The Collaborative Teaching and Learning Centre





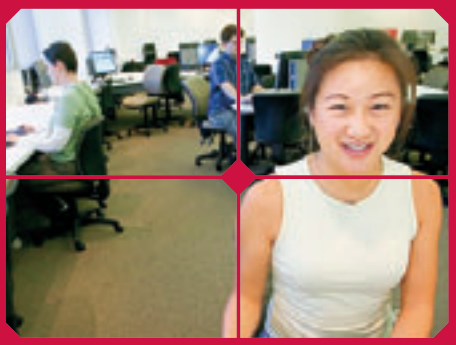


AUSTRALIAN LEARNING & TEACHING COUNCIL

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

THE COLLABORATIVE TEACHING AND LEARNING CENTRE

SIR JAMES FOOTS BUILDING, ST LUCIA CAMPUS



CONTENTS

Support for this project has been provided by the Australian Learning and Teaching Council, an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this report do not necessarily reflect the views of the Australian Learning and Teaching Council Ltd.

2008

Produced by

The Next Generation Learning Spaces Project

Introduction

Professor Paul Greenfield AO,
Vice-Chancellor

The University of Queensland is one of Australia's leading broad-based, research-intensive universities and is committed to the excellence of learning experiences and outcomes for its students.

A key objective of the University is to provide a high-quality learning environment that encourages independent learning and peer-to-peer interaction. To meet this objective, the University, in recent years, has invested in new teaching and learning spaces that are recognised as international benchmarks for excellence and innovation. Furthermore, it has supported the provision of advanced teaching spaces intended for multiple uses that incorporate formal and informal requirements.

The University's first Collaborative Teaching and Learning Centre (CTLC) in the $24 million Sir James Foots building on the St Lucia campus opened in 2005, featuring almost $1.5 million in technology. This award-winning CTLC has attracted worldwide interest with groups from Europe, the United States, the Middle East, South Africa and Asia visiting to study its unique learning concepts.

This publication, which is part of a suite of resources developed to assist understanding of advanced teaching spaces at UQ, has been produced by the Next Generation Learning Spaces (NGLS) project. This initiative, jointly funded by The University of Queensland and the Australian Learning and Teaching Council, is focussed on the research, development and evaluation of new learning spaces within higher education institutions, and has received positive national and international interest.

The Next Generation Learning Spaces project and its findings are crucial elements in facilitating The University of Queensland's provision of excellence in learning experiences and outcomes for students.

Background

The Collaborative Teaching and Learning Centre (CTLC) at the University of Queensland consists of a suite of six innovative teaching and learning spaces that were opened in 2005 at the St Lucia campus to support collaborative approaches to teaching and learning.

These spaces were built as an initiative by the former Deputy Vice Chancellor, Teaching and Learning, (Professor Margaret Gardiner) who considered that the existing teaching and learning space facilities at UQ did not adequately support collaborative pedagogies.

The CTLC spaces were designed to foster collaborative approaches to teaching and learning, both internally in the small and large collaborative teaching and learning spaces and externally through the videoconferencing and access grid rooms. Critically, the design of these spaces was seen as offering teaching and learning opportunities not provided by 'traditional' teaching and learning spaces. The opening of this unique Centre sparked national and international interest. It was intended that the CTLC spaces would support timetabled teaching activities as well as independent study for students. Using the spaces for both teaching and learning activities created particular challenges in managing the space to optimise access for both staff and students.

The development of these spaces represented a considerable investment by The University of Queensland. There is a need to understand how successful these spaces are in achieving the anticipated outcomes particularly those related to fostering collaborative teaching and learning activities for both staff and students. Consequently an extensive evaluation of the Centre has been conducted since 2006 and is ongoing. In evaluating the Centre, we are attempting to better understand the relationship between pedagogy, space and technology. This evaluation has investigated a number of factors including staff and student usage, the reasons students use the Centre, the technology they find most useful, the design aspects of the space and how they impact on learning, how staff use the Centre and the impact of staff development activities.

The University of Queensland has continued the development of innovative collaborative teaching spaces with the opening of spaces at the Gatton Campus and in the General Purpose North 4 building at the St Lucia Campus. Lessons learnt from the evaluation of the CTLC have also informed the design of a number of other innovative, student focused learning environments such as the refurbished Biological Sciences Library and the Engineering Learning Centre.

Large spaces

The CTLC houses two large collaborative teaching spaces that seat up to 90 students. These spaces are used for scheduled classes and are available to students outside of classes and in the evenings for individual or group study.

Each of the large collaborative spaces can be used as a single seminar room or can be divided into five separate and distinct ‘pods’ or self contained group working spaces.

The audiovisual control systems in the room facilitate three distinct modes of operation, which support different kinds of teaching and learning and allow swift transitions between modes.

The default mode is ‘Individual’ which effectively allows the space to operate as a Learning Commons. Large tables and benches along with freely reconfigurable seating provide space for up to ninety students to work individually or as part of groups. A total of 36 PCs are provided, all with internet access and connection to a networked print server.

The student-to-PC ratio in the large collaborative spaces is deliberately set at around 3:1, which encourages collaboration. The rooms are spacious and well lit with panoramic windows providing views of the University Colleges to the south. Rooms in the Centre are available for use in this mode in the evenings until 7pm and whenever there are no scheduled classes.

Although the 'Individual' mode can be selected during teaching sessions, there are two other modes of operation which are more commonly used during classes; teachers have the ability to shift between modes during a class.

A teaching session will often start by selecting 'Seminar' mode which allows the teacher to address the whole group to define the tasks and provide background information. Engaging 'Seminar' mode sets off a train of events using motorised blinds, lighting changes and audio cues which re-orient students' attention to the lectern at the front.

To facilitate group work, 'Pod' mode is engaged. This physically divides the room into five separate and distinct working spaces, complete with projection and sound systems under the students' control to facilitate group interactions. Again, motorised blinds, electric screens, lighting changes and audio cues make the transition overt, almost theatrical and set the scene for a different phase in the teaching session. Each 'Pod' can also be monitored and shared from the lectern.

There are two large projection screens in each room that ensure clear sight lines everywhere in the room. The technology and facilities in the large collaborative rooms enable each of the three modes and support collaboration in teaching and learning practice.

Small spaces

The CTLC also houses two small collaborative spaces that have all the same facilities as the large collaborative rooms.

These are configured for 25 students (on the third floor) and 40 students (second floor); somewhat smaller group sizes than in the large collaborative rooms. The small collaborative spaces also have the ability to split into three pods, but these are not physically separated.

These rooms feature curved walls which provide a warm and intimate feel. PC workstations are spread around the walls on a single, continuous bench. Students can work at the benches or form groups at the three large curved pod tables. Student work from each pod is displayed on large plasma monitors fixed to the walls, instead of the projection screens used in the large spaces. The output from any pod may be selected for display on the main projection screen for discussion with the whole class.

External focus

The two externally focused spaces in the CTLC have videoconferencing and access grid conferencing equipment. Each room has the facility to receive and display multiple video feeds from each end point or node.

The Videoconference room on the second level can connect to any standards-based (H323) Video-conferencing end point. The room can be configured to present from the lectern to a remote audience; to allow a remote presenter to interact with an audience in the room or to allow for group-to-group remote interactions based around the central pod table. Control of the Videoconference functions is possible either from the lectern or the Pod.

The corresponding room on the third floor was initially equipped to use the then-novel “Access Grid” technology. This allows for display of pictures from a number of end points across three large screens with control from the lectern or Pod table.

Eight student PC stations are provided on benches around the periphery of the room. A sliding wall allows the Videoconference and Access Grid rooms to be joined with the small collaborative spaces and this is sometimes opened to allow for larger groups such as the Peer Assisted Study Sessions (PASS). Pod mode is commonly used for these occasions with tutors roaming the space and making use of the group presentation facilities.

Pedagogy

The spaces in the CTLC were designed to support collaborative modes of teaching and to be flexible teaching spaces.

Teaching and learning spaces of the traditional physical university environment focus on teacher-led pedagogies (Dane & Jamieson 2005; Edwards 2000; Jamieson *et al*. 2000). The CTLC was a push for a new type of space within an existing structure.

The University was provided with a range of possibilities by Wilson Architects. These options were considered by the teaching staff and other likely users of the new space. The outcomes identified three main pedagogical styles: teacher-led learning; group-led collaborative learning; and individual learning. The technology and space designs resulted in the three modes of the CTLC rooms: Seminar, Pod, and Individual modes, which are in turn based upon the three identified likely pedagogies. The selection of an operation mode adapts the room in terms of lighting, separation screens and projection options to best enable the intended pedagogy (see images below).

The CTLC spaces exhibit a range of alternatives that suit varying pedagogical styles and needs. In all the planning stages, focus was maintained on intended learning outcomes and probable uses of the spaces. In addition to the technological and spatial aspects of the new rooms in the CTLC, the architects developed an inviting, warm and engaging space where people wanted to be, and that had formal and informal learning areas.

All of the CTLC spaces were designed to encourage collaborative interactions within a teaching and learning environment, and were largely created from the perspective of the student.

An example of multiple pedagogies within one class can be demonstrated by the Veterinary students who use the CTLC rooms. These classes start in Seminar mode, during which the teacher provides background information or a problem to be solved through collaborative work. The class then splits into Pod mode where each group works to determine a diagnosis and treatment for their case. The Pod groups then present their findings to the rest of the class by projecting them to the front of the room for all to access. This class format allows the students to start with a knowledge basis then to work collaboratively on a problem, and to present their solution to the whole class.

Academics describe their teaching experiences in the CTLC spaces:

"The dynamic was improved: the room allowed us to break into smaller groups and enabled better interaction between the students, and the staff and students"

"The students like the facilities. You can get through a lot of material without it causing confusion, as happens in large lecture theatres."

"Most other 'computer lab' spaces don't allow the kind of movement and collaboration that is possible in the CTLC rooms."

"Students haven't just been in the rooms, we've made use of the foyer areas and the outside terrace. Students respond well to using the space in different ways."

Space

The CTLC evolved through a series of workshop events in conjunction with University teaching personnel and key stakeholders.

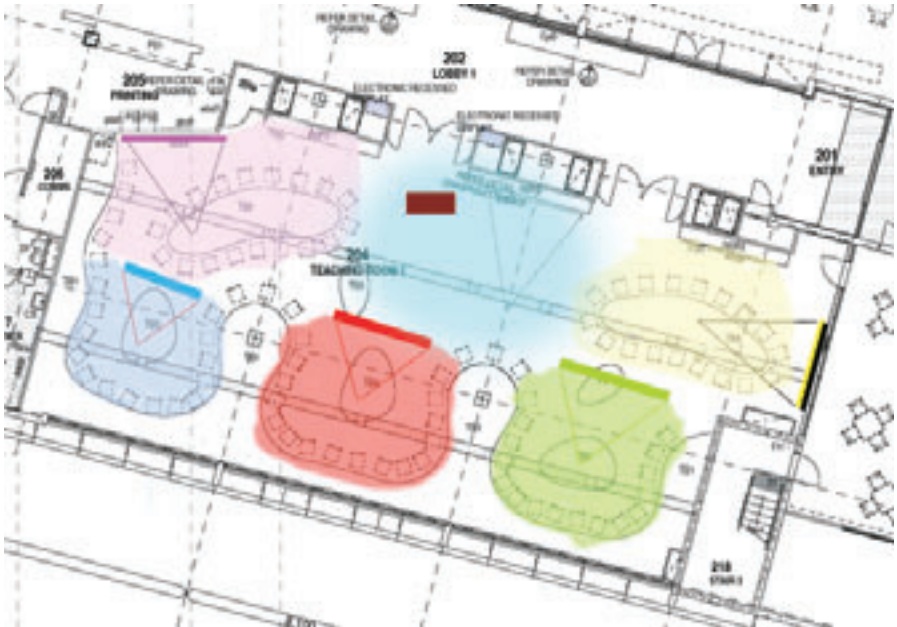
These events were facilitated by Wilson Architects who encouraged users to consider alternate methods of teaching by analysing and abstracting the existing teaching models. The outcomes of this method of abstraction led us to develop a series of structured and unstructured teaching spaces able to offer flexible teaching methods with an emphasis on project based learning.

The flexibility embedded into the space looks at the ability to switch between modes of teaching without moving furniture or walls. At the beginning of a session, lecturers can focus the students on their project work for that particular session. This instructional mode has a preset room setting of lights focused to the lectern and projected images of content to the lecturers' flank. Switching from this mode to Pod mode the room's environment also adjusts with blinds automatically and theatrically lowering to the windows, projection screens dividing each of the spaces from each other, lighting lowers and focuses each group with each Pod group having control of their collaborative work production via a document camera, computer and projected image.

The lecturer can then switch back to feedback mode by sharing the content of each group with all or other groups. Again the lighting can automatically shift to refocus the attention of the students. Furniture in the space is deliberately curved to facilitate movement and enough space has been left open to enable lecturer/student migration through the room.

As part of the idea that the environment of space can have a direct affect on the process of teaching and learning, two different room types were developed. The larger rooms were seen as active noisy spaces. These rooms are predominantly white and light with the ability to moderate the space through lighting and screens. The other space is more introverted 'quieter' space which is timber clad and warm with an organic, less structured feel. The technology however is similar in how it can be enabled.

The CTLC provides a level of student interaction and empowerment to adapt the spaces to suit the individual's or the group's needs. The teaching and learning rooms are also supported with breakout spaces with access to computers (wired or wireless), a student lounge, parenting facilities, integrated plasma displays providing information about the space, and a coffee shop.



Technology

The technology design in the CTLC evolved in response to the pedagogy envisioned for the space. From the beginning, technology was considered in three broad categories: IT and Computers; Audio/Visual Sources and Displays; and Control Systems.

IT and computers

The CTLC has 170 PCs over two floors, including walk-up PCs in the foyer areas. In what was an early and deliberate response to the collaboration imperative, the ratio of PCs to students was deliberately kept low. In general, there are around 2-3 students per PC in the spaces. Academics have often noted the difficulty of generating any collaboration or group interaction when each student is allocated their own screen. Despite the importance and ubiquity of IT equipment in the space, the CTLC was deliberately visualised as being different to a traditional computer laboratory.

The computers are available whenever the centre is open, though students need to log in using their UQ username and password. Printing facilities are located on each floor. The PCs give students access to the internet and a range of software including Microsoft Office programs. Academics can request special software (for which they already hold licences) to be loaded onto the PCs for use during teaching sessions in the room.

Students have access to several storage methods for their work. The PCs contain a CD burner as standard as well as USB ports for portable storage. In addition to these, all students have access to a network drive when they log in. This allows them to store and retrieve their work from any PC in the Centre – or from any student accessible PC across the University.

It was decided not to implement specific collaboration software within the rooms as it was initially feared that the learning curve for this type of software may discourage students or academics. Experience has shown that specific software may be unnecessary for in-room teaching sessions as the students have adapted quickly to using the projector displays for discussion of group work. They have also adapted to sharing their results and continuing to work outside class time by using on-line document sharing and Wikis amongst other techniques. Material is commonly moved between computers using e-mail and the ubiquitous USB drives.

Audio visual facilities

The audiovisual elements within each of the spaces needed to be comprehensive, as it was recognised that elements such as videos, pictures and even sounds were often valuable in sparking creative collaboration. It was also important that the space did not become totally computer-centric. The PCs should be there to help focus the learning, and not to be the focus of the experience.

A good example of this approach was the decision to use the innovative Lumens document cameras. Having a document camera in each student Pod allows collaboration that is not PC-centred, as the students can use it to display lists, diagrams, mind-maps and so on as they are created, after the fashion of a whiteboard or flipchart. The cameras also allow the students to display and work from photos, textbooks and objects, like an overhead projector, allowing free-ranging brainstorming sessions. Crucially, the Lumens enable the capture of all of these resources directly to PC via a USB connection to the Pod computer. This means that the list of tasks on which the group had just agreed can be instantly transferred to PC and emailed to everyone for action. Equally, a diagram or photo can be directly captured as a JPEG image for incorporation into a document or PowerPoint presentation.

The lecterns in each space provide access to all the inputs normally expected in a modern teaching space: a desktop PC, the ability to plug in a laptop; a DVD and VCR player; document camera; and an auxiliary input for connecting other devices such as a video camera or tape player. In addition, the lectern has the ability to monitor inputs from each student pod so that the teacher can easily follow the progress of each group. Where appropriate, the lectern facilities allow the teacher to share the output from any pod with the rest of the class by sending it to the front projector, or to all of the pod display screens.

Each element in the Audio Visual integration was calculated to complement the space design and enhance the teaching by gaining and keeping student attention. In the large collaborative spaces, the projection screens are deployed from the ceiling to help define the group work spaces by forming a fourth 'wall'. This makes the transition between teaching and learning modes overt and unmistakable, allowing the teacher to clearly signal the intention of each phase in the session. Other, more subtle indicators also aid in this process. In all spaces, the PA speakers are placed at the front of the room, rather than in the ceiling. This means that when the presenter speaks, the direction of the sound calls attention to the front of the room, signalling clearly the change of focus required.

Control systems

The AMX control system brings all the elements together and is notable in that it places pedagogy at the centre of its control philosophy and screen layout. The system requires a choice of mode between Individual (where the room is available for free use by students); Seminar (most sessions start off in this mode, analogous to a presentation or lecture where the focus is on the presenter) and Pod (which energises the individual presentation system in each pod and is designed for the group work phase).

The AMX controls lighting, sound, mechanical elements (like screens and blinds), sources and display systems and uses each element in a theatrical way to signal transitions between modes. The unique preview mode allows work to be shared across the whole group.

The University of Queensland is committed to undertake systematic evaluation and review of the evolution and operation of the St Lucia CTLC and new CLCs as they are built across the other campuses. To this end the University is putting in place a comprehensive management strategy to promote, embed, manage and evaluate advanced teaching spaces.

Regional Centre

The first of the 'next generation' collaborative rooms was constructed at the Gatton campus and went into operation in 2007. This space retains the successful multi-mode control system allowing the individual; seminar and group work modes, but uses a refined modular design for the group work spaces.

The new Pods seat up to ten students and feature elevating screens at the end of the desk. These screens rise or lower depending on the teaching mode. The Pods face the central presentation lectern and low profile laptop computers are used to improve sight lines from all student locations.

The $2.8 million Regional Collaborative Learning Centre, designed by Dimitriou Architects, is equipped with the latest audiovisual technology and is partly funded by the Commonwealth Government's Capital Development Pool.

The Regional CLC also features the three operating modes with flexibility enhanced by the elevating monitors. An advanced control system transforms the room using lighting changes, power-operated screens and blinds and advanced projections systems which optimise the equipment so students can work either in groups, with an instructor, or independently.

A CTLC session typically begins in 'Seminar' mode, in which the teacher addresses the class and sets learning objectives. At the press of a button, a large-screen LCD monitor rises from the end of each nine-seat group table transforming it into a Collaborative work centre or 'Pod'.

Students at each pod table can display computer images or items captured with a document camera to enable collaborative activities and each group's work can be shared via a preview system controlled from the lectern.

Outside of scheduled classes, the R-CLC is used predominantly by students for collaborative group work. This is the same response that students have to the St Lucia CTLC. Students report that these spaces provide excellent support for collaborative research and individual work.

The University of Queensland has ensured that students attending a regional campus, like Gatton, are in no way disadvantaged with respect to high standard teaching and learning and research facilities, by providing them with innovative collaborative spaces such as the R-CLC.

Alongside the R-CLC is a sophisticated dual-screen video-conference teaching room which allows teaching to or from St Lucia, Ipswich or hundreds of potential sites around the world, freeing students and staff from inter-campus travel and widening the possibilities for global guest lecturers and collaborative research.

In response to feedback from students, as well as a recognised need to develop learning spaces that encourage innovative teaching and learning practice, the University is continuing to undertake an extensive program of refurbishment and renewal of centrally-controlled teaching space.

The future

Leadership in teaching and learning – as in research and commercialisation – is never accidental. Our teachers and their culture, along with UQ's pedagogical practices, designs and learning spaces, are recognised as national benchmarks precisely because the University has a long-standing strategic focus on excellence.

Management

A cross-disciplinary group chaired by a member of the Teaching and Educational Development Institute (TEDI) oversees the management of the CTLC at St Lucia. Members of the committee include the teaching spaces manager, the manager of Teaching Technology and representatives drawn from the ranks of academics across all three campuses. The goal of this committee is to promote the use of the space and to develop and maintain the facilities. To this end, small grants are made available to academics on a competitive basis which provide funds for the development of curriculum or teaching aids particularly suited for use in these collaborative environments.

New spaces

Lessons learned from the different kinds of space in the original CTLC in the Sir James Foots building were incorporated into subsequent designs for collaborative teaching spaces at UQ.

The Regional CLC was the second collaborative teaching space at UQ that built upon knowledge gained from evaluating the operation of the original CTLC.

A new collaborative teaching space, based on the further development of this design has been constructed in the GPN4 building on the St Lucia campus. This new facility incorporates the most successful design and technology features from the St Lucia and Gatton collaborative learning centres and provides more scope for informal collaboration.

The Advanced Concept Teaching Space (ACTS), also housed in the GPN4 building on the St Lucia campus, boasts teaching technology not expected to be commonplace elsewhere for at least a decade. This new space is, in effect, a laboratory for teaching technology and is capable of rigorously evaluating each new practice. ACTS will allow the best emerging technology to be tested and adopted in mainstream UQ teaching spaces years sooner than otherwise. The architecturally stunning GPN4 building was designed by Richard Kirk Architect and ML Design (in association).

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Produced by
The Next Generation Learning Spaces Project in association
with the Australian Learning and Teaching Council

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