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Final Report

‘scaffold’:

A protocol for developing curriculum-led human-centred next generation learning environments in higher education

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Contents

| | |
|------------------------------------------------------|----|
| Executive Summary..... | 1 |
| Project Outcomes and Impacts..... | 3 |
| Background..... | 3 |
| Approach and Methodology | 5 |
| Advancing existing knowledge..... | 10 |
| Project Outcomes..... | 26 |
| Dissemination..... | 44 |
| Linkages..... | 45 |
| Evaluation..... | 47 |
| References..... | 49 |
| Appendices..... | 56 |
| Appendix A – Key project publications and workshops | 56 |
| Appendix B – Final Workshop Evaluation Questionnaire | 58 |
| Appendix C – Final Workshop Evaluation & Feedback | 59 |
| Appendix D – Example of project focus group | 60 |
| Appendix E – Example of project workshop | 62 |

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Abbreviations and acronyms

| | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| ALTC | Australian Learning and Teaching Council Limited |
| CETLD | Centre of Excellence in Teaching and Learning in Design |
| JISC | Joint Information Systems Committee |
| FELS | Framework for Evaluating Learning Spaces - A Study of Effective Evaluation Models and Practices for Technology Supported Physical Learning Spaces " |
| PST | Pedagogy Space Technology framework |
| SCAFFOLD | Space, curriculum affordances for future oriented learning design |
| UNSW | University of New South Wales |
| UTS | University of Technology Sydney |



Executive Summary

Understandings of, and approaches to, learning have shifted dramatically in recent times, however conceptions of learning space design have remained relatively unchanged and under theorized (Banning & Cannard 1986, Temple 2007, Boys 2010).

This project arose in recognition of the need both to generate fresh insights into the relationships between space, curriculum and learning, and to progress approaches to learning space design. The project aim was to develop processes, tools and models to assist in the production of curriculum-led, human-centred learning spaces for higher education.

Central to the success of any learning space design project is the formulation of an informed and insightful brief. Well-considered briefs have the potential to enable and facilitate the design of innovative, next generation learning spaces that will foster authentic learning. However, the process of design brief development is often compromised by the complexity of multiple stakeholder voices, and by the constraints of limited time, communication difficulties and the inertia that tends to reproduce habitual dispositions within new gestures. The project aimed to enable to alleviate this predicament through a collaborative and participatory brief development process which would help to overcome some of the barriers that currently hinder the production of innovative and insightful briefs.

The social sciences and service design proved rich sources for participatory and collaborative engagement models. To support these types of engagement processes tools and frameworks are required to support and guide stakeholder engagement and interactions. As there were no tools or frameworks immediately available that related specifically to the lines of enquiry for developing next generation learning spaces, one of the first foci for the team was to develop a series of bespoke tools and games.

The project embraced a cross-section of action research and participatory design methodologies, and methods with a particular focus on the visual to develop the tools and games through iterative cycles of testing, evaluation and improvement in the field, in both live projects and hypothetical scenarios. The intention was to develop an approach that was human-centred and propositional in nature with the capacity for promoting generative dialogues that elicit insights and support collective meaning making.

The first outcome of the project was the development of a prototype tool, a cue card set, used in workshops, focus groups and interviews to break down barriers and promote generative dialogues, that elicit insights and support collective meaning making. The cue card set was trialed and developed over a series of workshops with the project team, at international conferences and with stakeholders involved in live projects.

The second outcome was the development of a range of evaluation tools enabling stakeholders to consider existing and proposed spaces through a series of dimensions.

The third outcome was the development of a persona development set of tools that supports stakeholders in the consideration of learners and teachers dispositions and constraints.



The fourth outcome of the project was the development of the Parallel Univers(ity) Game. The game brings together the previous tools and adds a relational framework asking stakeholders to consider the relationships between learning, space, curriculum and affordances in what the project has termed activity-scapes (Sherringham & Stewart 2011).

The tools and games can be variously combined for use in workshop, focus group and interview models to support participatory and collaborative processes. In combination with the protocols and models developed by the project team, these tools and games inform processes applicable to projects that range in scale from campus redevelopment to single learning space renovations. However, their primary focus is on the places where exchange happens, typically the formal or structured learning environments and informal learning environments whether physical face-to-face environments, hybrid, augmented environments or in the virtual realm.

The outcomes of the project have been disseminated through workshops nationally and internationally, through conferences and invited presentations. The tools and methods have received positive feedback with many participants requesting a set of the tools for their own use and our facilitation of further workshops for them. A project website has been established and is under development, providing downloadable versions of the tools and the participatory models developed: www.scaffoldlearningspaces.com

The processes, tools and methods developed provide meaningful and participatory models for stakeholder consultation in the development of design briefs, and also for the consideration and evaluation of learning spaces; present and future. They assist in the development of aspirations for future learning and how space, technology and other affordances might support these new learning engagements. The resources developed by the project have the potency to improve the process of developing and evaluating next generation learning environments and, through the generation of shared understandings, to act as vehicles for promoting and facilitating positive change.



Project Outcomes and Impacts

The project aimed to develop models, tools and processes for facilitating future oriented conceptions of and approaches to learning space design that were both curriculum-led and human-centred. The project responded to one of the central considerations coming out of the research on learning space design, which is the critical nature of the project brief, as highlighted in the *Learning Landscapes Project* report (2010) and the 'Teaching with space in mind' tool. The design project brief needs to capture and crystallise the educational practices that are to be housed and supported in authentic ways and to articulate what this might mean spatially in the broadest sense. In the development of the design project brief possibilities for improvement and positive change need to be identified and agreed upon. The need for change in approaches to learning space design also signals a need for the reconsideration of the ways in which they are informed and conceived. Central to this process is the introduction of new approaches to the development of the design brief.

Background

There have been major shifts in learning goals, curricula and pedagogy, particularly over the last thirty years (Johnson and Lomas 2005). There is greater focus on action learning, group work, collaborative and peer learning, with new and emerging technologies actively incorporated into learning scenarios. Consistent with these shifts and with current ALTC priorities, the University of Technology Sydney (UTS) has a strategic focus on curriculum renewal to support future-oriented learning for current and new generations of students. Renewed curricula are being designed to place greater emphasis on authentic, practice-oriented learning and assessment experiences (Barrie 2008) that are research inspired and integrated, and situated within global contexts.

Authentic learning involves learners in actual practices or simulations that take place in other learning environments but are as close as possible to the environments of practice (Piaget 1954, 1974, Radinsky, Bouillion, Lento & Gomez 2001). Constructivist theorists have supported this idea for almost two decades; 'a meaningful context that brings the real world into the classroom learning environment is key to promoting learning' (Brown, Collins & Draguid, 1989).

Authentic learning and action learning build on the work of many educational theorists including Kolb, Lewin, Lave and Wenger (Kolb 1984, Lave 1993, Wenger 1998) and are situated within a social theory paradigm. Authentic learning is understood to take place when the learning scenario experienced by the student reflects contexts for action typical of those for which the student is being prepared. In other words, authentic learning is authentic to the practice context within which the learned skills and understandings will be performed (Herrington & Oliver, 2000). As such, this conception of authentic learning is situated in and builds on a growing body of social theory that is concerned with a theory of practice / practice theory (Bourdieu 1972, Schatzki 2001, Reckwitz 2002, Warde 2004). The desire to foster authentic learning, in many ways, has arisen from recognition of the centrality of 'practices' to human motivation and striving (Sherringham & Stewart 2011).

Authentic learning experiences therefore require that attention be paid to curriculum design, pedagogy, human-centred design, learning space design and 'practices'.



Shifts in educational aims and expectations, and developments in understandings of how people learn, signal a need for the reevaluation of the spaces within which learning is expected to take place. However, such reevaluation of learning spaces has not, until recently, been considered in innovative ways (Loi & Dillon 2006, Johnson & Lomas 2005, Jamieson 2007).

Through the growing reevaluation of what learning spaces might be there is now a growing recognition of the value of new approaches to considering learning space design and how they may support and respond to the changing nature of higher education. This reevaluation needs to consider the whole campus, and beyond, as a learning environment that includes both formal and informal learning spaces within which learning and participants in learning are central.

Through the experience of team members in university learning projects it had been recognized that when entering into discussions around what 'new learning' might look like and what types of spaces and technologies might support such learning there is often no universally understood language to describe what is needed or desired. Even when the need for change is acknowledged, stakeholders struggle to articulate what might be needed and often fall back on what is already known leading to positions that maintain the status quo rather than opening up to the possibilities of promising change. In addition, when stakeholders are brought together to consider projects for new learning spaces they embody an array of conflicting priorities, values, opinions, and agendas and a range of professional language and orientations. It is only natural that stakeholders' see their own position as having the highest priority leading to an unwillingness or inability to relate to other stakeholders' concerns. Often the conversations between stakeholders in such groups are laden with biases, politics and power plays, again rendering them inflexible. Finding appropriate ways for stakeholder engagement in such complex projects is difficult, but nevertheless essential, in order to establish a meaningful design brief.

The development of the design brief represents a moment for reflection on what is and what might be, and therefore a moment for the crystallisation of promising change. However brief development is typically through discursive processes and involves the collection of information from the diverse range of individuals that represent the stakeholder group. This information is often disparate and non-cohesive with some individuals gaining positions of authority over others in terms of what becomes central to the brief. Alternate methods for consultation are needed to overcome what can be problematic in the brief development process, in terms of giving a voice to all, envisioning and implementing positive change, and developing shared understandings and goals for a learning space project.

When looking for alternate methods for developing new learning environments it was clear that they needed to be inclusive and collaborative with sufficient granularity and flexibility to support a detailed review of curriculum objectives, pedagogical approaches, stakeholder expectations, infrastructure and technology appropriateness (Fisher 2005). In addition putting people at the centre of learning called for these methods to be human-centred providing opportunities for user led or co-design partnerships to be developed across the stakeholder groups. Through such approaches the development of shared understandings and meaning making give stakeholders a far greater sense of ownership in the final project.



Protocols and tools to assist these processes promote a supportive environment for the realization of best practice in the conception, design, implementation, evaluation and use of next generation learning spaces. These protocols and tools support a dynamic cyclic and collaborative approach that takes into account the evolving nature and interrelationships of and between space, technology, pedagogy, curriculum and learning (Johnson & Lamas 2005, Loi & Dillon 2006). The approach to the development of the processes and tools therefore needed to be one that could appropriately engage with such diverse and dynamic systems.

It was the recognition of the dynamic nature of stakeholder groups and the difficulties entailed in stakeholder consultation for learning environments that was the catalyst for the direction taken for this ALTC Priority Project. The project needed to develop processes that promoted a shared language, were inclusive, diffused power plays and enabled stakeholders to envision alternate futures. The development of processes and tools was seen as a 'scaffold' for assisting stakeholders and designers to establish collaborative and constructive engagements for the development of the design brief (Lawson 2005). In addition, the development of a case study model that also serves as a 'learning tool', a 'planning tool', and an 'evaluation tool' was seen as a way of capturing what was working and what was not in these new spaces; such evaluation is imperative to gaining understandings and ongoing improvement.

The development testing and refinement of the protocols, tools and models has been an iterative process that has been stakeholder inclusive, human-centred and one that embeds evaluation and dissemination in each cycle. Each stage of the project contributed to the mapping of protocols, and the types of tools and models to be developed. The development of the protocols and tools looked for participatory and collaborative approaches that might provide insights into the interplay between the different and competing needs, desires and elements involved in the design of new learning environments in higher education.

Approach and methodology

The project approach sought to build on UTS' institutional strategies relating to learning and teaching spaces as reported at the Carrick Places and Spaces for Learning workshops (Alexander 2007) and brings together the work of three university working parties. The areas of focus for the UTS' working parties aligned closely with three significant trends informing learning space design highlighted by Brown and Long (2006). The working party areas of focus were;

1. Curriculum renewal and the range of learning activities students need to engage in to enable them to achieve high quality authentic learning outcomes.
2. Emerging technologies and their incorporation to support new developments in the design of curriculum and learning activities to enhance the student experience.
3. Learning space design to support the shifts in curricula and technology in human-centred ways.

The initial reports of the working parties, in broad terms, have both informed and been developed through the project which has engaged with research and theories from a broad range of fields to support holistic and informed outcomes.



To achieve such outcomes the project brought together a team of experienced academics and design practitioners that all have a vested interest in the development of next generation learning environments and the associated research and development in this area. Team members from the University of Technology Sydney, in collaboration with team members from the University of New South Wales, developed an open and inclusive project framework.

The project drew on the diverse experiences of the team members contributing to a rich understanding of the process and aims of learning space design, in particular, expertise of members in Education and Interior Design. This expertise brings into focus the relationship between space and its inhabitants; practices [for example learning and teaching], projects, communications, identities and ‘things’ (Warde, Borgmann, Verbeek in Stewart 2008). Due to the experience of the team members this project provided an opportunity for outcomes with particular interior design expertise and spatial understandings and as such has taken a designerly approach to the project and the methods used for investigation development and evaluation.

Approach

A designerly approach requires designerly research, that is to say, divergent, iterative, exploratory, and human-centred research. The term designerly research was first coined by Bruce Archer. According to Archer, a designerly research approach is a way of moving from the general to the particular through iterative cycles of enquiry, experimentation or testing to develop an improved outcome. This approach starts with a broad configuration or ‘rich picture’ of what may be required, then moves on to developing subsystems, then the details of these subsystems, through an iterative process which tests assumptions at the various stages (Archer 1991). The outcome is one of a proposition for change and improvement. Designerly research seeks to gain understanding, insights, to notice patterns, connections and inspirations rather than to establish generaliseable facts. This allows for an exploratory and emergent and inclusive approach to research amongst a cross disciplinary team.

Designerly research also supports inclusive and collaborative processes that enable a detailed review of such things as curriculum objectives, pedagogical approaches, stakeholder expectations, needs and aspiration alongside infrastructure and technology appropriateness. These inclusive and collaborative processes are human-centred and facilitate the development of user led or co-design partnerships across the stakeholder group. Designerly research is both playful and propositional and embraces many research methodologies, several of which were particularly appropriate to the project. These included ethnographic, phenomenographic, appreciative enquiry, participatory design and a participatory action research framework. These methodologies have been identified as appropriate to researching learning spaces, their design, use and success and have been discussed in detail elsewhere through publications stemming from this project and research by others (Sherringham & Serle 2010, see also Cousin 2009, Norman 2005, Norton 2009). These methodologies bridge the interpretive and praxis research paradigms.

As learning environments and their users represent a set of continually changing needs and interrelationships it was important for the approach, protocols and tools being developed to be dynamic and to consider the breadth and fluidity of these needs and interrelationships (Johnson & Lomas 2005, Loi & Dillon, 2006). The following expands on the methodology, theories and methods that have been incorporated into the designerly approach for this project.



Methodology

In line with the designerly approach, the project took on an action research methodology as the research paradigm drawing on the integration of participatory action research (Elliott 1991, McKernan 1991, Winter 1989), aspects of action science (Argyris & Schön 1972) and soft systems methodology (Checkland 1981, 2006, Weinberg 1975) to develop a broad framework for the development of processes for collaborative enquiry. Action research was seen as an appropriate research paradigm for a number of reasons:

- designerly, participatory, liberating, self-evaluating
- visual, propositional, explorative and iterative
- externalizing, eliciting, communicative
- provides a framework that is scalable and transferable
- sufficient granularity to be appropriate to complex social systems

A designerly approach and action research methodology are complimentary to one another. They both involve iterative cycles of enquiry and experimentation leading to a direction for improvement. They are both human-centred and rely on the participation of users and stakeholders to flesh out directions for promising change. Within a participatory action research framework, insights are gained from cycles of critical reflection and action, by researchers and participants in the field, which guide the research process. These types of participatory and cyclic enquiry processes are a way of applying systems thinking to non-systems situations such as those that incorporate high levels of social, political and human activity (Checkland 1981, 2006).

Next generation learning environments represent a “non systems situation” that can benefit from systemic consideration. They represent what design theory has referred to as ‘wicked’ or ‘ill conceived’ problems (Rittel & Webber 1973, Cross 1984) and what systems theory terms as ‘messy’ problems (Checkland 1981). Soft systems, as an action research methodology, provides an appropriate approach for dealing with such problems. At a meta level it assists in framing the ‘problem situation’, its boundaries, elements and interdependencies. As soft systems mapping of complex relationships is open ended it allows for the ongoing evolution of the different elements within the system. From this systems perspective, learning environments can be seen as both places where the activities of the curriculum take place, and as part of the curriculum in themselves, in that students’ perceptions of these environments create messages about what the university sees as valued and important for learning.

Action research provides a methodology that integrates theory, research and practice, one that bridges both interpretive and praxis paradigms (Dick 1999, Dick & Dalmau 1999). This methodology attempts to foster a learning community where the stakeholder group is involved in defining the ‘problems’ and ‘opportunities’ allowing them to appreciate and contribute to an understanding of the situation and through this process identify desirable change, needs and actions. As in all systems methodology, a broad view is taken of what constitutes the system, what influences the system, who participates in the system and the relationships between these. This methodology was adopted by business in the 1980’s (Senge 1990) and more recently by design (Cottman & Leadbetter 2004) as a mechanism for defining the problem situation and its elements and interactions leading to change, innovation and transformation. It compliments human-centred designing in terms of its participatory nature and its relational analysis and focus on human activity.



Human-centred design supports and reinforces the human focus of a soft systems/action research methodology. It provides insight into the dynamics of human practices and experiences in relation to designed environments and equipment. Curricula can be described as systems that include students' and teachers' experiences of content, how content is structured and represented, teaching and learning practices, assessment, evaluation and student support, situated within broader administrative, educational, practice and social contexts (UTS 2007, Hicks 2007).

Human-centred designing has been gaining impetus since the 1990s. In that decade earlier user-centred approaches, that incorporated research data about potential users into the design process, were expanded and invigorated through engagement with participatory design techniques developed in Northern Europe (Sanders & Stappers 2008). These techniques engaged with potential users at all stages of the design process. Rather than seeing user representatives as passive sources of information, participants were actively included in the generative and evaluative process (Sanders 1992).

Respected voices within the field of design research that have contributed to the discussion on human-centred designing include Victor Margolin (1997), Donald Norman (1996, 2004) and Klaus Krippendorff (2006). The resulting field encompasses diverse approaches to gaining insight into the relations (and potential engagements) between humans and designed things and environments. These approaches range from those that employ empirical or ethnographic research techniques, to more playful, innovative and designerly approaches, such as those developed by Bill Gaver (1999), or by Anthony Dunne and Fiona Raby (2002). Elizabeth Sanders, a leading proponent of human-centred designing, has provided a useful mapping of these approaches and the field (2006).

Human-centred designing incorporates an array of user-centred approaches including participatory design, co-design, social design, appreciative enquiry and positive psychology. Such user-centred approaches require tools and processes to 'scaffold' stakeholders through participatory and collaborative engagements.

The combination of soft systems methodology and human-centred design, particularly participatory design methods, provided a guiding action research framework with the potential to capture systemic and holistic relational information and insights. This approach was not easily implemented and needed development and adjustment through each cycle to provide a scalable and transferable approach; one that could be taken up by those unfamiliar with the peculiarities of a soft systems and participatory approaches. This required the design and development of protocols (processes), tools and models to support and guide those unfamiliar with such methodologies.

It was also clear through the team members' involvement in live projects that a 'single' protocol was not going to provide the flexibility or scope to be scalable and transferable. Rather the team recognized through the development stages of the project that a series of processes, tools and models, that could be drawn upon through a project were a more valuable and applicable approach than a single protocol. In some ways a single protocol takes on some of the restrictive nature of a set of principles.

Within the action research framework the project engaged with a theoretical frame in regard to learning space design and what might constitute informative and authentic lines of enquiry. In the context of higher education learning can be conceived of as



the acculturation of individuals into a particular 'practice' or discipline. Here, 'practice' is understood through a body of theory that builds on 20th century phenomenological, hermeneutic, anthropological and sociological arguments (Sherringham & Stewart 2011). The team looked to 'practice' as a theoretical starting point for orienting the brief development process to the requirements of 'authentic' learning (Bourdieu 1997, Schatzki 2001, Reckwitz 2002, Warde 2005). 'The term 'practice' refers to an identifiable constellation of activities, know-how, orientations, values and striving that is entered into, embodied and performed by those who are engaged in the practice' (Sherringham & Stewart 2011). Whilst there is as such no coherent, unified 'Practice theory' there is a growing body of theory that engages with theories of practice. Here it is understood that people gain knowledge through their transactions with their social and physical environments within which they are embedded.

Practices can range from the simple and every day, such as cooking to more complex professional practices such as medicine. They are not simply clusters of related activities and associated know-how, rather, they are rich collections of associations, orientations, embodied experiences and engagements with the world through designed (and non-designed) things, environments and interpretive frameworks (Osterling 2009 in Sherringham & Stewart 2011). Recognition of the centrality of 'practices' to human motivation and striving, in many ways has given rise to the desire to foster authentic learning (Sherringham & Stewart 2011). Practice theory therefore in the context of our project provided a way of considering what matters to those within a 'practice' and finding ways to make this explicit thereby gaining insights into what might constitute authentic learning spaces to support authentic learning experiences.

In addition to the approach, methodologies and theory, the project has been informed through an autoethnographic frame. Autoethnography drew on the project team members' experience in particular the team leader and the control group members all of whom have considerable teaching and spatial practice experience.

The team leader has also been working on university learning space improvement projects for the past four years, providing opportunities for participant observation in learning space project development. Autoethnography is a methodology within which researcher-practitioner consciously embeds themselves within theory and practice. It provides a reflexive means to 'operationalise critical consciousness' (McIlveen 2008) a central aspect of participatory action research.

Action research, human-centred and participatory design are ideally suited to work and community situations, and social systems, particularly where there are systems of both stated and unstated values and rules, such as within the higher education sector in the context of developing new learning environments. Within action research projects the cyclic nature of the process calls for continued investigation, reading and critique to inform the next cycle of action. Reflexive questioning seeks to challenge the understandings gained through each cycle, and to test each ensuing cycle. The literature review therefore needed to continue throughout the project to inform the critique and challenge the assumptions. The cyclic nature of action research represents an "hermeneutic spiral" (Gummesson 1991:p62) of questioning and evaluation. It is this cyclic process of questioning and evaluation that defines action research as a viable research strategy. These methodologies also provide for 'action with intent' that can bring about learning, change and positive transformation.



Advancing existing knowledge

There is a growing body of research in the area of design for next generation learning spaces (Oblinger 2006, Jamieson 2007, Jilk 2007, Strange and Banning 2002, Scott-Webber 2004). Whilst this research provides some useful case studies of next generation learning spaces and broad first principles there is a need for this body of research to be developed into a cohesive and theorized body of knowledge to inform the design of next generation learning environments to maximize opportunities for authentic learning.

As previously stated, as our starting point the project drew on and developed the work undertaken by three working parties of the Teaching and Learning Committee at UTS. These three groups were investigating three priority areas of the university; curriculum renewal, technology integration and learning space improvement, as outlined in the section approach and methodology.

As a reference point the literature review and case studies undertaken by these working parties identified a number of recent local and international projects undertaken in Australia and the United Kingdom that were exploring the relationships between learning, space and technology and the evaluation of such learning spaces. These provided a useful range of existing knowledge to interrogate and build on.

An expanded view of reference projects was developed and included the following:

Reference projects such as

the *Carrick Places and Spaces for Learning*, with highlighted projects.

the work of EDUCAUSE and CETL, in the UK, including 74 funded learning space projects.

worked examples such as the "*Design Down*" Process developed in Iceland for the co-design of a new school facility, Nyr Grunnskoli Grafarholti,

the work of Suzanne Hofmann, in Germany, *Tak-Tuka-Land*, *Traumbaum*, and *Erika Mann Primary School* as working examples of human-centred and or co-design practices in the design of educational institutions.

Specific Collective Research

- *Designing Spaces for Effective Learning*, 2006, JISC
- *Spaces for learning: a review of spaces in further and higher education* – report for the Scottish Funding Council prepared by AMA Alexi Marmot Associates in association with haa design
- Learning Spaces, Oblinger et al, 2006
- The Carrick Forum on Design of Learning Environments, Melbourne, 2007
- Carrick Institute, Places and Spaces for Learning Seminars, 2007



Case Studies

- Learning Spaces, 2006, Diana G. Oblinger ed. Educause – 30 case studies
- Spaces for learning: a review of spaces in further and higher education – 4 case studies including Glasgow Caledonian University, Saltire Centre
- JISC – Infonet – 23 Case Studies
- CETLS – 74 new projects with a focus on curriculum-led innovation & learning space design
- Learning Landscapes – University of Lincoln, UK - 12 case studies
- PST Framework – University of Queensland, Australia including 17 case studies as part of the Learning Spaces in Higher Education: Positive outcomes by Design

Guidelines and Protocols

- Planning and Designing Technology Rich Learning Environments – JISC
- Whole Building Design Guide - National Institute of Building Sciences
- Linking pedagogy and space- 2005, Dr Ken Fisher for the Department of Education and Training, Victoria
- *Our New School*; Part of the Building Schools for the Future, Project, UK
- Explorelt tool for developing academic workspaces, DEGW, UK
- *Spaces for knowledge generation*, La Trobe University and Charles Sturt University
- *Retrofitting learning spaces in Higher Education*, ALTC Priority Project, Queensland University of Technology, Charles Sturt University and Edith Cowan University

Evaluation of learning spaces

- JELS; Study of Effective Evaluation Models and Practices for Technology Supported Physical Learning Spaces, UK
- *Learning Landscapes*; led by the University of Lincoln, UK
- *Project Faraday*; developing spaces for science in high schools, UK, CABE
- *Pedagogy-Space-Technology Framework for Designing and Evaluating Learning Places* (PST Framework); University of Queensland, Australia including the Learning Spaces in Higher Education: Positive outcomes in Design
- *Evaluating learning spaces*; ALTC Priority Project, Swinburne University, University of Queensland, and University of Victoria

Building on the working parties research the project has extended the review of the literature and undertaken an analysis and review of existing protocols, case studies and tools alongside an engagement with developments in the learning sciences. What follows is an overview of this review and key elements that have informed the development of the processes and tools building on the existing knowledge.



Protocols

A review of existing approaches to designing learning environments both reinforced and expanded the directions the project was considering with JISC, Learning Landscapes, Our New School and the PST Framework approaches being the most useful in terms of recent work. These frameworks draw on a broad cross section of previous research. One gap identified within these frameworks was a sufficient level of granularity & guidance for detailed interrogation and stakeholder engagement.

JISC Infonet – Good Practice and Innovation

This online resource for best practice provides a series of infokits, 38 tools and techniques, case studies publications and a record of events. Whilst the site has a focus on e-learning, technology and business the infokit 'Planning and designing technology-rich environments' provides a simple framework that builds on the JISC publication *Designing Spaces for Effective Learning* (2006) and the Scottish Funding Council publication *Spaces for Learning* (2006).

The infokit outlines four stages for learning space project development each with a series of questions and tips to be engaged with to inform the project. The four stages are outlined below.

Anticipation

- What's going on in the sector
- What's happening in institutions
- What are learners doing
- Entrepreneurship and business start-up spaces
- What's going on with technology
- Bringing it together

Imagination

- Innovation in the sector
- Aspects of design
- Techniques to aid imagination
- Imagining future processes
- Developing the vision
- Reality check

Implementation

- Moving forward
- Sustainability
- Procurement
- Working with others
- Making it happen

Evaluation

- How do we know it has worked
- What is a successful learning space
- Evaluating the use of technology
- Questions to ask
- Collecting data
- Entrepreneurship and business start-up spaces
- The U.S. perspective
- Using evaluation and review



Our New School

This project was developed as a partnership between Walker Technology and Engine Service design. It sought to bring together a range of people to collaboratively learn, share thoughts, discover opportunities with the aim of improving the school experience. The project came about as part of the *Building Schools for the Future* funding in the UK. It aimed to consider the whole school in terms of the activities that should take place there and what might support or prevent this. It engaged with staff, students and the wider community to consider and question what the school could be like and to grapple with the real challenges of making a school work well, now and into the future. The project took on a co-design methodology and developed a collaborative game and a four step approach to developing the project.

Discovery

- Finding things out
- Listening and looking

Generation

- Inspiring new ideas
- Exploring opportunities
- Working as a team

Synthesis

- Bringing things together
- Which ideas are best
- Involving people affected

Enterprise

- Making things happen
- Ensuring solutions are supported and sustainable

Learning Landscapes

This research project, led by Lincoln University, reviewed the campus profile and developed a case study of an innovative learning space in each of twelve diverse universities across the UK. The research was undertaken in partnership with DEGW who began to use the term 'learning landscape' to describe the range of spaces where learning takes place. Through this research a series of key areas for consideration in the development of new and innovative learning spaces, which respond to the shifting nature of learning in the 21st century, were identified. Each of the areas highlighted by the project is presented through a series of development tools to assist stakeholders to consider what they are trying to achieve campus wide and within particular learning environments. The five main tools listed below consist of a series of enquiry frameworks for engaging stakeholders, questioning assumptions, and establishing goals with a central focus on learning in the 21st century and the intention of supporting collaborative innovation.

The idea of the university
Pragmatics of Place
Talking the future into being
Campus Profiles
Teaching with space in mind



Project Faraday

Arising out of the UK's government commitment to making science a priority area in schools, this project aimed to develop a series of exemplar projects for science education and to develop ideas and principles that could be used by other schools. It brought together a team of education designers, teachers and design consultants to produce 12 exemplar projects in the UK. One of the core drivers of the project was the understanding that learning and teaching models should inform the design outcomes. The project approach was collaborative and engaged teachers and students in an integrated process looking at research, vision, strategy, practice and enrolment and their interrelationships and interdependencies. The project also developed a series of tools to assist this process.

The approach and the tools helped stakeholders to identify a vision, informed by research, that established a teaching and learning strategy (translation of vision – big picture), informed the implementation in terms of teaching and learning process (translation of strategy day to day), and considered how these should be translated through space and technology to support the people involved in the teaching and learning. Several workshop models were developed including future learning scenarios, area analysis and a 'taxonomy of decisions'. These are summarized as follows:

Boundary Conditions: non, minor, major, total (to this we add flows keep out keep in, allow in & out also acoustic qualities/performance, and visual quality and flexibility)

Group Size: individual small medium large (to this we add specific size ranges and whole campus engagements, face to face, self directed and virtual)

Atmosphere: informal, versatile, cyclical, formal

Flexibility: Fully flexible, configurable, moderate, fixed (referring to furniture settings – we extended this to also cover walls, technology, location, activities, learning approaches / pedagogy)

Learner Interaction: minimal, collaborative, interactive, social

Teaching Interaction: One to one, class, interactive, group presentation (to this we added one to small group, collaborative, one to many groups, face-face, remote, virtual)

Key pedagogies for science were identified as experimenting, researching, debating, observing, listening, documenting, reading and presenting and these were then considered in relation to learning activities in terms of how specialised or generic they are, and how much they depend on group or individual work. The project also developed a series of typical 'learning settings' however these to a degree segregated activities into different spaces rather than supporting multiple activities within a space limiting possibilities and excluding some considerations altogether. This was not necessarily reflected in the final exemplar projects.

Of particular interest is the diagnostic change tool developed for this project, looks at the organisational model (people and processes) and spatial model (place) both in terms of what is current and what is aspired to. Whilst the tool is geared toward schools it presents a framework for considering and expressing current and future models of delivery and engagement and their spatial implications, holistically linking a series of variables and how these will need to evolve over time to achieve more



innovative organizational and spatial models for learning.

PST Framework

The Pedagogy-Space-Technology Framework (PST) was developed as part of the ALTC Priority Project, *Designing Next Generation Places of Learning*, led by the University of Queensland. The project focused on what happens in learning spaces and aimed to create a comprehensive framework for guiding the design and operation of new learning spaces and to test this against three learning space 'types'; next generation libraries, collaborative learning centres and advanced concept teaching spaces.

As its starting point the project looked to the pedagogy space technology nexus that was emerging in the literature and in the case studies the project reviewed along with the growing array of design principles.

Pedagogy, space and technology are identified as the three focal elements of the framework, with the recognition that the relationships between these elements are reciprocal. Whilst the framework is not intended as hierarchical it is suggested that pedagogy should be considered first followed by space and then technology. The project's aim was to create a simple, non-prescriptive framework that supported equitable engagement across stakeholder groups.

Whilst the final framework represents two life cycle stages, conception and design, implementation and operation, the intention is that within these stages the framework can be used iteratively to develop the project. It should also be noted that each of the life cycle 'stages' included in the framework represent more than a single stage of a project.

The framework is simple with two to six questions asked in each cycle against each of the three focus elements, pedagogy, space, technology, and a fourth 'overall' element. The project acknowledges that additional and more detailed questions need to be added under each section and at each stage.

This is somewhat problematic as it is often identifying these questions that can prove the most difficult when developing a project.

The initial diagram illustrating the three elements of the framework, pedagogy, space and technology (as represented in Radcliffe 2008) is perhaps the most useful starting point as it elicits key questions.

- What is the pedagogy?
- How will this be enabled by the space?
- How will this be enlarged by technology?
- How will the space encourage the pedagogy?
- How will space embed the technology?
- How will technology enhance the pedagogy?
- How will technology extend the space?

To this framework the ALTC project *Retrofitting University Learning Spaces*, led by Queensland University of Technology, added the focus element of people and changed the focus element of 'space' to place.

This improves the model by adding additional layers for consideration with a human centeredness through the inclusion of the stakeholders and the emphasis on place.



Bennett (2006) offers a series of first questions that provide a useful framework for a line of enquiry regarding learning space design.

- What is it about the learning that will happen in the space that compels us to build a bricks and mortar learning space rather than a virtual one?
- How might this space be designed to encourage students to spend more time studying and studying more productively?
- For what position on the spectrum from isolated study to collaborative study should this learning space be designed?
- How will claims of authority over knowledge be managed by the design of the space? What will this space affirm about knowledge?
- Should the space be designed to encourage student teacher exchange outside of the classroom?
- How might this space enrich educational experiences?

In addition to the above examples of protocols, one useful, however, less recent model was *SPATIAL*, developed by Rodney Fulton in the early 1990's. Within the context of Fulton's model, *SPATIAL* stands for; satisfaction-participation-achievement-transcendent/immanent-attributes-authority-layout.

This model sought to allow for multiple types of learning environments, address the complex nature of relationships between physical settings and learning activities, allow for interaction among several variables including spatial and instructional dimensions. Fulton hypothesized that '(1) individual perceptions of space affect learner satisfaction, participation, and achievement; (2) certain aspects of a space, as perceived by learners, are subjective or beyond the visible physical attributes; and (3) authority and layout are external realities that can be changed' (Fulton 1991:p18).

The *SPATIAL* model and its considerations resonated with the intentions of our project and informed and reinforced the relationships under consideration.

The protocols reviewed generally all sought to develop relational understandings between different aspects of learning environments, learning and learners including the use of technology, from a whole campus perspective and in terms of individual learning spaces, formal, informal, virtual, augmented and physical. A number of the protocols also established a series of stages that projects should progress through.

These stages can be seen as a research or review stage, an envisioning stage, a testing and reflective stage, an implementation stage followed by evaluation. The review of these protocols alongside our own concerns confirmed and highlighted a number of key considerations.

- There are no universally agreed principles for learning space design
- Creating successful learning spaces is about creating 'place'
- Learning must be at the centre of any learning space project
- Learning spaces are becoming dynamic, hybrid and multipurpose



- Learning spaces cannot be entirely categorized into spaces for different typologies of learning – rather multi-activity settings or activity-scapes
- Projects generally benefit from a sponsor or champion
- Stakeholder involvement and consultation is important to success
- There are differences in definitions, vocabulary and conceptions of terms between stakeholders
- There is growing consensus that there is a space/place, technology and learning nexus, however the development of theory in this area is lacking
- Stakeholders often find it difficult to articulate what is needed or imagine something other than the familiar
- Effectiveness, efficiency and expression are all important considerations and drivers as too is experience
- Design briefs need to be developed through consultative and inclusive processes
- Design briefs need to incorporate layers; visionary, strategic, descriptive, prescriptive, and also more human, moral, and user-centred layers
- Interactions, boundary conditions and flows need to be considered
- Learning spaces can be social, technology rich (technology in the broadest sense), blended, specialized, experimental, informal, formal, physical, virtual, augmented and in various combinations

The review of these frameworks/protocols highlighted the need for a protocol that provided definitive processes and tools that can be mobilised during the different stages of a project for collaborative stakeholder engagement, envisioning, brief development and project evaluation. They also highlighted the need to shift assumptions in order to envisage future oriented learning spaces. These considerations were summarized well by Long and Ehrmann (2005 p.56)

“Our ability to imagine the classroom of the future is shaped by changes in our own beliefs about learning spaces:

- *From seeing college-level learning as being primarily about listening, reading, and taking notes, to seeing learning as being about situated action, collaboration, coaching, and reflection*
- *From focusing on formal education, to emphasizing learning in both formal and non-formal settings*
- *From assuming that academic work and rewards are neatly divided into compartments of research, academics, and community engagement, to assuming that learning spaces need to support a mix of all three of these functions*
- *From seeing faculty and students as the recipients of new learning spaces designed by specialists, to using their dreams of better teaching and learning to shape pioneering new learning spaces*
- *From seeing the design and construction of a building or other learning space as a fixed goal, unchanging after completion, to envisioning a building as the beginning of an evolutionary process in a state of permanent flux and informed iterative change”*



Case Studies

The project team identified a series of case study models that were reviewed for their ability to provide insights into the success and failures of a project within a contextual frame. Many of these provided little more than a brief description of the project and some images. Of those reviewed the case studies from Educause, JISC, the *PST* project, *Learning Landscapes* and *Project Faraday*, began to provide directions for the development of a case study model. The intention for the case study model for our project was to create a 'learning tool' a 'planning tool' and an 'evaluation tool', that would document a learning space project in sufficient detail to capture critical aspects of the project including lessons learned.

Educause

- What is it
- What happens here
- What technology is used
- What makes the space successful
- What Principles were behind the design
- What is unique or noteworthy

JISC – Technology rich environments

- Background and Context
 - Background and context
 - What is it
 - What happens in the space
- Finance
 - Funding Sources
 - Cost of Project
- Technology
 - What technology is being used and how is it being used
 - How does the technology add value
- Success
 - What makes the space successful
 - What principles were behind the design
 - What is innovative about the design and use of the building
 - What changes have you made as a result of receiving feedback
- Top Tips
 - What are your top tips

Project Faraday

- Context
- Vision
- Design Rationale
- The Design

PST (Next Generation Learning Environments)

- What it is
- Why it is
- What happens here
- How is the space used
- What could be improved



How is technology used
How was the facility evaluated & What were the main lessons learnt
Each case study had minor variations depending on the focus or nature of the space and possibly the interests of the author. Variations included questions or headings such as

What pedagogical principle(s) drove the design
The nature of the learning task
The year of study
The ambience of the learning space
The availability of support services
Which aspects of the space design and equipment worked and which did not
What would you do differently next time
Principles behind the design
Evaluation against the design principles
Fitting space, technology and pedagogy together

Learning Landscapes

Innovation
Vision and Mission
Leadership and Governance
Developing the brief
Project Management
Post-project evaluation

From the review a more detailed model, consisting of a framework that questions the many dimensions of a project, was developed. The intention of this model was to not only act as an evaluation tool but also as a planning and learning tool.

The model is built around a series of enquiry lenses. Under each lens is a series of questions that relate to the lens and that also relate to several of the tools and workshop, focus group and interview models. This allows the framework to be used for different purposes over the course of a project starting with pre-evaluation and planning, stakeholder consultation through to post occupancy evaluation and case study development. The model is described under the section 'project outcomes'. Alongside the model the team also identified and developed a number of ethnographic methods that could feed into the study and evaluation process, which are briefly presented in the tools section of this report.

Principles reviewed

As part of the literature review the project looked at the literature around design principles for learning spaces. This review concluded that whilst principles may provide an overarching starting point they can also close down other possibilities, considerations, or prove ambiguous due to different interpretations and meanings held by diverse stakeholder groups. They are often lofty and aspirational and provide more than broad ambitions for a project. This echoes the findings of the PST Framework project (Radcliffe 2009).

Evaluation frameworks

Several learning space evaluation projects and reviews were identified. Frameworks identified include the PST framework, ELS (Evaluating Learning Spaces – an ALTC Priority Project), the DEGW frameworks, and the JISC FELS framework. Reviews of evaluation frameworks that have informed our approach include those by Scott-Bennett (2006), Melhuish (2009), Bligh and Pearshouse (2011), the ALTC Projects



Evaluating Learning Spaces, ELS, (Lee and Tan 2011) and *Retrofitting Learning Spaces – Evaluating University Learning Spaces* (Mitchell 2010).

The PST Framework

This framework provides a simple list of questions to consider once a learning space is operational as outlined below.

Overall

What does success look like?

Is the facility considered to be a success? By whom? Why?

What is the evidence? Does this relate to the original motivation or intent?

What lessons were learned for the future?

Pedagogy

What type(s) of learning and teaching are observed to take place? What is the evidence?

What evaluation methodology or approach was used and what methods were used to gather and analyse data?

Who was included in the data gathering and analysis? Students? Faculty? Staff? Administrator? Senior Leadership? Facilities managers and technology staff?

Space

Which aspects of the space design and equipment worked and which did not? Why?

What were the unexpected (unintended) uses of the space and facilities that aided learning or facilitated teaching? Do these present ideas for future projects?

How was the effectiveness of the use of space to aid learning and teaching measured? What were the different metrics used?

Where there synergies between this and other spaces that enhanced learning?

Technology

What technologies were most effective at enhancing learning and teaching? Why?

What were the unexpected (unintended) impacts (positive and negative) of the technology on learning and teaching?

How did technology enhance the continuum of learning and teaching across the campus and beyond?

Whilst the framework offers some relevant questions it does not suggest how evaluations might be carried out nor does it clearly articulate what the evaluation findings might be compared with, such as base line data or pre project evaluation instruments to identify and evaluate success.

Evaluating Learning Spaces (ELS)

This ALTC project, alongside a literature review on the subject, conducted a series of trial evaluations of three existing learning spaces at the three institutions involved in the project. These trials covered three distinctive types of spaces, evaluation foci, and methods of investigation. Each evaluation was unique in its approach, conceptual model, theoretical frame, methods and focus so does not present a unified model as such however each of the evaluations share a similar overall process. Lee and Tan outline this process as follows (2010):



- selection of representative stakeholder groups
- consultative process of identifying the purpose of evaluation, and selection of models and methods
- ethical approvals, data collection and analysis
- consultative review of findings with internal reference groups
- critical reviews of models, methods and questions in relation to the stated aims of the evaluation
- dissemination of findings within the institution for further application

The *ELS* project confirmed many of the findings of the *FELS* project establishing that most institutions share a range of challenges in relation to learning space design and evaluation. These were summarised as ‘a lack of resourcing dedicated to comprehensive evaluations; sensitivity of evaluation processes and findings; a tendency to present spaces positively and without contextual information; limitations in understanding about the purpose and value of evaluation; limiting assumptions about the potential for input from a variety of stakeholders, and; the complex nature of evaluation itself’ (Lee and Tan 2010 p). The project also identified the need for longitudinal evaluations of spaces using a cross section of methods. Such evaluations require support in terms of investment and or training from institutions to be viable which in turn requires institutions to understand the value of evaluations.

DEGW

The consultancy firm DEGW have been engaged in post occupancy evaluations for over a decade, initially in the area of workplace environment evaluations and more recently in the area of learning spaces. As part of this work they have worked with many institutions including Lincoln Universities on the Learning Landscapes project. This project developed a number of tools for planning and evaluating learning spaces. The first tool is a campus-profiling tool that facilitates a mapping of the universities values against the Expression, Efficiency and Effectiveness of the campus facilities as a method for evaluating existing facilities. The project also developed a series of development tools that are mentioned elsewhere.

DEGW as part of their strategic design services conduct post occupancy evaluations for institutional clients. These evaluations, through observation, record the use of the space in hour blocks in terms of population, how and where students are working, what equipment they are using and how long they remain in the space. These observations are supplemented with random interviews with students and ‘other’ users. The observations and interviews are then analysed in regard to whether the space is working as intended against the original aims of the project.

JISC Infonet

The JISC project, *A study of effective evaluation Models and Practices for technology supported physical learning spaces* set out to identify tools, methods and frameworks being used for the evaluation of technology supported physical learning spaces. The project found that the practice of evaluating learning spaces was not readily evident in the sector and that evaluations that were undertaken were generally internal to the institution and revolved around student satisfaction. The project identified a number of exceptions.

The review of existing frameworks prompted the project to develop a conceptual *Framework for Evaluating Learning Spaces (FELS)*. This framework presents a set



of high-level categories that are a series of dimensions; intentions, context, practice, designs and procedures. These are then further sub-divided into *aspects*. ‘Beginning from the questions Why? What? and How?, the dimensions indicate a combination of information that must be understood about a learning space if a meaningful evaluation is to be constructed, plus a series of questions which indicate alternative options that might be explored within the construction process” (Bligh and Pearshouse 2009 p). Once the dimensions and aspects have been considered the intention is that they then need to be prioritised.

In addition, the intention of the framework was to provide a number of benefits.

- A common vocabulary to standardise evaluations
- A checklist of issues to be considered by individual practitioners and evaluators
- A structure to describe the nature and character of evaluations completed to date (Bligh & Pearshouse 2009)

The *FELS* project reviewed a range of evaluation models and developed a typology of learning space evaluation models based on what the models valued as evidence of success.

- **‘Demand model:** quantitative analysis of conventional space metrics (occupant density, booking statistics), or financial income (external bookings, internal market calculations), etc.;
- **Outcomes model:** evaluating changes in learning outcomes;
- **Satisfaction model:** collecting data about the *experiences* and satisfaction of space users;
- **Scenario provision model:** examining *space provision* (technology, configuration, size, etc.), in light of *judgments* about the *activities* which need to be supported;
- **Activity support model:** evaluating activities undertaken within a space *in practice*, often using observation-based methods;
- **Spatial ecology model:** examining configurations of, and relationships between, the variety of spaces available;
- **Brand model:** evaluating spaces’ contribution to institutional image, as projected to entities including media, external partners, prospective and current students and staff, etc’.

(Bligh & Pearshouse 2011:p6)

Bennett (2007) identifies three additional typologies. These typologies are particular to libraries and learning commons as learning spaces:

- **Service and Instructional Model:** quantitative analysis of the service provision of information technology and the instructional support for the use of this technology;
- **Marketing Model:** seeks to understand the behaviours and preferences of students and whether a space has responded to these;
- **Mission-based model:** seeks to identify specific learning behaviours that the institution, faculty and students see as important. This constitutes a strategic model.



This work highlights the complexity, interrelatedness and interdependencies of the many elements that need to be considered when designing and evaluating learning spaces. The value of evaluation is dependent on many factors. Central to this is what is seen as valued in learning space success, that is what does success look like, the methods used and understanding their merits and limitations, recognizing that evaluations to be truly meaningful have to be undertaken using a range of methods over a sufficient period of time in order to capture the true and full range of users and activities; **the learning inhabiting the space.**

Retrofitting Learning Spaces in Higher Education

This ALTC project completed a literature review on evaluating university learning spaces that considered the literature from the period 2000 to 2009 building on the work of Strange and Banning (2001), Fisher (2005), the Scottish Funding Council (2006), Hunley and Schaller (2006), Bielaczyc (2006), Temple (2007) the *FELS* project (Pearshouse, Bligh et al 2009). This work identified eight emerging themes needing to be addressed when considering learning space evaluation.

- A recognition of the paucity of thorough and innovative studies
- The complexity of the phenomena under evaluation
- The role and importance of evaluative frameworks
- A variation in emphasis on a particular segment of the cycle
- Sanitised unproblematic reports of the process of collecting data
- A ubiquity of standard methodologies vs some directions
- A privileging of space and usage as evaluation targets
- A conviction that environment and learning are intimately related

InQbate and CETLD

The *InQbate* Project and the Centre for Excellence in Teaching and Learning in Design Project developed a series of learning spaces at Sussex and Brighton Universities. The group reviewed qualitative methods for assessing learning spaces and undertook qualitative evaluations of three completed learning environments. These evaluations aimed to study the interaction between spatial design, technology and human behavior. Ethnographic approaches from anthropology and environmental psychology, that place understanding the user in context as a central concern, were seen as appropriate for the evaluation of learning spaces whilst recognizing these do not provide an objective truth, rather unique insights (Melhuish 2009). In addition 'research studies need to make space and its occupation central' (Melhuish 2011).

The broad typologies identified by Bligh and Pearshouse (2011) were also identified by our project through the review of existing protocols, case study models and evaluation methods and informed the lenses we chose to include in our evaluation/case study model. In developing an evaluation framework or model it is essential to acknowledge what can reasonably be evaluated and what the intention of evaluation is. As the process of learning is, to a large extent, invisible more tangible indicators of what is taking place within a learning activity and space need to be brought into focus. No single tool or evaluation instrument is likely to capture these complex relations at any one stage of a project. Rather a variety of tools and framework variants are needed for considering and capturing the range of dimensions, aspects, elements, goals, users, adjacencies, management and so on that are involved in a learning space project. This requires holistic consideration of the variety of learning spaces that make up a campus each with its own variables and complexity and the need to for these to relate to and support each other in a



systems way. Specialized and dedicated spaces present the most constant and identifiable criteria whilst other spaces are open for interpretation. Each space needs to be considered in terms of how it will address different aspects of or moments in learning and provide different arrays of support for that learning.

Notwithstanding the complexity and difficulties associated with evaluation, the benefits of evaluation cannot be brushed aside. The overarching benefit of evaluation is in supporting continuous improvement through a feedback system that enables an organization to learn from the projects they implement and to feed these lessons into new projects in systematic and informed ways to influence future actions (Carthey 2006). These lessons can range from the unexpected way spaces are used to critical operational considerations (Zimmerman and Martin 2001). As Bligh and Pearshouse note, 'the quality of evaluation should ultimately be judged by the insights gained into the ways spaces support learning and the ways in which these insights are shared within a community of interested practitioners' (2011:p5).

Review of Literature and Theory

From the outset, the project had identified space, curriculum and technology as interrelated considerations in the development of next generation learning environments. Also identified was the need for processes and tools to assist in the important aspects of stakeholder consultation and space evaluation. In order to develop useful processes and tools the project drew and built on a broad range of literature. The following is a brief summary of the key areas and references:

- Curriculum development, authentic learning, motivation drawing on Biggs, Bransford, Brown, Cocking, Herrington and Herrington, Maslow
- Design brief development for learning environments drawing on Kolko, Lawson, Phillips and Blyth
- Relationships between space, people and learning drawing on Fulton, Heimstra, Brown & Long, Strange & Banning, Scott-Webber
- Learning space evaluation drawing on JISC, Educause, JELS, & PST
- Participatory design processes, Co-Design, Social Design drawing on Sanders, Brandt, Messeter, Johansson, Henderson, Styhre & Gluch
- Appreciative Enquiry, Positive psychology drawing on Whitney & Bloom, Passmore & Hain
- Play and game design drawing on Salen and Zimmerman, Gaver, Kolb & Kolb, Kolko, Loi and Burrows
- Social Theory in particular Practice Theory drawing on Bordieu, MacIntyre, Giddens, Schatzki, Reckwitz, Warde
- Social Science research methods with a particular focus on ethnographic, phenomenographic, autoethnographic and photovisual methods. For this we drew on the work of Banks, Carse, Corti, Harper, Hyerle, Mier, and McIlveen



The project also drew on and built upon the prior practice / theory knowledge of the team members, particularly the control group members, gained through observing, designing, documenting, facilitating and evaluating teaching and learning spaces in Australia, the UK and the USA. This experience formed an autoethnographic reference to critique and build on.

Finally, the project, through the live projects at the University of Technology Sydney, provided vehicles for participant observation and the iterative trialing of a number of the processes and tools. Both an annotated literature review of key texts and a bibliography of all texts reviewed to develop the project will be made available on the website.

As a point of reference, the project also looked at, the work of Engine, FutureLab and DEGW. These three consultancies provide service design, strategic design and project facilitation in the United Kingdom, Australia and internationally. The work of these companies was seen as important informers of collaborative processes for stakeholder consultation, organisational systems analysis, problem/possibility identification and future orientating. The tools and processes used within these service design and research agencies informed the development of the initial protocols and tools and served as a benchmarking resource.



Project Outcomes

The primary goals for the project were to develop, test, evaluate and refine a series of protocols, tools and models for the development of curriculum-led human-centred next generation learning environments in higher education. The intention was for these outcomes to be scalable and transferable and to suggest and support a process for developing design briefs and evaluating next generation learning spaces including the associated technology and pedagogy to achieve curriculum aims. Through these processes it was also intended to simultaneously stimulate and develop academics' capacity to change their practices to more effective use of next generation spaces.

In summary the project was designed to:

- Develop non prescriptive protocols (processes) for the development of curriculum-led, human-centred next generation learning environments; that will invite an exploration of the relationship between the stakeholders and the other project elements including:
 - curriculum
 - pedagogical approaches
 - technology and
 - learning environments

for their capacity to transform learning;

- Develop tools to support the processes for gathering information;
- Provide worked examples as models of how the tools and processes might be used;
- Develop a website to provide
 - a repository for learning space research
 - a repository for case studies evaluating leading edge learning spaces
 - a dissemination point for protocols, tools and models
 - links to other similar sites
- Deliver a case study framework for a consistent and informative holistic approach to evaluating learning space design;
- Complete case studies of the use of leading edge learning spaces designed with particular curriculum intentions in mind, including both formal and informal spaces; and
- Facilitate workshops engaging a broad cross section of stakeholders to test the potential of identified outcomes including more effective use of new spaces to facilitate learning.

What follows is an outline of the outcomes achieved against the aims of the original project proposal and a summary of what has informed these outcomes and deliverables.



1. Protocols, tools and models

The Protocol(s)

The project developed a series of protocols to assist in the conceptualization of, and pre and post occupancy evaluation of, next generation learning environments in higher education. These protocols focus on creating inclusive, participatory, collaborative, and potentially transformational processes with a view to achieving authentic learning environments. The protocols form part of a framework for the development of design briefs for curriculum-led, human-centred next generation learning environments through a participatory design approach. These protocols do not represent a checklist of principles, or a linear series of steps to take, nor are they prescriptive. Rather they invite an exploration of the relationships between the stakeholders and the other project elements including, but not limited to:

- curriculum
- pedagogical approaches
- learning approaches and stances
- technology and tools
- learning environments
- user needs, values, and attitudes (orientations)
- disciplinary dispositions
- institutional and disciplinary cultures

for their capacity to transform learning. The recognition that learning environments represent open dynamic systems highlighted the need for the ‘protocol’ or processes developed to have a high degree of equifinality; that is to say that the same or similar results can be achieved by using a variety of different processes.

As previously outlined the protocols / processes adopted have been drawn from action research, participatory design and soft systems methodologies. They have been iteratively applied and tested in the field through the course of the project.

A first iteration of the framework and protocols was piloted from November 2008 to February 2009 through team involvement in the brief development and design process for new formal and informal learning space for the Faculty of Business at UTS. The protocol included identification of stakeholders, the formation of a project committee of stakeholder representatives, wider consultation with academics regarding current and desired pedagogical practices, broad consultation with students concerning their needs and desires in relation to their learning activities, case studies of student use of existing spaces, and an identification of gaps between the types of learning spaces and facilities currently provided and those desired.

This pilot process delivered a number of key insights the most important being the need for a collaborative culture to foster shared understandings within the stakeholder group. It was found that one tool (a pack of visual cue cards or prompt cards and accompanying activities) developed by the project team and trialed at a focus group and a workshop, provided an effective icebreaker for collaboration between stakeholders with very different agendas and backgrounds. The tool also supported open and generative dialogue promoting participatory and collaborative engagements. These insights led to further research into participatory and collaborative approaches to stakeholder engagement and the types of tools and approaches used to support such engagements.





Figure 1. Before (left) and after (right) shots of UTS Faculty of Business Block C – touch down zone

The use of the processes also informed the design brief in useful ways, for example, highlighting a number of teaching strategies that were not supported in the existing spaces. The need for group study and quieter spaces, for better lighting and the provision of more power to better facilitate the use of laptops. The need for spaces that appeared ‘orderly’ but could still be reconfigured to suit student needs. Spaces for ‘serious study’ where you could study alone, alone together, or in groups through the night. This alerted the designers to many functional requirements for the space alongside a sense of what type of aesthetic may support these engagements.

A second iteration of the protocol was undertaken through team involvement in the design process for new learning spaces for the Faculty of Engineering and Information Technology at UTS, from March 2009. Our involvement in this project is currently ongoing working with stakeholder groups and the architects DCM. This, much larger, project allowed for a more extensive research process within the early stages of brief development, concept design and design development. Research into the future trajectory of engineering/IT pedagogy and curriculum directions, nationally and internationally, was undertaken and compiled in a report. This report, together with findings from stakeholder engagement, was used to inform an external design consultant employed to develop the accommodation schedule for the building and to brief facilitators for inclusive workshops to engage faculty academics in a process of pedagogical change appropriate to the proposed new learning environments.

A third iteration of the protocol was facilitated through team engagement in the preoccupancy evaluation, development of the design brief, design development, project implementation and post occupancy evaluation for a new Student Hub at the Haymarket Campus at UTS. The project aimed to create a vibrant student hub that would provide a diverse range of facilities for supporting informal learning and experimental teaching. Anecdotal feedback and initial observations suggest the space has been well received and overall is delivering the intended outcomes. Monitoring of the space continues with issues being recorded and addressed and fed back into the universities understandings of learning space design. An initial post occupancy evaluation of this space is currently underway with the intention of using a number of the tools developed in the project.



Student Hub – Haymarket Campus UTS – Woods Bagot

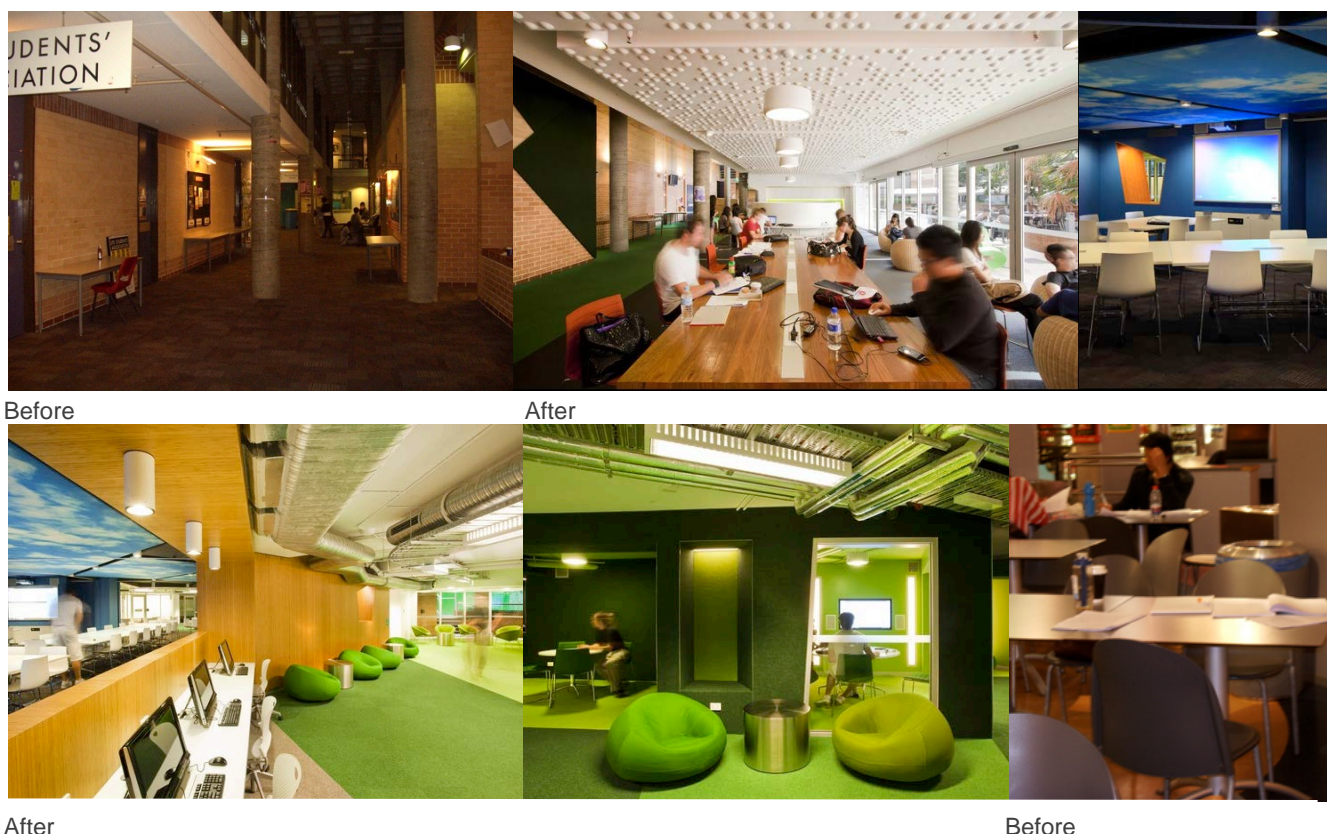


Figure 2. Before and after shots Student Hub, University of Technology Sydney

To assist students with the use of the space, IT student rovers provided assistance in regard to the technology and the use of the space for the first four weeks and a Facebook site was set up for questions and comments regarding the space. Student comments are being collected via the Facebook site to capture initial responses and experiences.

‘Block A is a great place to study...green colour is amazing. It creates a comfortable and positive environment for both study and chat’

‘Fabulous! Makes you feel like never finishing Uni’

The collaborative space, dubbed ‘the sandpit’, is being used by students for teamwork and is also being used by academic staff to test new approaches to their teaching and student learning engagements.

A series of evaluation processes are being employed to evaluate the ‘success’ of the space. These include occupancy rates, snapshot culture hunts and longitudinal culture hunts involving photo recording, interviews and observations and in the case of the experimental teaching sessions students were asked to provide feedback via post it notes in terms of one aspect of the learning experience that was positive and one that was negative. Early indications are that the space has high levels of occupancy, is generally being used as it was intended, is enjoyed and appreciated by the students, and is a social and learning hub. On the down side, furniture is moved around by students, which was intended, however sometimes it is left in locations where it blocks paths of travel. A remedy for this is currently being assessed.



The protocols represent processes that enable

- Community building
- Envisioning
- Futuring
- Scenario Building
- Persona Development
- Cultural Probes
- Game Play
- Curriculum mapping for authentic learning engagements

The protocols begin to provide a framework of participatory strategies for the development of design briefs and the evaluation of learning spaces. Such participatory strategies require participatory tools.

The Tools

In response to the identified need to develop participatory and co-design processes for developing meaningful design briefs for next generation learning environments a series of bespoke tools were developed by the project team to facilitate participatory and collaborative engagements.

Drawing and building on the existing 'landscape' of participatory tools the following generic aims were identified for the tools being developed:

- provide a lexicon / vocabulary for stakeholders to speak with and to
- act as playful triggers
- act as group thinking tools
- provide a ludic space where power plays are set aside
- represent and connect to different ways of knowing
- provide multiple forms of representation
- provide images and words ranging from the concrete to the abstract
- reveal tacit and latent needs, desires and orientations
- reveal relational interdependencies
- allow stakeholders to empathize with each other and see different points of view
- assist stakeholders to see themselves in alternate futures
- move the conversation away from automated responses and functional focus; from problem solving to possibility generation
- allow stakeholders to view the situation holistically whilst analyzing the relationships between individual elements

Following is a brief description of the main tools developed within the project.

Cue Cards:

The first tool developed by the project team was a visual cue card tool. This was designed in response to an unexpected difficulty made evident in the first project team workshop. Whilst using a soft systems approach that requires the development of 'rich pictures' therefore drawing, it was observed that amongst workshop participants there was a general reluctance toward drawing and a propensity to revert to words and list making. In response to this observation the use of images, in place of drawing, represented a possible solution and a useful addition to an action research framework.



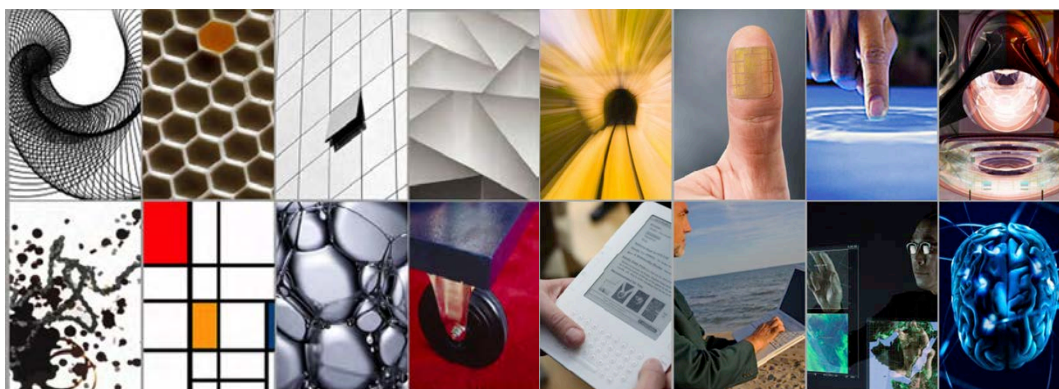


Figure 3 – Examples of preliminary cue cards used for the purpose of testing and development

A series of visual cue card decks were developed to overcome participants' reluctance to draw. These include both concrete and abstract images, symbols, word cards, and what if and future cards.

The cards were developed around a series of themes, emerging from the literature, that were seen as central to the development of next generation learning environments. These include:

- values and attributes
- learning approaches
- interactions
- ownership and control
- sensory and aesthetic
- technology and tools
- needs and desires
- activities
- support and services
- layout, boundary conditions and flows

Whilst the primary objective of developing the cue card tool was to overcome participants' reluctance to draw, the tool has other beneficial qualities for the purpose of action research strategies.

Firstly, in research and enquiry situations, images, whether photographic or abstract representations, evoke deeper responses and often represent 'a different kind of information' than is brought forward through words alone (Harper 2002:p13); information that can be particularly insightful. Photo elicitation, as the term suggests, uses photos however the principles apply to virtually all forms of visual images (Banks 1995, 2001, Corti 1993, Harper 2002).

Secondly, the use of images shifts the emphasis from dialogue to visual narrative. This tends to subdue personal agendas and power plays, and provide for a more collaborative model of stakeholder consultation.

Thirdly, the images assist stakeholders to situate themselves out of the everyday and out of their normal settings, to envisage alternate futures and alternate selves. They provide support for creating past, present and future worlds or 'what if?' situations in which participants (players) have equal voice, and socio-political stratification is minimized (Carse 1986, Brandt 2008).



The cue cards can be used in a variety of scenarios in both participatory and collaborative ways, either in one-on-one interviews, workshops, focus groups, or as expressions in photo journals, scenarios, vignettes, day in the life exercises, future-scapes and activity-scapes (Sherringham & Stewart 2011). Within the project the development and testing of the visual cue card tool has taken on two primary models; one a workshop model of enquiry and the other through a group model of enquiry where the cards are curated to focus participant engagement around critical, questions, dilemmas and scenarios. The cards can also be used within the context of an interview.

Lens Cards:

A series of lens cards has been developed as mechanisms to question participant responses to particular aspects of a project. As participants move through the developmental process of envisioning a new project, navigating the various competing needs and aspirations typical of complex socio-spatial projects such as new learning environments, often things are overlooked, forgotten or not viewed in context. The Lens Cards remind participants of the myriad of considerations to be holistically considered during the development of learning space projects.

The lenses identified by the project team for the purpose of developing and evaluating learning spaces include

- Vision
- Context
- Culture
- Curriculum
- Spatial
- Technology Systems
- Interaction
- Ownership
- Sustainability

Each presents aims, questions and reality checks to keep in mind whilst negotiating discussions and reaching agreement. The same lenses form the broad headings used for the case study model and the evaluation frameworks.

Culture Hunt:

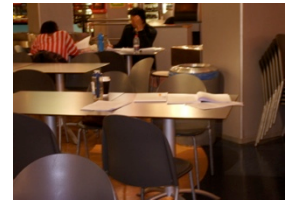
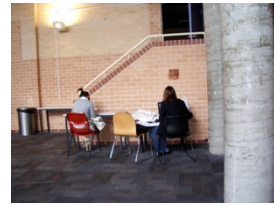
The culture hunt has been developed from the work of Engine. It uses a number of ethnographic methods to quickly gather information. These methods include observation, photo diarizing, and snapshot interviews. A matrix of things to record, observe, photograph, and question has been developed and compiled on a template. The matrix provides a mechanism to bring into focus how a space is being used, what people bring to the space, how they enter and leave, where they have been before, attitudes towards its use and possible enabling and disabling aspects of the space.

The culture hunt is an immersion method within which an observer(s) spends an intensive period of time in a pre-selected location or group of locations. The aim is to gain a deeper understanding of the workings of the particular place of study. A series of questions and things to observe guide the culture hunt. It is as important to notice what is happening and what is present as it is to notice what is not happening and what is missing. Quantity is as important as quality when undertaking a culture hunt.



Location: Bldg 5 Block A
Semester period: Study Week

Date: June 2010 Time: 13.00 Weather: Overcast



| | | | |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Lack of adequate lighting; Time out socialising playing cards betwn study 'Its Homebase, we come here everyday' | 'We like being outside' Peer support study group Bags, laptops, phones, food | Make do study spaces – furniture dragged from Classrooms | Studying alone or in pairs, quiet Concentration several books & bag per student No one buying from Cafeteria |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|

Figure 4; A mock sample of part of a culture hunt – images, comments and observations

Persona Development:

The use of personas helps to develop insights into stakeholder groups, both majority and minority, to develop pictures of their needs, constraints, preferences and predispositions toward learning and the necessary or desired pathways for transformation. The development of personas supports and informs considerations during the conceptualisation of learning space projects.

The initial introduction of persona scenarios to the project team in a team workshop highlighted the complexity of persona development but also its potency for revealing dilemmas and opportunities where positive change could be enacted. It also highlighted a general unfamiliarity with such processes and the complexity of and time needed for persona development.

Whilst acknowledging the rich resource available in the literature on persona development, for the purpose of stakeholder engagement in participatory workshops, the project team recognised that they needed to develop a series of generative tools and prompts that would enable a quick yet useful development of a cross section of personas to feed multiple stakeholder perspectives into the conversations.

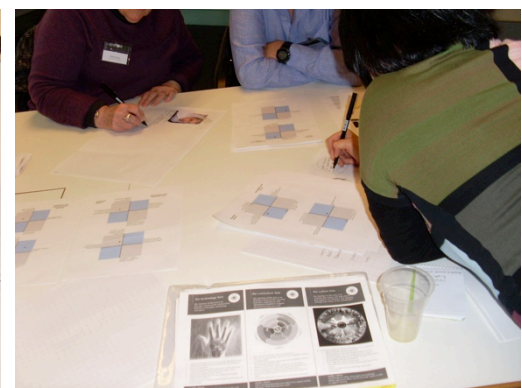


Figure 5; Persona Development in process, Scaffold Workshop, Sydney, September 2010



The persona cards are a series of bi axial quadrant matrices that analyse competing or opposing needs, dispositions and orientations of both students and staff: for example, availability and focus, aesthetics and environmental qualities, autonomy and responsibility, personality and coping. Building up a series of characteristics and constraints begins to enable participants to gain insights and understandings of what is at play and what might interfere with desired outcomes. Participants in a group develop a series of student and academic personas starting with a 'headshot' to provide more concrete engagement with the persona. The headshots are intended to represent diversity amongst the potential user group. Participants then complete a series of the matrices.

The cards allow for the quick development of a number of stakeholder personas that are then fleshed out to create a relatively rich profile, inclusive of aspirations, motivations and impediments. The process develops empathy and deeper understandings and insights into user needs and what might enable or disable user engagement. The stakeholders then take stewardship of these personas and are charged with the task of representing the persona's voice in ensuing stages of the workshops. This process can also be used to enable stakeholders to engage in 'identity play' as 'a way of believing in a possibility and behaving as if it exists' in a provisional trial of future selves or future others (Ibarra & Petreglieri 2010:p10).

Parallel University Game:

The concept of playful engagements led the team to design a game that has been provocatively named, 'The Parallel Universe (ity)'.



a)

b)

c)

Figure 6; Development of the game a) Cambridge trial b) Cambridge Workshop August 2010 c) Scaffold Workshop Sydney September 2010

The parallel universe was conceived of as a 'serious play' space bringing together several strategies and tools for a focused 'playing out' of an alternate future, a future that is not about continuing doing what we do as we do it now. The game developed out of the recognition that stakeholders, though often recognising the need for change and the shortcomings of existing arrangements, often struggle to conceive of how things could be done differently. By setting a future scenario and putting stakeholders in a game space they are free from normative rules and responses. In this way the game forms an abstract setting that sits outside participants normal frames of reference.



Within the game space opportunities are created to consider, interrogate and explore the multiple dimensions that relate to what future learning spaces might be; what they need to support in terms of activities, performances, modeling, technology, tools and so on and what they may need to ‘feel like’ in terms of boundary conditions, textures, aesthetics and the like. What messages should these spaces send to their users in terms of what is valued, what affordances should they provide, what should they enable? Who are the users and what conditions and orientations do they carry that may need to be tempered or supported. These considerations are drawn together through a series of rounds of play each engaging with a focused interrogation of a particular dimension or lens.

The game produces a series of research artefacts that are representational of the stakeholders views of and engagements with ‘what if’ or ‘design world’ scenarios (Schön 1983), which can be read, interpreted and responded to. As a model the game can be contextualized to a given design situation by framing the game through different scenarios, lenses and questions to create a specific focus. It is played in a form of cascading workshop and is intended to assist stakeholders to express and bring into view what is salient. The game interrogates learning and learning space design on multiple levels ranging from cultural values to enabling activities and practices. Through a series of questions stakeholders must negotiate the selection of images, words or pictograms that best represent their collective responses. From image decks, curated around the questions, participants choose a set number of cards. As participants put forward different cards and discuss what meaning they ascribe to the image, generative dialogues unfold. The process ‘*mind maps*’ the group’s collective thinking with the selected images and words capturing the group’s discussion on the game board.

The game brings together three of the tools being developed, the visual cue cards, the persona tool and the activity tool to create what we have termed ‘activity-scapes’.

Activity-scapes:

The tools can be used individually or in a variety of combinations to develop insights and gather information. In the context of the workshops the tools facilitate playful and imaginative participant interactions, support generative dialogues and can be used to play the game in its various forms and to develop ‘activity-scapes’.



Figure 7; Examples of activity-scapes being developed ConnectEd Conference Sydney 2010

An ‘activity-scape’ can be summarized as ‘the supportive experiential, spatial, equipmental and service environment immediate to the performance of a particular activity’ (Sherringham & Stewart 2011).



‘An activity-scape develops from an exploration of five key dimensions of a learning activity:

- 1) what kinds of orientations, embodied experience, communications and interactions need to be supported within the activity;
- 2) what different aids, inputs and facilities are needed;
- 3) what tools and technologies will be taken up;
- 4) what is needed to support those technologies; and
- 5) what should the boundary conditions of the activity be?’

(Sherringham & Stewart 2011:p114)

These dimensions, once mapped out, need to be considered in terms of institutional and practice-oriented preferences for a particular aesthetic, atmosphere or ‘feel’ that may further support the learning activity manifesting and reinforcing what is valued within an institution and or within a practice.

Activity-scapes lead to the development of rich pictures, or thick descriptions, that provide relational information of how learning scenarios may play out and how best to support them.

Practice Curriculum Profiling:

In order to integrate curriculum-led learning in a way that informs learning space design the project team has developed two tools to assist the process of curriculum mapping or profiling. These provide a further layer of interrogation that builds on the activity-scapes and the game.

The first tool is a ‘future-scape’. It uses several of the cue card decks to envision what learning in the future may look like. The tool is used in response to a hypothetical scenario to develop a picture, a vignette of the types of activities that might support the intended learning and learning outcomes. The future-scape can be built around a moment, a timetabled period, a day, a week, or a year. The future-scape is a form of concept mapping and can include the use of the visual cue cards and personas.

The use of this tool aims to promote fluid discussion and development of rich pictures relating to curriculum objectives, learning stances or preferences, learning activities, space, technology and time in propositional and relational ways that are future oriented.

This activity is a teasing out and visual narration of what is presently fictional but represents future possibilities envisioned by the stakeholders. These possible futures inform what needs to be considered ‘the fragments’ and ‘frayed edges’ that represent ideas, needs and opportunities and how these may be enabled through the design process (Kemp 2001).

The second tool provides a relational matrix that interrogates dimensions of practice theory against a taxonomy of learning. This tool is still in the development stage, however, it is hoped that a final version will be realizable. The introduction of practice theory and a taxonomy of learning as frames for enquiry provides a detailed and authentic way to establish and interpret the relationships between curriculum, technology and spatial affordances



Learning Grid:

This is a simple tool developed specifically for the St Mary's primary school project. It incorporates a range of learning activities within a grid framework. The learning activities included in the grid built on work by Educause and Future Lab and workshops with the staff of St Mary's. Children are invited to colour a grid square around the learning activities they enjoy the most selecting between 5 and 10 activities. This can be done as a group exercise or individually depending on the level of analysis intended in regard to students learning preferences. This tool provides a way of capturing the types of learning activities that a cohort of students are motivated to participate in and provides insights for both teaching staff and designers in terms of what will automatically be engaged with and what needs to be fostered and supported in the learning environment.

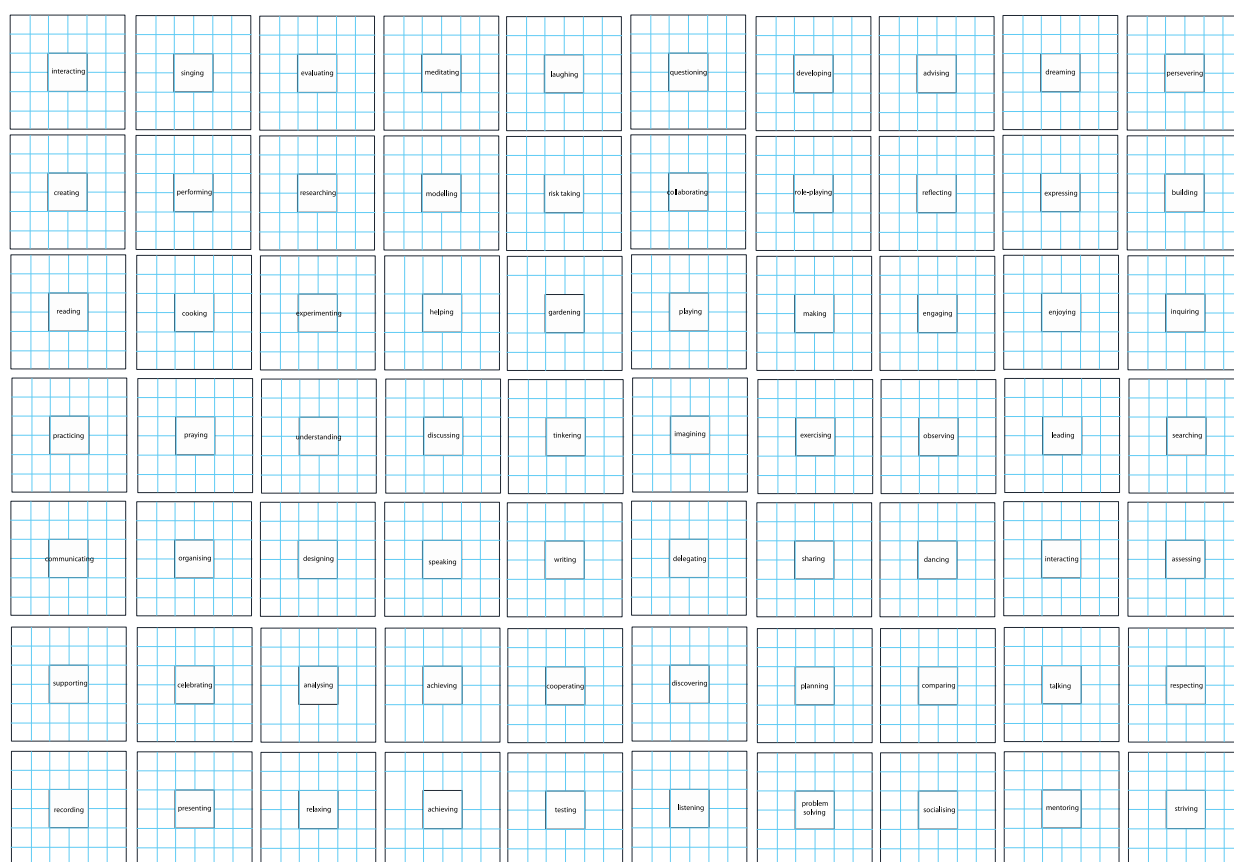


Figure 8; The learning grid developed for the St Mary's project

Self-Completion Research Instruments:

Self-completion research instruments such as journals and diaries have a number of advantages over other data collection research instruments. They are extremely reliable as they provide instant recall of events, responses, activities and feelings and can be conducted in anonymous ways to overcome sensitivity about personal information and opinions (Corti 1993). As a source of information they can supplement interviews and/or focus groups, or become the subject of interviews and focus groups, to elicit more detailed and rich information and insights. The following is a brief overview of the self-completion instruments adopted by the project.



Photo voice methodology, is a form of participatory action research, developed by Wang and Burris, which asks participant to take on the role of a photographer who captures photos that best illustrate the participants perspective (Barrett 2001). A question or series of questions are posed to the participants and they are asked to capture images of what best addresses these questions. Qualifying statements accompany the photos to provide deeper insights. In the same way as 'autodriven' photo interviews increase stakeholder voice, the photo journal represents 'life as they see it' (Hurworth 2003).

Photo or visual diaries are used 'to construct pictures of social reality from the actors' perspective', in this case the students' (Plummer 1983, Corti 1993). The diaries are used to collect more detailed information particularly in regard to 'behaviour, events and other aspects of individuals' daily lives' (Corti 1993). They can be used to capture a moment, a day a week or an idea. Day in the life or week in the life diaries are used to construct pictures of social reality from the actor's perspective (Plummer 1983). These scenarios or vignettes provide more detailed information particularly in regard to 'behaviour, events and other aspects of the individuals daily lives' (Corti 1993).

In the context of the project the journals or diaries take on a structured format rather than a free format to allow for easier analysis of the data. Some open or free sections are included to allow for greater opportunity for understanding the stakeholders' needs and perceptions. The aim of the journals and diaries is to record and reflect on what the participants see as assets and concerns. This is a method often used to engage students in the consultation process and allow them to highlight issues of importance that are then critically discussed in focus groups and workshops. In addition to their use as self-completion tools, photo diaries, day in the life, week in the life and scenarios/vignettes can be used as generative tools for stakeholder engagement. Using personas as a starting point these tools can be used as a strategy for envisaging an holistic playing out of 'reality' and to dig deeper into a persona's life to enable stakeholders to gain insights into the intrinsic pressures, modalities, preferences and behaviors that may represent an extended social reality including and beyond the campus.

Free format feedback can be sought through the creation of feedback spaces on social media sites such as Facebook. Here students can openly and spontaneously provide feedback and insights on what works and what doesn't, what they like and dislike, how they are using the space, and whom they use the space with. The ongoing dialogue provides a rich source of information to inform the ongoing use and management of a new space and also the development of future spaces.

A simple like dislike sticky note exercise is also valuable and can be quickly and easily conducted with students as a one off or as a series to identify different reactions to spaces dependent on whether the space is a totally new experience or whether the nature of activities being undertaken and or the technologies used in the space shifts.

The array of visual tools described above form part of the protocol for stakeholder engagement, and can be mobilised in a range of workshop and focus group activities. Through a curatorial process tools can be ordered into 'authentic' sets of images, scapes and games that speak more pertinently into a particular practice or array of practices and their authentic activities as they relate to the project at hand.



Benchmarking

The project also used tools developed by others in order to compare the effectiveness of the tools developed by the project against those already in existence. Existing tools used include; Culture Cards by DEGW, the Culture Hunt developed by Engine Design, the Dreamcatcher developed by Ruth Churchill Dower of Isaacs UK in response to Futurelab's call for informal learning ideas. Messy Maps, which are a form of mind mapping, use images and words to capture students' ideas about a particular topic or place to develop detailed and textured insights. The Archaeological Hunt used by Future Lab was identified for its potential to engage stakeholders with the value of historical aspects of their institutions, curriculum and learning approaches and to highlight the importance of assessing what is, alongside what should be.

The Models

A series of worked examples to demonstrate the use of the tools and the processes have been developed to guide others in their use, and illustrate what the protocol and tools might produce. The following provides a brief summary of the models developed.

Case studies

A case study framework was developed to provide a consistent and informative approach to capturing what fed into the design process alongside both pre and post-occupancy evaluation of learning space design. The framework has two variations to provide for both pre and post occupancy evaluation of existing and new leading edge learning spaces. The framework has been designed with particular curriculum intentions in mind, including both formal and informal spaces.

The case study framework reviews the processes needed or processes undertaken for the development of the learning spaces, including funding, vision, stakeholder engagement and includes post occupancy ethnographic studies to evaluate the performance and use of the space related to the intended spatial practices and curriculum/ learning objectives and activities. The case study model uses the Lens card categories as a way of ordering the review of the projects in a consistent way. Under each Lens a series of questions are posed. These questions assist in guiding the planning and review processes. Development of the line of enquiry for the case studies has been informed by the broad range of projects reviewed and the cross disciplinary experience of the project team.

Culture hunt

Building on the work of Engine Design, a model for pre and post occupancy culture hunts has been developed. The model aims to help observations that will inform an understanding of the 'success', 'failure' of the space and 'lessons learnt'. The culture hunt creates a rich tapestry of images, comments and observations that serve to contribute to an evaluation of how the space is really being used as opposed to how it was intended to be used? The hunt focuses on behaviors, equipmental engagements, activities, social interactions, attitudes, and flows of people and things. In the context of the project it can be undertaken as a snapshot or a longitudinal study.



Workshops

In the context of this project ‘a workshop refers to interactive, usually one-off, intensive, face-to-face, educational initiatives that require input from all present and result in benefits for both participants and facilitators’ (ALTC Working with Workshops). The workshops are conceived of as transformative processes that facilitate generative dialogues and visual narratives that serve as interpretable artefacts.

The project has developed a series of workshop models through an iterative process of designing and facilitating workshops with stakeholder groups. The workshops engage stakeholders in a ‘liminal space’ where they are free to ‘play’. The workshops are designed to focus participants endeavors on the various dimensions and considerations of a learning space starting with meta level considerations such as the values and strategic aims of the university, graduate attributes, learning approaches cascading through persona development learning activities, to technology and spatial affordances. Different aspects of a project are brought into focus at different stages of project development.

The use of one or a combination of the tools developed within the workshop models support playful and collaborative engagements. The workshops can take many forms to address specific intentions. The design of the workshops and the use of the tools, both visual and textual, therefore draws on game and play theory to engage participants and facilitate safe or politically neutral environments that allow participants, through discussing and negotiating, to develop shared conceptual understandings. They enable highly effective methods for sensemaking and framing, eliciting and subsequently promoting a diverse range of stakeholder views, expertise, orientations and knowledge to be externalized in nonthreatening ways to create a shared ‘canvas’ for synthesis (Kolko 2010). Through the development of shared understandings and visions of the future, the intention is for stakeholders to have ownership of the project at hand and a vested interest in its successful implementation.

Focus Groups

The project team was already familiar with the use and value of focus groups to enquiry and research processes. The main benefit of focus groups is acquired through group interaction and the opportunities for drawing forth multiple or shared views within a group context and the reevaluation of individual views in light of discussion. Making these views explicit brings to light the attitudes, feelings, beliefs, experiences and reactions of participants and allow researchers to uncover what is salient and why (Gibbs 1997, Morgan 1988). Like any social interaction, this process can either be empowering, with the group working as a unit and trust developing, or they can be intimidating for individuals. To overcome the social tension visual cue cards are introduced to focus group sessions providing a starting point to prompt, stimulate or focus dialogue. Individuals are united through a common non-threatening and familiar stimulus. As with workshops, what is important in focus groups are the insights and information brought forth through the interaction of the participants (Gibbs 1997).

Focus groups can be used in the preliminary and exploratory stages of a project and also the evaluation stages of a project. In combination with other methods they provide for triangulation and validity testing if these are identified as imperatives (Morgan 1998, Gibbs 1997).



2. Project Website

The project is in the process of developing a 'scaffold' website. The website will provide the following;

- a repository and resource for learning space research and learning space projects
- a repository for case studies evaluating new learning spaces
- a final dissemination point for protocols, tools and models
- links and or access to project publications
- a substantial bibliography of publications relating to the design of learning spaces
- an annotated bibliography
- links to other resource sites.

The resources provided on the 'scaffold' website aim to inform and support participatory strategies for developing briefs for next generation learning environments. In addition the strategies hold the potential to transform spaces and practices in the higher education sector.

Deliverables

In addition to the above outcomes this project has achieved the delivery of a series of workshops at local, national and international events. The workshops have been through invitation to facilitate generative dialogues for other projects and as collocated events to enact the ideas and tools presented in conference and journal papers and invited presentations around the dissemination of the project.

The workshops have engaged a broad cross section of stakeholders and assisted in the evaluation, development and dissemination of the outcomes of the project. They have also begun to demonstrate the potential of the processes, tools and models to develop the capacity for change both in terms of approaches to the design of next generation learning environments and in terms of pedagogical approaches to make more effective use of new spaces to facilitate authentic learning.

The generative processes and the tools developed by the project support the creation of rich visual and textual artefacts that are interpretable (Sanders 2000, Loi and Burrows 2006). In many ways they enable participants to enter into design moments; just as designers use drawings to create 'visual conversations' the artefacts operate in similar ways to sketches providing conversation pieces that speak to the participants and in turn to others.

The tools and the game therefore provide 'things-to-think-with' and 'things-to-speak-to' that start to enable participants to actively engage in the design process by giving them ways of talking back and 'expressing design moves' in a similar way that sketches do for designers (Brandt & Messeter 2004). The processes and tools developed in the project do not replace but rather enrich and compliment the data gathered via more traditional methods in the design brief development process and evaluation processes.



Critical success factors

The project from the outset was ambitious and required focused and critical exploration of possible processes, tools and models to create a protocol for informing curriculum-led human-centered learning space design. The process required a considerable gestation period that consumed the first nine months of the project timeline. At the end of this gestation period a number of ideas for tools, models and processes had germinated. These then needed to be developed, tested, refined and retested through a series of iterative cycles. A series of design briefs were then prepared to guide this development and testing process.

This orienting of the project took much longer than anticipated requiring an intense period of activity for the development and testing of the protocols, tools and models during the second stage. The multi-disciplinary nature of the project team ensured an informed and holistic critique and evaluation of the tools and models as they were evolving.

Unfortunately, in the relatively early stages of the project two institutional members had to withdraw due to other commitments. Their input to the project was still of value with one institutional representative engaging in ongoing dialogue around the project and the development of the project outcomes. This dialogue provided an additional layer of critical reflection and evaluation to the project.

In order to mobilise the project initiatives and facilitate a concentrated development stage a project control group, consisting of the project leader (Susan Sherringham) the project officer, and two team members, Dr Susan Stewart and Sue Serle, was formed. This enabled regular meetings, a strong pool of the necessary experience and a forum for the open debate and critical analysis required to progress and refine the protocols, tools and models being proposed. The formation of the control group also facilitated the introduction of a number of theoretical positions, and in turn studies of existing frameworks and their review providing insights into the direction the project might take, suggestions of the types of tools and models that needed to be developed in response to the integration of particular theories and frameworks, and the types of stakeholder engagements that might prove effective in achieving the project goals.

The iterative nature of the project, developed through an action research framework, allowed the protocol, tools and models to be tested in the field, refined, retested and developed. This embedded evaluation and refinement process enabled the protocols, models and tools to be developed further than a single cycle process.

Whilst most stakeholders embraced the methods and tools being tested there was still a level of resistance and skepticism from some participants; this was typical through each iteration of the testing and development of the various project elements, however, stakeholder reservations generally were allayed through participating in the workshop sessions. This was one of the benefits of using an action research framework as stakeholders could experience the methods in action..

Overall the action research method and the designerly approach have both contributed to the success of the project and enabled a fluid and iterative development of the elements of the project, through cycles of testing, evaluation, critical judgment, refining and improvement.



Implementing project resources

The protocol, tools and models developed provide a suite of easily accessible resources for the support of developing the vision and the brief for new learning spaces and the pre and post occupancy evaluation of existing and new learning spaces,

The protocols and tools have been tested, in part, through 'live' university projects at both institutions, and in part through workshops and focus groups with stakeholder engagement involving senior executive management, faculty management, facilities management, education designers, university services, academics and students. These engagements have provided insights into the potency of collaborative stakeholder consultation using generative tools to envision alternate possibilities for future oriented learning environments.

The workshops undertaken over the course of the project for the purpose of both testing and disseminating the project also brought together academics, facilities managers, education designers and spatial designers from a cross section of universities and engaged them in collaborative and generative enactments of the processes tools developed by the team. Participants generally were enthusiastic about the tools and processes the project was developing and could see many applications for them in their own institutions. Requests for sets of the tools and for the project team to facilitate future workshops from participants were common.

The potential use of the protocols, tools and models stretches far beyond their use in the development of next generation learning environments for higher education. Many participants have recognized the transferability of the tools and processes to other organizational learning and student learning applications. In addition the tools and processes are equally applicable to learning spaces in the school and vocational sectors, as they are to higher education.

The use of the protocol and tools was further developed through a live project working with St Mary's Primary School North Sydney. This demonstrated the application of the resources to a wider audience within the education sector. The project involves the assessment of newly built learning spaces, completed under the Building the Education Revolution NSW Government initiative, through an envisioning process involving staff, students and parents. Through facilitated workshops the using the tools and models the stakeholders developed a rich picture of possibilities for improving the spaces. The insights gained and the projected futures imagined, provided initial briefing material for a group of fourth year design students in the School of Design, University of Technology Sydney.

These students then engaged in a further cycle of enquiry through participatory processes with the staff and students at St Mary's and developed a series of design propositions for enhancing the learning experiences and supporting the learning activities within St Mary's School. These design propositions address a series of activity-scapes that came to view through the action research process alongside a range of spatial/object interventions to assist in reorienting practices within the learning spaces.



Dissemination

The project engaged a combination of embedded and information provision approaches consistent with the ALTC framework and dissemination reports. The embedded aspects of the project dissemination within and across the institutions were achieved through the action research project methodology and approach. Whilst the project was focused within two universities, these universities have institutional policies and practices sufficiently different to test and produce an appropriately flexible system of protocols, tools and models. The project outcomes have been further interrogated through the action research model of dissemination and feedback, engaging national and international stakeholders in the evaluation and testing processes.

The dissemination of the project to date has been through a series of workshops, colloquia conferences and publications. This has facilitated dissemination between universities through the workshops in Sydney and overseas, involving participants from other states and countries, members of other institutions and architectural, design and facilities management practices to facilitate holistic feedback and evaluation. Ongoing dissemination of the project shall be via the project website (currently under construction), the seminar and workshops held in July 2011, in collaboration with the *Spaces for Knowledge Generation*, ALTC Priority Project, and the ReShaping Learning Conference, in collaboration with Brighton University, being planned for 2012. Funding is currently being sought from the Arts and Humanities Research Council, UK, Research Networking, to assist with this collaboration.

A summary listing of the presentations, focus groups, workshops, book chapters, journal articles and conference papers is contained within Appendix A. Summaries of workshops and focus groups can also be found in Appendices D & E. Reports on these activities are available from the project website. In addition to the above publications and presentations, the results of the project have been informally disseminated internally at both UNSW and UTS through pilot projects, master plan projects and staff engagement. Presentations, relating to the UTS pilot projects, to other Universities and external interested parties through learning space forums, disseminate the project outcomes to a national audience. The website will provide the resources and models necessary for a broad range of higher education institutions to benefit from the project.

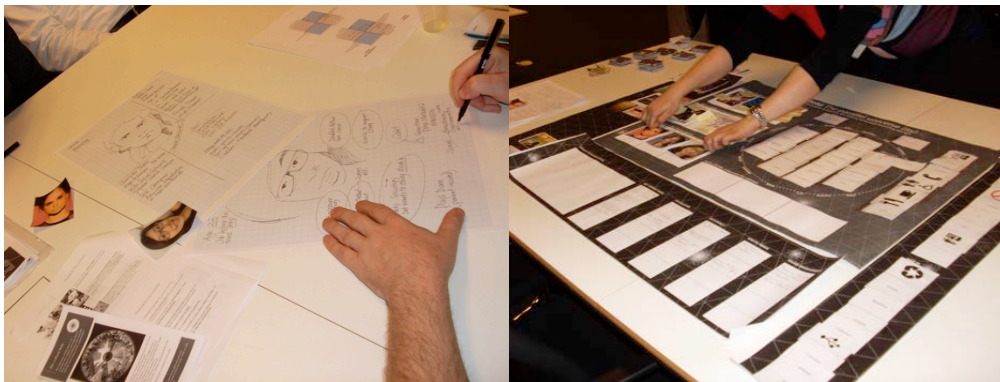


Figure 9; Persona Development and the Parallel University game - Scaffold Workshop, Sydney, 2010. Photograph: Susan Sherringham.



Linkages

During the project linkages were developed by the project leader, initially as a member of project reference groups and workshop facilitator, leading to collaborative engagements. Nationally these linkages include collaborative engagements with strategic consultants, architectural and design practices through pilot projects undertaken at UTS and several linkages with strategic ALTC priority areas. Internationally, linkages have been made with a number of individuals and government funded projects.

Linkages with strategic priority areas

The project has developed linkages with other ALTC learning space projects leading to a number of collaborations. These include:

ALTC Priority Project - "A comprehensive learning space evaluation model" (2008) project involving Nicolette Lee (Swinburne University of Technology), Julie Dixon (Victoria University), and Trish Andrews (University of Queensland).

This linkage led to two day colloquium disseminating outcomes of both projects. The first day was dedicated to presentations on the implication of project outcomes for new evaluation strategies for learning environments with the second day involving a full day workshop engaging participants in the SCAFFOLD projects, its processes, tools and models.

ALTC Priority Project – Spaces for Knowledge Generation: a Framework for Designing Student Learning Environments for the Future, led by Dr Kay Souter of Latrobe University in partnership with Charles Sturt University, Apple and Kneeler Design P/L.

This linkage led to a forthcoming national seminar / workshop series that also links with several other priority projects. This series is scheduled for the second half of this year.

ALTC Priority Project - Design Based Curriculum Reform Within Engineering Education, led by Dr Carl Reidsema (UNSW & UQ) in partnership with Queensland University of Technology, University of Melbourne, and University of Sydney.

This linkage led to several invitations, and workshops to facilitate and present workshops engaging participants in the processes, tools and models of the SCAFFOLD project. These workshops were designed to assist participants consider their own ALTC project from different perspectives and to break through preconceptions.

ALTC Priority Project – Retrofitting Learning Spaces, led by Geoff Mitchell of QUT in partnership with Edith Cowan University and Charles Sturt University.

This led to participation in the evaluation of the principles initially proposed by the project.



International Linkages

The project has established linkages with the CETLD project at the University of Brighton. This project, led by Anne Boddington, Dean of the Faculty of Arts and Architecture, and Dr Jos Boys, Senior Research Fellow, involved a partnership led by the Faculty of Arts at the University of Brighton in collaboration with the Victoria & Albert Museum (V&A), the Royal Institute of British Architects (RIBA) and the Royal College of Art (RCA).

‘The CETLD was developed to extend the educational and research opportunities and reach of all partners focusing specifically on object scholarship and object based learning explored through and across the archives and collections of all partners’. <http://arts.brighton.ac.uk/research/cetld>

The project culminated in a conference, ReShaping Learning in July 2010. Project members Susan Sherringham and Susan Stewart were invited to present at the conference. Susan Sherringham presented an overview of the project through a poster session and workshop. Following the conference Susan Sherringham and Susan Stewart were invited to contribute a chapter to the book, *ReShaping Learning: a critical reader*. The members of CETLD and Scaffold hope to host a second ReShaping Learning Conference for Australia, to be hosted by the University of Technology Sydney.

Linkages with disciplinary and interdisciplinary areas

The project outcomes have received wide interest in terms of their capacity to develop briefs in higher education, to evaluate learning spaces and to provide transformational participatory processes. Due to the transferability of the outcomes the interest in the processes, tools and models encompasses academics, facilities managers, project managers, designers and educators who are keen to use the outcomes for the intended purpose but also for educational purposes and participatory engagements outside the higher education sector.



Evaluation

The overall evaluation strategy for the project included an embedded iterative process of formative evaluation within the project activities. The completion of the case study framework, the mapping of the protocol, the case studies, the draft protocol, the development of the tools and models and the workshops were all undertaken within an action research framework through a series of evaluation cycles. Each of these included an evaluation process that extended to the full project team, project reference group, and a broader group of stakeholders.

Action Research Framework

As outlined in the section on approach and methodology, the project was undertaken in an action research framework within which cycles of reflection, evaluation and action are embedded into the process.

Participation in the project involved a cross section of stakeholders, students, academics, deans, associate deans (teaching and learning), facilities management, faculty managers, designers and architects, to provide a cohort representative of a 'real project' for useful and meaningful feedback and evaluation. The cohort will also represent potential channels for dissemination. A series of evaluation models for engaging the various stakeholders was developed for example probes, surveys, focus groups and workshops.

The workshops represent the primary self-evaluation, feedback and development process for the protocols, tools and models. The workshops used real and hypothetical scenarios or pilot projects as their premise. Evaluation was in the form of participant observation, analysis of the outcomes / artefacts and generative dialogues and the feedback from the workshop participants. These evaluation processes then fed into the development of the project elements in the next stage. During the workshops participants were asked to evaluate a process, tool or model using a 'keep, change, toss' process of evaluation. At the conclusion of each workshop participants were asked to evaluate the tools and processes used through a feedback survey consisting of a series of questions against a five point Likert scale and open ended comments. An example of a workshop evaluation survey and participant feedback can be found in Appendices B and C. Each workshop built on the previous workshop with processes, tools and models being reevaluated, modified and refined in response to the participants feedback and team member evaluation. Models, and facilitator guides have been developed so that others may easily facilitate similar workshops.

Development of the case study model has been evaluated against design methodology and ethnographic methods, and existing case study frameworks presently used in the evaluation of learning spaces. The case studies provide a benchmarking process against both national and international practice in the priority area of teaching and learning spaces with a particular focus on curriculum-led human-centred outcomes.



Formative Evaluation

Ethnographic fieldwork, workshops, probes, interviews, focus groups and surveys undertaken at different stages of the project where subjected to analysis and review by the team providing feedback and evaluation for the development of the protocols, tools and models.

Workshops and focus group participants provided immediate feedback and evaluation relating to the tools and the processes. As previously mentioned this was captured in three ways. Firstly through a keep change toss assessment of the process and or tools being trialed whilst in action. Secondly through a formal evaluation survey, as previously mentioned, and thirdly through audio recording of the workshop and focus group discussions. Transcripts of these discussions were analysed to gain further insights into the use of the tools and processes from the participants' perspectives in order to identify areas for improvement.

Finally the projects completed at UTS and UNSW during 2008, 2009, 2010, early 2011 and the St Mary's partnership have allowed the processes, tools, and models to be tested and evaluated at varying stages of project evaluation and development.

External evaluation of the project was facilitated through the involvement of the reference group in the evaluating the approach and methodology, and the project outcomes in terms of the tools and models for brief generation and tools and models for evaluation. This was fed back into a final refinement cycle for the tools and models published on the website. The website will seek feedback and evaluation from external stakeholders and interested parties for ongoing refinement of the protocols, tools and models.

Impact and value to the sector

The protocol, tools and models developed through the project provide a unique and applied method for developing design briefs and for evaluating next generation learning environments. The impact of the project is evident in three significant ways. The first is the new learning spaces being developed through the testing and use of the tools and protocols that are receiving positive feedback from students, staff, management and external visitors; these have predominantly been realised at UTS. The second is stakeholder engagement with and enthusiasm for the protocols and tools as evidenced by the workshops and the subsequent interest from other universities to involve the team in the development of new learning space projects and or to have access to the protocol, models and tools.

Thirdly the interest demonstrated by international academics and facilities managers including the CETLD partnership with Brighton University. Visiting academic Shona Cameron, Director Learning Services, University of Strathclyde, Glasgow. Following her visit to UTS and participation in the Design@Eng Workshop Cameron commented that 'you are much further progressed with learning space development than we are in the UK'.

The most valuable aspect of the project is the emphasis on collaborative and inclusive processes and the richness of knowledge and the enthusiasm for improvement and change that this can bring to the development of learning space projects. Through the designerly approach to the project the team has been able to develop a rich resource of tools and models that can be easily integrated into a number of stages of the design process when developing and evaluating next generation learning environments.



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Websites

DEGW

<http://www.degw.com/>

Educause

<http://www.educause.edu/LearningSpaces>

Engine Service Design

<http://www.enginegroup.co.uk/>

Futurelab – innovation in education

<http://archive.futurelab.org.uk/>

JISC Infonet, Planning and Designing Technology-Rich Learning Spaces

<http://www.jiscinfonet.ac.uk/infokits/learning-space-design>

Learning Landscapes

<http://learninglandscapes.lincoln.ac.uk/>

Our New School

<http://www.ournewschool.org/>

Project Faraday

<http://www.goved.co.uk/projects/faraday>



Appendix A

The following summary listing represents the key publications and workshops through which the project has been disseminated to date. Dissemination of the project is ongoing with further workshops, presentations and publications underway for 2011 and 2012 including the launch of the 'scaffold' website.

Book Chapters

Sherringham, S. & Stewart, S., 2011, 'Fragile Constructions', in *ReShaping Learning: A critical reader. The future of learning spaces in post-compulsory education*, Boddington, A., & Boys, J., (eds.), Rotterdam: Sense Publishing, (in press due for launch June 2011).

Journal Articles

Stewart, S., & Sherringham, S. 2010, 'Spatial culture, learning and design: shifting ecologies of practice', *IDEA Journal, Interior Ecologies: exposing the evolutionary interior*, Vol.10, No.1 pp. 2-12

Sherringham, S., & Serle, S., 2010, "Using Visual action methods in the design process", *International Journal of Design Principles and Practices*, Vol. 4, No. 3, pp. 179-192.

Sherringham, S., & Serle, S., 2010, 'Developing curriculum-led human-centred spatial design briefs for next generation learning environments in higher education', *International Journal of Design Principles and Practices*, Vol. 4, No. 3, pp. 125-136.

Sherringham, S., & Serle, S., 2010, "Visual Action methods in the research process", *International Journal of Interdisciplinary Social Sciences*, Vol. 5, No. 10, pp. 371-385.

Conferences – refereed proceeding

Sherringham, S., & Serle, S., 2010, 'Visual action methods in design research and learning', *ConnectED 2010, 2nd International Conference*, University of NSW, Sydney, Australia

Conferences – unpublished workshops

Sherringham, S., & Serle, S., 2010 ConnectED 2010 Conference, University of NSW, Sydney, Australia

Sherringham, S., & Serle, S., 2010, Design Principles and Practices, University of Chicago, Chicago, Illinois

Sherringham, S., & Serle, S., 2010, Design Principles and Practices, University of Chicago, Chicago, Illinois

Sherringham, S., 2010, Scaffold, University of Technology Sydney, Sydney, Australia



Invited presentations

Sherringham, S., 2009, New Learning Environments, Design@Eng, University of NSW, Faculty of Engineering,

Sherringham, S., 2010, Reshaping Learning, Brighton University, Brighton UK

Sherringham, S., 2010, Scaffold, University of Technology Sydney, Sydney, Australia

Workshops

Susan Sherringham, Dr John Holm, DEGW, & Dr Chris Stevens, 2009, Soft Systems Methodology; Theory and Practice, University of Technology Sydney

Susan Sherringham & Susan Serle., 2009, Creating Communities of Practice in Engineering Education, Design@Eng, University of NSW, Faculty of Engineering

Susan Sherringham & Dr Susan Stewart, S., 2009, University of Technology Sydney, Kuring-gai Campus

Susan Sherringham, 2010, *Scaffold Pilot*, University of Technology Sydney, Sydney, Australia

Susan Sherringham, 2010, *Scaffold Developed*, University of Technology Sydney, Sydney, Australia

Susan Sherringham, 2010, *Scaffold: Envisioning future learning*, Space 2 Learn Project, St Mary's Primary, North Sydney & UTS School of Design

Susan Sherringham, 2010, *Scaffold: Discovery*, Space 2 Learn Project, St Mary's Primary, North Sydney & UTS School of Design

Susan Sherringham, 2010, *Participatory engagement techniques for K-6*, Space 2 Learn Project, St Mary's Primary, North Sydney & UTS School of Design

Website

'scaffold' space, curriculum & affordances for future focused learning design

This website is currently under construction and will be populated with the tools, models and case studies in downloadable formats. It will provide additional information about the project, its findings and outcomes, including an extensive bibliography.



Appendix B

Evaluation and feedback form from final project workshop



Workshop: Tools for Developing Stakeholder Engagement & Design Briefs -

Presenters: Susan Sherringham and Susan Stewart, UTS and Sue Serle UNSW

Date: 3rd September 2010

Thank you for your participation in the Australian Learning and Teaching Council Scaffold Workshop at the University of Technology Sydney. We would appreciate your assistance in completing the following evaluation. Your feedback will assist us in the development of our research and future workshops.

WORKSHOP EVALUATION

| Scaffold | Strongly Disagree | Disagree | Unsure | Agree | Strongly Agree |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Using visual cue cards assisted in eliciting ideas and opening up the conversation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The Lens card helped think about the questions in rich and interesting ways. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The development of a persona helped create insights, considerations and empathy. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Participating in the game enabled consideration of a range of challenges and opportunities for next generation learning environments | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The strategy of using game playing for eliciting ideas, opinions and gathering varied stakeholder perspectives was useful to the players. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The game opened up different ways of thinking about learning environments. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The game process allowed a rich picture of ideas and considerations to be captured to inform the development of a responsive learning environment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The visual narrative outcome on the game board was representative of the players' discussion. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. What was valuable about this workshop? | | | | | |
| 10. Would you consider using these methods and tools in the future? | | | | | |

!



Appendix C

Evaluation and feedback from final workshop

Likert scale questions

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|-------|----------------|
| Using Visual Cue Cards assisted in eliciting ideas and opening up the conversation | | 5% | | 45% | 50% |
| The Leans Cards helped me to think about the questions in rich and interesting ways | | | 25% | 50% | 25% |
| The development of a persona helped create insights considerations and empathy | | | 15% | 35% | 50% |
| Participating in the game enabled consideration of a range of challenges and opportunities for next generation learning environments | | | 15% | 35% | 50% |
| The strategy of using game playing for eliciting ideas, opinions and gathering varied stakeholder perspectives was useful to the players | | | 10% | 60% | 30% |
| The games opened up different ways of thinking about Learning environments | | 5% | 20% | 45% | 30% |
| The game process allowed a rich picture of ideas and considerations to be captured to inform the development of a responsive learning environment | | | 15% | 35% | 50% |
| The visual narrative outcome on the game board was representative of the players discussions | | | 20% | 45% | 35% |

Open questions / comments

What was valuable about the workshop

‘the approach to learning’

‘overview of a process that I might be able to use to help link spaces and curriculum’

‘mix of ideas and thoughts around the table’

‘teamwork – different and stimulating’

‘the activities promoted good discussion’

‘a broadening of considerations’

‘a rich collection of ideas and methods that can be used in different ways’

Would you consider using these methods and tools in the future

To this question the response was a resounding yes, including

‘absolutely e.g. in virtual worlds’ and ‘me, institution, yes’

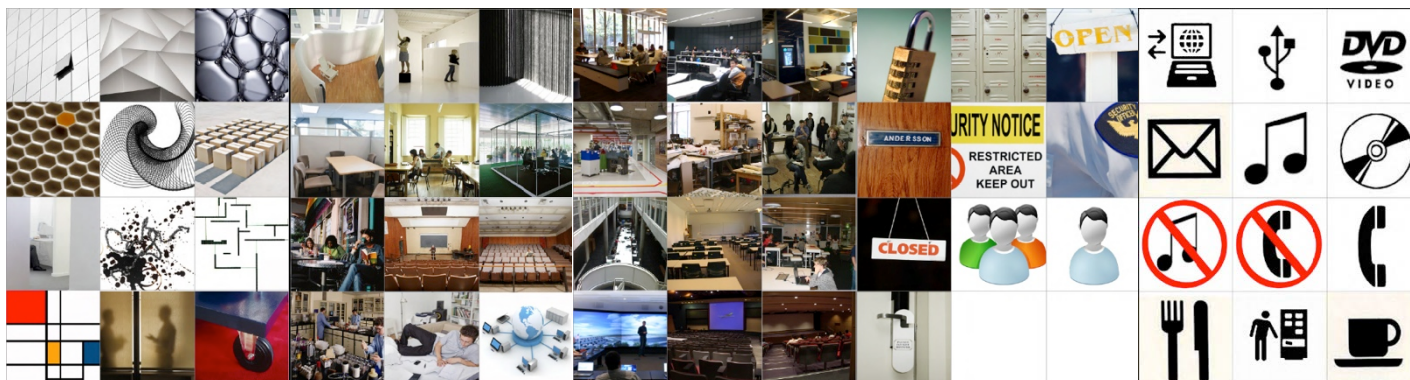
only one participant did not think that the processes and the tools as they were, were successful as they felt them to be too complex

‘application to a concrete project rather than a hypothetical one’



Appendix D

Focus Group Example - Kuring-gai Campus Learning Spaces Improvement



Summary

A focus group session was held at the UTS Kuring-gai Campus with a group of students from the Faculty of Business studying in the areas of Tourism, Leisure and Sport. The project team was interested in the students' perceptions of existing learning spaces on the campus, how and where they currently liked to learn/study, how and where they might like to study given the choice and what types of learning spaces would they like to see in the future.

One of the aims of the focus group session was to use and evaluate one of the tools identified by the project as a potential tool for stakeholder engagement. This tool is a deck of visual cue/prompt cards designed to provide a visual language that can be seen as a uniform language across a group. A prototype tool was designed and developed using a combination of abstract images, pictograms and photos of 'real' environments. The deck was broken into several 'themes' and a series of questions relating to those themes were developed.

In the focus group students were asked to respond to a series of questions. For each question they were to select 9 images that they saw as representing an answer to the question. For each question the students were given a group of cards representing one of the 'themes'. They then discussed what these images meant to them and why they had chosen them. At the end of each question session they photographed the images they had selected. The discussion of each group was recorded digitally to capture how and what the students associated with the cards.

The intention was to also have the students view and discuss the responses from the other groups; however, there were time limitations and this was not possible.

A workshop report has been generated for distribution to the project team members.

A final version of the report will be made available via the project website which will be set up in the first half of next year.



Focus Group Example - Kuring-gai Campus Learning Spaces Improvement



Evaluation

Focus Group Participants:

This feedback has been taken from the audio recording of the focus group session.

- The cards helped us to talk about how we use spaces and what we like
- It was fun
- It was pretty intense

Transcribing of the feedback and the focus group session is still in process.

Focus Group Facilitators:

Generally the session ran smoothly and the students had no hesitation to participating. Generally their understanding of learning spaces and their conceptions of learning were surprisingly conservative.

There were not enough participants to form groups for a range of responses so the students worked in pairs, which perhaps made the process and responses too 'personal'. Having said this, students found the cards useful to help their thinking and prompt thoughts and conversation – they found it quite an intense process

More time for the focus group would have alleviated this and also given students the opportunity to compare and discuss responses across the group.

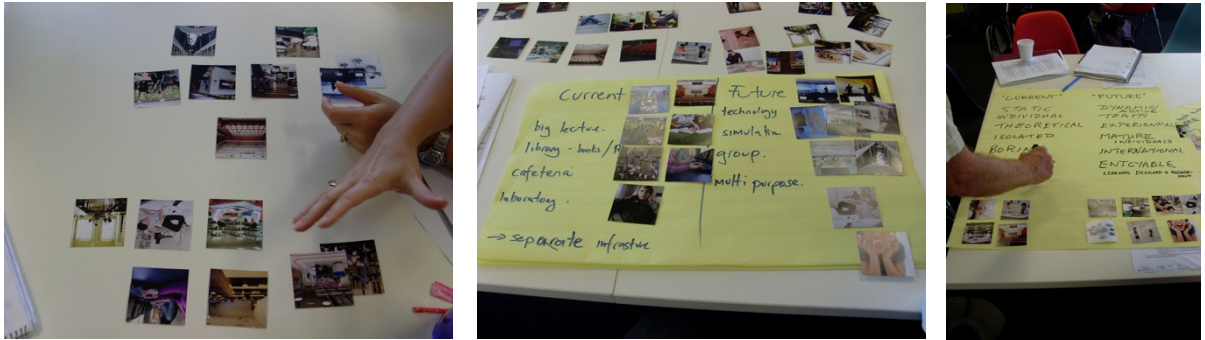
Some points relating to the tool.

- Need more scripted prompts alongside the discussion and cards
- Too many cards and too many alike cards
- Some cards are polar – noise, quiet but do not allow for shades of grey or variety
- Responses to some images were more about 'the particular shot' than what it stood for.
- Themed grouping of cards works
 - learning spaces preferred styles of learning
 - formal learning activities and spaces
 - informal learning activities and spaces
 - support for learning spaces
 - environment, aesthetics, texture & colour



Appendix E

Workshop Example - Design@Eng UNSW - Future learning and Future Spaces



Summary

The project team was invited to run a workshop session as part of another ALTC Priority Project - Project design based curriculum reform within NSW, led by Dr Carl Reidsema of UNSW with partner institutions in Queensland University of Technology, University of Sydney and the University of Melbourne.

The workshop was held in the newly completed Design@Eng floor in the Faculty of the Built Environment at UNSW, Mechanical Engineering building. Design@Eng consists of a large collaborative teaching and learning space, a postgraduate project space, informal learning areas and ancillary amenities areas such as a kitchenette and toilets.

The third workshop aimed to engage with a broader audience and to bring one of the tools developed for the project to the workshop for evaluation along side a similar commercially developed tool. The objective was for participants to be introduced to the concept of visual cue cards as a way of eliciting ideas, promoting discussion and breaking the ice amongst a disparate group of people. The audience represented a diverse group of people from several institutions; both from within Australian and the United Kingdom with backgrounds ranging from education design, engineering education, libraries and business.

The scene was set through a short presentation on global perspectives and emerging spatial approaches in learning technology, curriculum /pedagogy and spatial design. A brief introduction to the teams ALTC project and the tool to be used in the workshop was also included. This was followed by the participants working with the project team in groups using the prototype cue card tool alongside a set of cue cards developed by DEGW to respond to a series of preset questions. The method and its key objectives were explained to the participants followed by an enactment of the method.

A workshop report has been generated for distribution to the project team members.

A final version of the report will be made available via the project website which will be set up in the first half of next year.



Workshop Example - Design@Eng UNSW - Future learning and Future Spaces



Evaluation

Workshop Convener:

"You could SELL the cards" - after the workshops many of the participants wanted to use the technique themselves and purchase a set of cards

- It worked, engineering is a very visually orientated discipline
- Effective way of engaging engineering and breaking down the language problem in an interdisciplinary group
- Strong communication tool
- Good lead in to other sessions of the workshop
- Out of the four sessions it was better organized than the others
- Success in a decent activity, then moving through it. Simple well organized conclusion. If you have a decent activity you don't need to do anything, participants throw energy and debate at it
- Nice; (such as the new engineering space at UNSW where the workshop was held) to use an innovative learning activity
- Stimulating

Workshop Participants:

As the workshop was held very recently the feedback has not been analysed as yet, however, the following are some open comments from the evaluation

- Really engaging,
- A great icebreaker. Before you knew it you were discussing ideas, hands in amongst hands, getting to know the people in your group without any effort
- Where can I get a set of cards
- You couldn't hide behind academic or disciplinary language
-

Workshop Facilitators:

- The enthusiasm for the tool and the method was surprising
- more time needed to be allocated to the cue cards
- the participants felt the introduction was not necessary however it did orient the participants to the exercise





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