## Project title
Dual Sector CAD teaching

## Project leader
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## Team members
Catarina von Hertzen, Commercial Manager/Industry Solutions  
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Building Design and Technology (VET)

Chris Job, CAD leader and Short Course Coordinator  
School of Design (VET)

Kylie Budge  
Teaching and Learning group  
Portfolio of Design and Social Context

## Funds approved
$40,000

## Funds acquitted (attach financial statement)
$13,200

## Introduction
The Dual Sector CAD Teaching has been set up to enhance students’ learning and skill development in the course BUIL 1107 Residential Design and Documentation. This project was developed collaboratively with input from staff within the School of Property, Construction and Project Management, and the VET School of Design. Students who enrol in the course BUIL 1107 (approximately 200, across the Property and Construction disciplines) are involved in learning about residential construction and design, largely by producing drawings that exhibit the technology of construction, and also demonstrate the communication methods used in the construction sector. In the past, the students have mostly prepared these drawings in hard-copy format, i.e. pens on tracing paper. Students were exposed to CAD (Computer Aided Design and Drafting) briefly, but merely as an alternative to hard-copy format drawings. This project addresses the imperative for students to be skilled in the use of CAD, which has almost completely replaced hard-copy format drawings in the construction sector. The project therefore is to vastly increase the CAD content of BUIL 1107. This project involves redesigning BUIL 1107 to include six (6) half-day sessions in CAD for all students, in the second half of the semester. These sessions are run by the VET School of Design (TAFE), in their CAD laboratory facilities, and using their teaching staff. Each session is restricted to 20 students, so multiple classes are conducted, and this requires increasing the infrastructure of the VET CAD facilities.

It has been difficult in the past to provide the individual guidance necessary to develop drawing skills in a large class, in particular for highly specialised types of drawing such as CAD. This is further exacerbated by the fact that this course is compulsory across four diverse disciplines, of Property, Valuations, Construction Management and Project Management. Students from the various disciplines need to do the drawings required to communicate information, in order to fully appreciate the way in which they are prepared. Students also need to do CAD drawings to be able to obtain the correct information that the drawings convey. This project enables the efficient, specialised delivery of course material that provides the students with the skills and knowledge to gain information from reading drawings, and understand the techniques and problems.
involved in preparing documents for the construction sector.

The ‘dual sector advantage’ forms a central part of the RMIT Strategic Plan (RMIT 2010: Designing the Future 2006). The Dual Sector CAD Teaching Project supports the university’s strategic plan to embed the dual sector advantage in its course offerings to students. Increasingly, HE graduates at RMIT have enrolled in VET courses to boost their technical skills after entering the labour market.

Many HE graduates at RMIT enrol in VET courses to boost their technical skills after entering the labour market. This LTIF proposal acknowledges this specific need by enrolling HE students in a VET (TAFE) Certificate to focus on CAD skills while they also complete a HE degree. In the RMIT Dual Sector Position Paper this is described as an integrated dual award approach, and offers an effective and efficient mechanism through which can engage in learning delivered by both sectors concurrently.

This project enables RMIT to offer a VET qualification in CAD to HE students. It adds to RMIT's capacity in developing and offering a greater number and range of dual sector qualifications to students. In addition, by having qualifications in both sectors, it places students in a stronger position when seeking future employment and increases their 'work readiness' and preparation for professional practice. The project is strongly aligned with the university’s mission to ensure that students have access to streamlined dual sector qualifications, pathways and learning experiences.

One of the recommendations from the RMIT Dual Sector Position Paper is to “endorse and promote the development of the five types of dual sector awards”. This LTIF project seeks to develop and promote one of those five types: the integrated dual award, by packaging a VET (TAFE) CAD certificate with a HE degree program.

Further, the RMIT Academic Plan identifies Learning and Teaching as a priority area under which the ‘dual sector advantage’ is listed as one of “the four core defining objectives”. Another of the four objects is the development of "work ready graduates with a hunger for lifelong learning". This LTIF project addresses both of these two objectives (and possibly a third: student satisfaction) by incorporating CAD skills offered through a VET qualification into a HE degree. Students have the opportunity to increase their 'work readiness' through obtaining high level CAD skills appropriate for their industry and participate in an integrated dual sector award (and thus, obtain two qualifications).

The School of Design (TAFE) is an authorised AutoDesk Training Centre. Participants use networked desktop computers and the latest release software. The trainers are registered Autodesk instructors with extensive industry experience. A certified AutoDesk certificate of attendance is awarded to participants who attend 80% of sessions and complete an Autodesk online evaluation on completion. This is an internationally recognised certificate.

The School of Design (TAFE) Autodesk training courses are also recognised and endorsed by the Building Commission Victoria as Continuous professional Development for its registered members.

This project also encourages the development and enhancement of the VET sector facilities and services, by being involved in dual sector teaching with the HE sector. It provides a formal link in strategies for teaching between HE and VET sectors of RMIT University.
Several meetings were held for the Course design team, to set up the provision of the VET CAD teaching component of the Course. The CAD workshops were conducted at the VET Brunswick campus, for six out of the total twelve weeks of Semester One. Students from past years of CAD teaching were consulted regarding how they felt it could be improved, and new students for BUIL1107 did an expectations survey in Week One. Students went from preparing CAD drawings to undertaking conventional hard-copy drawings throughout the semester, to experience both modes. At the end of the semester students did a follow-up to the expectations survey, to give their experiences and to confirm or otherwise whether their expectations were met. The Course team reviewed the students’ results for both CAD and traditional drawings, and also reviewed the design of the Course at a final meeting. It was decided at this meeting to provide some further specialist 3D CAD training in Semester 2 to those students interested. This is a result of student feedback stating they would like to do more CAD in the future.

The Semester 1 class was designed and completed successfully by the project team. In the first half of the semester, students were introduced to aspects of design and documentation for residential construction, and produced some hard-copy drawings. This provided them with the background knowledge and skills, to lead on to their CAD drawing activities in the second half of the semester.

Assessment comprised the students’ hard-copy drawings, CAD drawings and the theory of design and documentation. Students who successfully completed the VET CAD sessions were also awarded a VET (TAFE) certificate for competency in AUTOCAD. VET issued each successful student with the internationally accredited AUTOCAD certificate at a ceremony, as well as adding the CAD assessment component into the total course assessment.

This project provided students with a much greater knowledge base regarding drawings and documentation in the residential construction sector. It also brought them up to date and familiar with the principal method of drawing communication method in the industry, CAD. They gained the skills to not only produce basic CAD drawings, but also to read them and extract the correct information from them.

### A history of Project timelines

<table>
<thead>
<tr>
<th>TASK</th>
<th>MONTH</th>
<th>DELIVERABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary project design meetings for project team. Established scope of project. Determined costs of project.</td>
<td>December 07</td>
<td>Project Plan and cost estimates</td>
</tr>
<tr>
<td>Confirmed all details of requirements for project with VET School of Design. Produced final Terms of Agreement document with VET and set up infrastructure for CAD labs. Commenced introductory sessions for BUIL 1107 with students.</td>
<td>February 08</td>
<td>Terms of Agreement document. Confirmation of CAD facilities required.</td>
</tr>
<tr>
<td>Meetings between project team members to evaluate progress with provision of facilities.</td>
<td>March 08</td>
<td>VET CAD facilities and staff in place. Payment from PCPM to VET for provision of CAD course.</td>
</tr>
<tr>
<td>Confirmation of Terms of Agreement. Further consultation with Portfolio Teaching and Learning group.</td>
<td>April, May 08</td>
<td>CAD sessions delivered to students.</td>
</tr>
<tr>
<td>VET conducted CAD course for HE BUIL 1107 students. Project team members participated in CAD sessions, monitored procedures and obtained feedback. Project team review meetings were conducted.</td>
<td>June 08</td>
<td>Students obtain result for BUIL 1107, plus CAD certificate of completion from VET. CES surveys for BUIL 1107 and for CAD course. Interim Project review document.</td>
</tr>
<tr>
<td>Sessions completed. Students debriefed and assessment of both CAD and other aspects of BUIL 1107 completed. School of Design conducted their own student feedback assessment. Feedback obtained. Project team review meeting with Portfolio teaching and learning group.</td>
<td>July 08</td>
<td>Terms of Agreement document for 3D CAD. 30 students enrol.</td>
</tr>
<tr>
<td>VET offered a further short course in AUTOCAD 3D for Semester Two, as part of BUIL 1114. Expression of Interest document went out to students. 30 students responded.</td>
<td>July, August 08</td>
<td>3D CAD drawings to be added to folio for group submissions.</td>
</tr>
<tr>
<td>30 students undertake AUTOCAD 3D course for Weeks 1 to 4 of Semester Two, in addition to BUIL 1114 workshops.</td>
<td>November 08</td>
<td>Students’ diaries submitted. CES surveys for BUIL 1114 and for CAD 3D course from participants. Students receive result for BUIL 1114. 30 students also receive 3D CAD Certificate of Completion from VET.</td>
</tr>
<tr>
<td>Students build model of their designed house, and present it along with their folio of drawings etc. (including CAD and 3D CAD drawings). All work reviewed by Industry assessment panel.</td>
<td>December 08</td>
<td>ALTC presentation LTIF final report, presented June 2009</td>
</tr>
</tbody>
</table>

**Attach the full and detailed report and evaluation of your project outcomes including evidence of the impact the project has had. Also make reference to how the outcomes address the five key objectives:**

**How was student impact identified and measured?**

Data source Student feedback was captured via the CES. Analysis of this data identified that students were able to develop CAD skills to a far higher level than for previous years. Responses to the Expectations Survey (for all Semester One courses) indicated that students felt that it was important for them to attend lectures and activities, and they put a high priority on working with each other. The large majority of students thought the Semester was “Good”, and also agreed that university learning is entirely different from secondary school. Other student feedback comments were full of praise for the standard of teaching provided to them by the CAD teachers. Most
• Improved student learning experiences, outcomes and employment opportunities
• Innovation
• Strategic alignment
• University wide application
• Value for money

students agreed that the traditional drawing skills were necessary to learn as well as CAD skills, and that they supplement each other.

The project was evaluated by reviewing CES scores for BUIL 1107 at the end of Semester One, and for the “follow-on” course, BUIL 1114, in Semester Two. To supplement this feedback, students were asked to prepare a journal of their experiences and development during the Semester Two course, BUIL 1114.

There was a large variation for the reactions to CAD. Some loved using it, and some loathed it. Many students requested that more CAD be included in later courses. Most students produced high-quality CAD drawings.

The CES results for BUIL 1114 in Semester Two, obtained after the students had been able to put their CAD skills into practice, were far better than for previous years. The GTS was 88.1, and the overall satisfaction was 93.8. The following students’ comments were in their CES response:

“The hands-on aspect is the best where your hard work is shown in the end”.
“Practical application of knowledge is great with drawings”.
“The use of drawings gives you a lot of insight into construction”.
“AUTOCAD session was good for building the model”.
“Great learning tool for the future”.
“Interesting and gave an insight into how buildings are constructed from drawings”.
“It was good to follow design aspects from the drawings through to the building phase – it makes you realise what is actually “buildable”.

Improved student learning experiences and added value
Students were also better equipped to undertake BUIL 1114 in Second Semester. This course involved them in a project which involved designing, documenting and building a house. Student’s expertise in CAD enabled them to undertake these activities more effectively. One example of this is that they could measure and estimate quantities from CAD drawings, using CAD-related measurement packages.

Further, students undertaking the course were able to link their learning to not only courses following on from the project, but also to professional activities in the property, design and construction sectors.

Each CAD workshop had a maximum of 19 students, with one teacher. Previously CAD was taught in an auditorium with all 210 students at once. This intimate teaching mode was far more effective in developing skills.

Each student who completed the CAD component received an internationally recognised AUTOCAD certificate as well as a mark that was included in their overall assessment.

Dissemination of project outcomes both completed and planned. This should include both within RMIT and externally.

VET School of Design CAD group set up and ran a pilot study for advanced 3D CAD in Semester Two 2008. Students (approx. 30) volunteered to do this if they were interested in furthering their CAD expertise. The 3D skills they developed were used for providing high-end presentation drawings for the Semester 2 project in BUIL1114. This pilot study, along with consultants to set it up, was funded from the LTIF grant ($13,200). The outcomes of this were evaluated at the end of Semester 2, by the CES and by using Reflective Journal feedback.

Many students are using their CAD expertise for undertaking other courses in their programme that involve any drawing activity, and some are utilising CAD for their part-time work, if it falls within their professional area.

The association with VET staff for this project has led to the School of PCPM arranging to use other VET specialist facilities for enhancing the learning experience for our students. One example is that VET are providing PCPM with a purpose designed workshop area, where our students can build their house models for BUIL.
1114 in semester Two each year.
This LTIF project was presented to the final ALTC Leadership project meeting in November 2008, as an example of innovative use of RMIT’s facilities.
The computer aided drafting dual-sector initiative has been adopted by the School of PCPM for the relevant course for a contract period of three years. The reflective journals feedback mechanism will be used again in 2009 and other staff with appropriate courses will be encouraged to try the initiative in courses they teach.
Further improvements could be gained by greater engagement in dual sector activities for suitable courses and programs. Our experience to date has been that the VET sector of the University has many excellent facilities and VET teachers who are keen to have an involvement with higher education students.
The computer aided drafting dual-sector initiative has been adopted by the School for the relevant course. The reflective journal will be used again in 2009 and other staff from the school involved in the design and teaching of commensurate courses will be encouraged to try the initiative in courses they teach.

Summary of the project, outcomes, impacts and dissemination
Note: This is the summary that will appear on the Web, and needs to be a well formulated and succinct statement of ~500 words. Your more extensive report covering the above headings will be linked to this summary on the Web site.

You should also attach pictures, presentation material, web site links etc that may be important SEE BELOW

Summary for WEB presentation

LTIF Project 2007 – 2008:
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Geoff Outhred.

NOTE: Please refer to attached files for various photos and examples of CAD drawings produced by students.