 6, pp. 229-241.
- Thomas, H., (2010). "Learning spaces, learning environments and the dis'placement' of learning", *British Journal of Educational Technology*, 41, pp. 502-511.
- University of Southern Queensland, (2010). *USQ, The university for a connected community: expanding and enriching student participation*. University of Southern Queensland: Toowoomba.
- University of Southern Queensland, (2012). *Promise Fulfilled: USQ Strategic Plan 2013-2015*. University of Southern Queensland: Toowoomba.
- Weaver, M., (2006). "Exploring conceptions of learning and teaching through the creation of flexible learning spaces: the learning gateway - a case study", *New Review of Academic Librarianship*, 12, pp. 109-125.
- Wedge, C.C. & Kearns, T.D., (2005). "Creation of the learning space: Catalysts for envisioning and navigating the design process", *Educause Review*, 40.
- Westberry, N., Mcnaughton, S., Billot, J. & Gaeta, H., (2013). Lost in space: Physically, virtually, and pedagogically. In S. Frielick, N. Buissink-Smith, P. Wyse, J. Billot, J. Hallas & E. Whitehead (eds.) *36th HERDSA Annual International Conference*. Higher Education Research and Development Society of Australasia, Inc: AUT University, Auckland, New Zealand, 502-513.
- Whiteside, A., Brooks, D.C. & Walker, J., (2010). "Making the case for space: Three years of empirical research on learning environments", *Educause Quarterly*, 33, pp. 11.
- Wilson, H., (2009). The process of creating learning space. In D. Radcliffe, H. Wilson, D. Powell & B. Tibbetts (eds.) *Learning spaces in higher education: Positive outcomes by design*. University of Queensland: Brisbane, 19-24.
- Wolff, S.J., (2002). *Design features for project-based learning*.
- Wood, P., Warwick, P. & Cox, D., (2012). "Developing learning spaces in higher education: An evaluation of experimental spaces at the University of Leicester", *Learning and Teaching*, 5, pp. 49-72.

