Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

Learning & Teaching for Sustainability (LTfS) 2014 Teaching Fellowship
Final Report

Prepared by:
James Pow Chew Wong
Linnea Eriksson

Support for this fellowship/activity has been provided by the RMIT University Sustainability Committee via the Office of the Dean, Learning and Teaching. The views in this fellowship/activity do not necessarily reflect the views of the RMIT University Sustainability Committee or the Office of the Dean, Learning and Teaching
# Table of Contents

1 Executive summary ........................................................................................................... 3

2 Introduction ......................................................................................................................... 5

3 Literature review ................................................................................................................. 6

3.1 Comparison between face-to-face, blended and online learning ........................................ 6

3.2 The student perspective .................................................................................................... 6

3.2.1 Issues .......................................................................................................................... 6

3.2.2 Information required prior to enrolment ........................................................................ 7

3.3 The lecturer perspective .................................................................................................... 7

3.3.1 Issues .......................................................................................................................... 7

3.3.2 How to adopt aspects of a course for the blended environment ...................................... 9

3.4 Summation of literature review ........................................................................................ 11

4 Method .................................................................................................................................. 12

4.1 Delivery of BUIL 1225, feedback sessions and online supporting methods ......................... 12

4.1.1 Lessons learnt from ‘BUIL 1225 – Sustainability in the built environment’ .................... 12

4.1.2 Informal feedback sessions ........................................................................................... 14

4.1.3 Online teaching and learning supporting methods ............................................................ 15

4.2 Framework and recommendations ..................................................................................... 16

4.2.1 Framework ................................................................................................................ 16

4.2.2 Implementation of Framework ...................................................................................... 16

4.2.3 Recommendations for the School ................................................................................ 16

5 Delivery of BUIL 1225, feedback sessions and online supporting methods ............................ 17

5.1 Lessons learned from BUIL 1225 ..................................................................................... 17

5.1.1 Student feedback ......................................................................................................... 17

5.1.2 Lecturer perspective .................................................................................................... 23

5.1.3 Evaluation of course assessments ................................................................................. 25

5.1.4 Review of the effectiveness of the new Blackboard Shell ............................................. 29

5.2 Informal feedback sessions ............................................................................................... 29

5.2.1 Internal feedback session – School management ............................................................. 29

5.2.2 External feedback session – Industry .......................................................................... 31

5.3 Online teaching and learning supporting methods ............................................................. 32

5.3.1 Virtual case study model ............................................................................................. 33

5.3.2 Online real-time case study .......................................................................................... 34

5.3.3 Virtual problem based workshop .................................................................................. 35

5.4 Summary .......................................................................................................................... 36

6 Framework and recommendations ..................................................................................... 38

6.1 Framework ....................................................................................................................... 38

6.1.1 Recommended resources ............................................................................................. 43

6.2 An example of implementation of the Framework ............................................................. 43

6.2.1 Proposed redesign using the Framework ....................................................................... 44

6.3 Recommendations for the School .................................................................................... 46

6.3.1 Timetabling ................................................................................................................ 46

6.3.2 IT-support .................................................................................................................... 46

6.3.3 Staff training ............................................................................................................... 46

6.3.4 Workload .................................................................................................................... 47

6.3.5 Internet resources ....................................................................................................... 47

7 References .......................................................................................................................... 48

8 Appendix I: Part A and Part B of BUIL 1225 ...................................................................... 52

8.1 Part A: Course Overview ................................................................................................ 52

8.2 Part B: Course Detail ....................................................................................................... 54

9 Appendix II: Student questionnaire ..................................................................................... 63
1 Executive summary

Recently there has been an increasing awareness of sustainable development in the built environment. In order to achieve sustainable development it is essential to move away from carbon-based economy. In order to do this a transformation within education is needed, starting with embedding the concept of sustainability.

The purpose of the research project is to create a framework which will help other similar courses in higher education when converting into a blended learning mode (combination of face-to-face and online delivery) which will enhance the student learning experience, and improve the knowledge acquisition and practical competency of our students.

The intent of the research project is to implement lessons learnt from development and delivery of ‘Sustainability in the Built Environment’ course, which is the first blended course within the School on a broader program basis through creating a framework which can serve as a guide for other educators within construction management converting their courses into blended mode.

The research project was conducted in a number of steps where information was collected and analysed from students, the lecturers of ‘Sustainability in the Built Environment’, course assessments, the Blackboard Shell, School management and industry professionals.

1. **Literary review**: mapped out differences between face-to-face, blended and online learning. Explore issues related to conducting blended/online courses in higher education, possible solutions, and online teaching and learning support methods.

2. **Lessons learnt from ‘Sustainability in the Built Environment’**: collect student feedback (email and questionnaire), lecturer feedback (notes kept during development and delivery of the course), evaluate course assessments and reviewing the effectiveness of the new Blackboard Shell.

3. **Informal feedback sessions**: held sessions with School management and industry professionals.

4. **Online teaching and learning support methods**: support methods for virtual case study models, online real-time case study and virtual problem based workshop were explored.

5. **Framework and recommendations**: the framework was created based on lessons learnt from the research project. The framework was tested out through an implementation on an existing intensive face-to-face course, and recommendations were formulated for the School.

The process of converting a normal face-to-face course into a blended course can be grouped into nine different stages:

1. Review course objectives and course outlines to meet the online delivery requirement.
2. Brainstorm to formulate a theme for the course.
3. Developing subthemes to link the various subject topics together.
4. Relate topics to the industry.
5. Make a detailed course description and plan it as if it was a face-to-face course, make copyright check on all material published online, and timetable and book venue for different sessions (e.g. for face-to-face-sessions, online discussion sessions, feedback sessions). Possible delivery methods can be Blackboard Collaborate sessions, Discussion Forum, site visit and online teaching and learning support methods. Blackboard Collaborate sessions work well in the beginning for clearing out questions and misconceptions, and towards the end to help working on final assignment since students have a tendency to ‘skip classes’ at the end of the semester. Students might need encouragement in order to use the Discussion Forum, since they generally preferred sending emails. Site visits are a helpful tool to give students insight to a construction site but might be hard to schedule on weekends (when
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

sessions for blended courses generally are held). Possible online teaching and learning support methods are virtual case study model (e.g. Second life, computer based games), and online real-time case study (e.g. insight into actual construction sites through photos and videos).

6. Review or redevelop the assessments in view of the online tools available. Assessments can be carried out during, for example, the workshops or using Discussion Boards. For workshops it is important to plan for possible access issues since the sessions are generally scheduled at evenings and weekends. Workshops can be a very good complement to a course in helping students in their learning. Discussion Boards can be used to help students reach a higher order of critical thinking.

7. Provide each week with a topic and details of tasks. Also set up a plan for online correspondence with the students: on which forum, what will the different forums be used for and how often will the communication take place. It is recommended to send emails before the events (e.g. assessment initiation and workshops) giving information such as date, time, place and other details.

8. Plan how and when to collect feedback from students and taking course delivery reflection notes. Consider student feedback obtained during the delivery of the course such as emails, assessments, conversations etc. as well as student questionnaires.

9. Set up support for the students through considering what they will need, for example, Discussion Forums, Blackboard Collaborate sessions, instructional videos and guides.

Both the lecturer and students found the face-to-face workshops were a good compliment to the course. The lecturer also found it helped the students in their learning, providing hands-on exercises. Workshops in blended courses can hold a significant importance over the learning and satisfaction of the students; it should therefore be planned very carefully. The Discussion Board sessions were also a successful part of the course, encouraging a higher order of critical thinking, which is a usual problem in online/blended courses. One of the successful elements was the requirement for the students to provide a source of their own, which encouraged students to extend their reading and understanding of the topics.

There are a number of issues which needs to be addressed on School level were found, namely timetabling, IT-support, staff training, staff workload and internet resources. The timetabling for blended courses need to be resolved since Blackboard Collaborate sessions presently have had major clashes with other courses which run in the evenings and over the weekends. Since the students in a blended course are very dependent on IT, the support currently offered by the School should be evaluated. A suggested solution is for the School to employ a full-time course assistant with experience in e-learning. In order to successfully run a blended course the staffs will need training in, for example, use of various technologies, how to redevelop a blended course, and how to conduct a blended course. Since most sessions in blended courses are held at nights and over the weekends there need to be consideration on compensation for the lecturers’ workload, for example, through time off. Lastly the School should look at the available of IT resources, for example, whether there are computers with Windows available for students to do their assessments. The conversion process of changing a face-to-face course to an online/blended course is substantial and very time consuming, therefore the educators converting their courses will need a lot of guidance and helps.
2 Introduction

Over the recent decades there has been increasing awareness of sustainability in our environment and human development. Sustainable development is expected to meet the needs of the present without compromising the ability of future generations to meet their own needs.

In order to achieve this vision, a transformation away from carbon-based economy is essential and such a transformation required a new approach to education, which embedded the concepts of sustainability. Australia has responded to the UNESCO's strategic education for sustainable development, which encourages making decisions in consideration for the long term future of the economy, ecology and equity of all communities and building capacity for such future-oriented thinking through education, through the launching of the National Action Plan for Education for Sustainability.

The School of Property, Construction and Project Management has been actively incorporating sustainability capability into its programs. The course 'BUIL 1225 – Sustainability in the Built Environment' is the first course to be delivered under a 'blended mode' of the Construction Management Program in the School. The course was delivered mainly online with a couple of face-to-face workshops where the students were exposed to the principles and practice of environmentally sustainable design with emphasis on energy and environmental performance of built environment, within the global and national contexts. The course was designed to help students to develop global awareness and understanding of environmental issues and responses, as well as developing lifelong learning capability.

The aim of this project is to implement lessons learnt from the development and delivery of ‘BUIL 1225 – Sustainability in the Built Environment’ into the Master of Energy Efficient and Sustainable Building program, which is intended to be delivered fully online, and also into other courses in the Bachelor of Applied Science (Construction Management) program. The lessons learnt from the course will be used to create a ‘Framework’, which can serve as a guide for converting other courses into a ‘blended mode’. The project intends to explore the viability of the delivery mode of the course in implementing it to other subjects in the Master program. It explores ways and methods in enhancing student learning in sustainable development for online courses through implementing virtual collaborative problem-based workshops; and to explore possibilities in implementing online real-time case studies and virtual construction model with building industries to further practicality and in-depth understanding of sustainable development. This project will address all the goals and priorities in the RMIT Strategic Plan and address items 2.1.3 and 2.1.5 in the Sustainability Action Plan (RMIT 2014, RMIT n.d.).

The ‘Framework’ developed through this project will be beneficial to other similar courses in the higher education sector in Australia. The outcomes of the project will also improve the knowledge acquisition and practical competency of our students in sustainable development in the built environment and improve the competency of our students in sustainable construction management.

The report will reflect the student and lecturer perspectives on delivery the course. The Literature Review Chapter explore and compare different delivery modes and presenting issues experienced by students, and possible solutions from the educator perspectives. The main section will explore the experience in delivering the blended course ‘BUIL 1225 – Sustainability in the Built Environment’. In the course the student feedback, the educator experiences in developing and delivering the course, and two assessments are evaluated. Informal Feedback sessions are used to enrich the research in bringing in different opinions and feedback from the School and the industry. Possibilities and tools used for virtual case study model, online real-time case study and virtual problem based workshop are explored and tested. The report is concluding with recommending a ‘Framework’ for online/blended courses in Construction Management program.
3 Literature review

In order to meet an increasing demand many universities have converted their courses to be taught in an online or blended mode (Abdous and Yen 2010). Blended refers to a mix of online and traditional face-to-face instruction. Flexible modes of teaching, such as blended and online, can be the only possible choice for students under circumstances making it impossible for them to take traditional face-to-face courses, due to for example full-time work, childcare, or geographical location.

3.1 Comparison between face-to-face, blended and online learning

In comparisons between traditional face-to-face and online learning, there are differing opinions. The leading view, however, appears to be that there is no significant difference in learning depending on the delivery method (Frederickson, et al. 2005, Herman and Banister 2007). When it comes to the student satisfaction, there are too many differing results to draw a clear conclusion regarding whether a certain type of course mode can lead to a higher satisfaction (Kelly, et al. 2007).

Blended learning is sometimes described as taking the best from two worlds through being a combination of face-to-face and online learning. There remains a significant percentage of students that are reported as preferring a blended course before a course fully online, but there is no apparent difference in preference for delivery and assessment methods (Becker, et al. 2007). To have a successful blended course it is important to ensure the online element is used as a cognitive tool and not only for passively accessing information (Taradi, et al. 2005). Teaching in blended mode has, however, been described to both give student satisfaction, and achieve higher results than face-to-face instruction (Taradi, et al. 2005, Magnier-Watanabe 2011).

Strengths with online learning is the ability for students to complete tasks at their own pace and convenience, to get fast feedback on questions and assignments, and to not having to travel to campus (Song, et al. 2004, Paechter and Maier 2010). The students in online courses also tend to become more independent and not solely depend on the lecturer for answers (Kelly, et al. 2007). They are therefore not putting as much emphasis on having a knowledgeable instructor, as learners in face-to-face courses (Kelly, et al. 2007). The outline and course material are, however, of a higher importance in online courses, compared to face-to-face courses (Kelly, et al. 2007).

3.2 The student perspective

The student perspective focus on describing issues students have experienced with online learning: student feeling disconnected, hindering a higher order of critical thinking, group assignments, technical issues, and information required prior to enrolment.

3.2.1 Issues

This section presents issues students experience in connection to online and blended courses.

3.2.1.1 Student feeling disconnected

Online learning, which concentrates on text-based content and does not offer interaction in the form of learner-learner and learner-lecturer, has the effect of making the student feel disconnected (McGorry 2002, Boling, et al. 2012). The connection to course material, lecturer, and other students gets affected by the lack of interaction (Boling, et al. 2012). The opportunity to meet up online at a set time each week has been expressed by some students as a helpful way to form connections to lecturers and other learners (Song, et al. 2004).
3.2.1.2 Hinders to a higher order of critical thinking

Another risk of a course concentrating on text-based learning is that the reading and writing overwhelm the students and hinders cognitive skills, problem solving abilities and creative thinking (Boling, et al. 2012). Dr. Rhodes, working with online courses, describes that the simplicity to make reading material available to the students made it easy to accidentally overwhelm learners with reading material (Boling, et al. 2012). Similar indications were given by a study by Paechter and Maier (2010), who compared learning experiences from face-to-face and online courses. The study shown that students preferred face-to-face interaction when the interaction aimed to enhance students gain of knowledge and application of learning strategies (Paechter and Maier 2010).

3.2.1.3 Group assignments

Group assignments are often problematic in tertiary education and on an online platform is no exception. The issue of uneven workload, which is usual also in face-to-face instruction, with an additional problem of a lack of connection between students were reported by Boling et al. (2012).

3.2.1.4 Technical issues and feedback

Technical issues are something that can always occur and is always a source of stress for students (Song, Singleton et al. 2004). Cheawjindakarn (2012) emphasised the need for having a helpdesk available for the student to help them with technical issues, in the form of manuals, tutorials, and terminology in addition to human resources.

Students accessibility to their lecturer for feedback and information is one of the most important factors for the overall experience of online learning (Boling, et al. 2012). In the study conducted by Boiling et al. (2012) the learners experienced difficulties in getting in contact with their instructor and some used university advisory service or other educators.

3.2.2 Information required prior to enrolment

When asking students what information they need before enrolling in an online or blended course, to help them decide whether to take it or not, they consistently wanted to know dates and times for required meetings, such as orientation, workshops and exams. (Roby, et al. 2013).

3.3 The lecturer perspective

This section will address the issues experienced by students, as well as present methods for converting certain aspects of a course to an online environment.

3.3.1 Issues

The lecturer perspective will address the problems the students experience through presenting possible solutions.

3.3.1.1 Student feeling disconnected

Boiling et al. (2012) successfully addressed the problem with lack of personal connection to the other students and the lecturer in an online Master program. Examples of giving a “human touch” to online learning used in the Master program include: to record voice comments on student’s assignments, create assignments that enabled interaction with other professionals in higher education, and weekly audial wrap-ups to highlight “key learning points”. In this Master program, Wimba was also used successfully to create social interactions. Wimba is a web-based classroom allowing the students to talk, write and draw. For the lecturers to be able to use these kinds of creative solutions it is important
that the lecturer receives satisfactory instruction of technologies, since lack of knowledge can make educators reluctant to make use of the available technologies. (Boling, et al. 2012)

3.3.1.2 Hinders to a higher order of critical thinking

Jackson and Lawrence (2009) tried to introduce higher order of critical thinking into an engineering and re-engineering online learning discussion. Special consideration was taken to the online environment, size of discussion group, time window, and the moderator. Blackboard Vista was used as the online environment, providing two platforms for discussion: threaded discussion for deeper discussions, and Class blog for information sharing (Jackson and Lawrance 2009). For teamwork associated with discussions, each group was set up with private discussion areas (Jackson and Lawrance 2009). The groups were restricted to a maximum of 3 students, to help the involvement and accountability (Jackson and Lawrance 2009). Benfield (2002) does, however, recommend 5-8 students for effective participation. The flexibility in an online course is often a very valued factor for learners, which makes the time window for discussions important. The time window needs to be wide enough to make it flexible for the students, and give time for research and reflection, but still small enough to not become too spread out and irregular (Jackson and Lawrance 2009). In Jackson and Lawrance’s (2009) study, a time window of 1-2 weeks was used. A moderator is required to keep the discussion flowing and to the point, in the study the staff played the role as moderator with the exception of for the online conference in which the student was responsible for the progress (Jackson and Lawrance 2009). How to formulate appropriate questions as a moderator, Toledo’s (2006) suggestions could be used as a guide.

3.3.1.3 Group assignments

This particular issue was successfully addressed by Windeknecht (2003), in combining Salomons (2000) computer mediated communication model and Tuckmans (2001) group development model. Three key points were raised from this study: an understanding of group dynamics in an online environment, the need to allow time for socialisation in the online platform, and the timeline needing to be well structured with part assessments to ensure that the group keeps focused.

Windeknecht (2003) performed a case study to research problem based learning in the online environment. The problem given to the students was to be solved in randomly formed groups. Consideration was only taken so that the on and off campus students were distributed evenly throughout the groups, which ensured that the main part of the group work was mediated through online communication. The group described in more detail in the study consisted of eight students, half of which were off-campus learners. Tuckmans (2001) four stages of group development were quite clearly followed: Forming, Storming, Norming, and Performing. The initial stage, Forming, in Windeknecht’s (2003) study consisted of the students introducing themselves on the online forum through background, interests, and aim of course. This part was introduced early in the course and imposed through making it a mandatory task. This was used to ensure that the students familiarised themselves with each other and the technology. The posts in the Discussion Board were strictly transactional. The Storming phase started when the group members began clearing out the different roles in the group, leading to certain students feeling frustration in other learners failing to meet expectations. The issues during this phase culminated while the lecturer is being contacted in order to give assistance in solving the group issues. This then continued into the Norming stage where the roles were cleared out and the group started to work on the problem. The final stage, Performing, consisted of the students focusing on solving the problem and meeting the deadline. Most of the issues in this stage were due to students not keeping to the timeline set up by the group. As the stages moved on from Forming into Storming, Norming, and Performing the conversations on the online platform became increasingly deeper and more analysing. The project showed that the social aspect of the group project was important to maintain a functional group online, which is why discussions unrelated to the topic on the online platform needs to be tolerated by the lecturer. The lecturer should also raise learners’ awareness of difficulties in different cultural backgrounds (Salmon 2000). The main issue is that students from a culture valuing cohesion might feel uneasy around students from a culture valuing individualism, due to their tendency to openly challenge and criticise
other student’s comments (Salmon 2000).

3.3.1.4 Technical issues and feedback

Song, et al. (2004) suggests that the educator can lessen the stress of technical issues by making clear that they are aware of the problem, and that students can ease their own mind by making back-ups of their work and making back-up plans in case something goes wrong.

To make sure the students could get in contact with their lecturers, in the study by Boiling et al. (2012) the lecturers tried making themselves accessible through emails, web-forums, chat-rooms, and telephone.

Bowen et al. (2012) provided a number of recommendations for how lecturers can stimulate the students and make themselves available, by setting up a e-communication plan. Four of the recommendations given will be presented here. First recommendation is to state in the course outline how students can get in contact with their lecturer (Blackboard, Skype, Facebook), together with maximum email response time, and how often posts regarding the course will be made on different forums. Second recommendation is to select forms of communication and stick to them as changes during the semester will confuse the students. Also to limit the number of technologies, and let students know the different channels used for (e.g. emails for announcements, tweets for study questions). Bowen et al. (2012) recommends the lecturer to be consistent and dependable with posts, always kept to the set time (if not possible make an announcement about the delay) and post on a regular basis, but not to exceed one post a day. Third recommendation is to make up a schedule to help evaluate all e-communication for the next semester. This is to help decide for example, which day and time is best to announce workshops and assignments. A strong recommendation is also made to always make sure to keep personal and professional apart, for example if Facebook is used; create a professional account. The fourth recommendation is that it is important to keep a log of all posts along with which forum they were posted on (e.g. Blackboard). Since students might not have access to all different forums, so this is to ensure students know that information can be found in one place (Bowen 2012).

3.3.2 How to adopt aspects of a course for the blended environment

This section presents possible methods to convert laboratory demonstrations, mathematical assignments, construction site visits and management training into the online environment.

3.3.2.1 Laboratory demonstrations

Laboratory demonstrations are often used in engineering courses as a complement to theoretical learning as a way of deepening students understanding. Laboratories are expensive of which might restrict their application. Online Laboratory Learning Objective (OLLO) is a possible solution to this, as well as a required compliment to online courses. The Loughborough Process control lab was used on control engineering to introduce feedback loop, open-loop control, feedback control, PID-control and PID-control tuning. The process was used in undergraduate chemical engineering students as well as in a MSc course. The program used was LabVIEW, which is a commonly used application both in the academia and industry to develop OLLOs. (Abudulwahed, et al. 2009)

3.3.2.2 Mathematical assignments

Computer Assisted Assessment (CAA) has successfully being used in engineering courses for mathematical assignments. CAA enables automatic marking by computer, leading to instantaneous feedback, individualised questions by assigning different numbers to different students for the same question, protecting against copy-paste-cheating and guaranteed record of submission. Two systems were evaluated by Davis (2009): Web CT, and Maple TA. The conclusion was that Maple TA could successfully be used to give different students different numbers and giving partial marks when using

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
the right method. There are, however, a number of CAA systems available such as QuestionMark Perception, Quiz Factory 2, CyberExam, Test Pilot, Hot Potatoes and WebMCO, as well as subsystems like Moodle, Blackboard and WebCT. The choice of software is usually tied to the availability to the university. It was also found that the online assignments resulted in 10% better outcomes compared to equivalent paper assignments (Davis 2009).

3.3.2.3 Problem Based Learning for construction management students

It has been shown that a mix of traditional and problem based teaching helps motivate students and is an effective use of staff resources (Williams and Pender 2002). In a study by Williams and Pender (2002) it was found that the use of problem based teaching helped final year students to be more confident during the transition over to the industry. When using problem based learning the focus is on the problem designs (Lee 2013). It can be useful to show how professionals would approach the problem and encourage students to work in groups (Lee 2013).

Theoretical exercises for construction management training through problem based learning were used by the University of Glasgow in an undergraduate course (Williams and Pender 2002). The students were presented with a real-life construction problem which was to be solved through the use of project planning software and previous construction management knowledge. The problems were designed to enhance skills within team working, negotiation (with other group members), action planning, and technical judgement. Examples of problems used are given in Williams and Pender (2002). A more hands-on exercise for problem based learning was used at the University of Waterloo to improve construction and project management skills of senior undergraduate and master students (Hegazy, et al. 2013). The students were presented with the exercise of constructing the CN Tower in Canada in 30 minutes. Prior to construction a method statement, cost estimates, and a schedule for construction were handed in. As the construction went along the students were required to progressively update the construction schedule.

3.3.2.4 Construction site visits and management training

Within the construction industry, it is important that students can become aware of real construction problems through site visits. This has been solved by four cooperating universities in Hong Kong through a site called CIVCAL. The site contains multimedia content collected from three construction sites, which allows the students to take virtual site visits, branching off in laboratory visits, design office visits and production office visits. An example of a visual tour is a 20 minute video with audio commentary explaining things of interest at a construction site of a span structure using reinforced concrete technology (Wilkins and Barrett 2000).

Second Life, a 3D virtual world using avatars for the user interaction, was tested to link practical experience to theory through allowing students to play out dangerous construction scenarios. This was used as means of learning health and safety education at a university in South Korea (Le and Park 2012). It was found a helpful tool by educators, but a considerable time was consumed in preparing the gaming scenario, which was experienced as a problem (Le and Park 2012). Second Life has also been used as online live classroom where learners can interact with each other (Boling, et al. 2012). In this study, it sometimes led to frustration due to problems with scheduling these online sessions, technical issues and uncertainty regarding others identity (Boling, et al. 2012).

Another solution to give an insight into a construction site, which was an ongoing research project at the University of Nebraska, is a game based module called Virtual Interactive Construction Education (VICE). VICE is used to simulate the construction of a house from start to finish. It is mainly aimed at allowing students, workers and managers within the construction industry to learn scheduling, estimating, equipment selection and manpower selection. The module allows the user to go through the construction process with point initiatives, high scores for efficient solutions and penalties for non-optimal solutions. It also allows collaboration between users where different roles are used for the players: field engineer, project manager, etc. Different learning modes can be used stretching from the user being able to replay a system solution, to completely independent work with time-bound

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
solutions (Goedert, et al. 2011).

To create a game as a way of enhancing learning in preparation for the construction industry is not a new concept. Management training, especially, have been the aim of a number of computer based games since the 80’s (Rounds, et al. 1986, Veshosky and Egbers 1991, Hornibrook 1996). An ongoing online simulation game called MERIT, based on the managing of a construction company, was developed by the University of Loughborough. It has been used in the United Kingdom, Ireland, New Zealand, and Australia (e.g. University of Melbourne) to train students for the construction industry (Wall and Ahmed 2008). It is designed for working in groups and it is run in a form of a competition where student teams compete against each other during a period of seven weeks.

3.4 Summation of literature review

Current research shows that learning is not significantly dependent on the delivery method, but that a significant percentage of students still prefer courses containing some face-to-face components. There are clear positive aspects with an online or blended delivery mode; flexibility to perform tasks when and where it is convenient, geographic freedom and independent learning, and allowing different learning paces. The literature review presented issues for teaching and learning in an online environment from previous research, both from a student and a lecturer perspective, where lecturer perspective aims to present solutions to the issues experienced by the students. The review focused on the following topics: student feeling disconnected, hindering to a higher order of critical thinking, group assignments, technical issues and feedback. In addition, student perspective describes what should be made clear prior to enrolment. In lecturer perspective, methods for how to conduct laboratory demonstrations, mathematical assignments, problem based learning and construction site visits in a blended course are presented in closer detail.
4 Method

This Chapter will present how the data used in the study has been acquired and analysed.

4.1 Delivery of BUIL 1225, feedback sessions and online supporting methods

The main part of this report is where collected information from BUIL 1225 blended course and from Informal Feedback sessions are gathered and analysed.

4.1.1 Lessons learnt from ‘BUIL 1225 – Sustainability in the built environment’

This research is closely related to BUIL 1225, which is the first course in the School to be taught in a blended mode. Information regarding student feedback, the educator perspective, and evaluation of course assessments were collected throughout the course. Note that this course was taught in a blended mode with two face-to-face workshops. The course overview (Part A) and the detailed course description (Part B) can be found in Appendix I.

4.1.1.1 Student feedback

Student feedback in the course has been collected through emails and questionnaire.

4.1.1.1.1 Emails

Information was collected from the student emails as means of receiving student feedback on the course. The emails reflect when and with what the students experienced issues in the course; e.g. technologies, assignments, communication tools etc. The emails were only noted if they required answers, excluding assignment submissions. All student emails in the course were noted down and analysed.

4.1.1.1.2 Questionnaire

A student questionnaire was formulated and distributed at the end of Workshop Two in order to receive feedback from the students on the course. The results were analysed to investigate the successful of the course, as well as explore course contents understanding differences between student groups depending on their gender, program enrolment and originating country.

Each question in the questionnaire was formed as a statement, where the students checked the box best reflecting their views where 5=Strongly agree, 4=Agree, 3=Neutral, 2=Disagree and 1=Strongly disagree. The questionnaire wrapped up with an open ended question allowing for additional comments. A sample of the questionnaire can be found in Appendix II.

4.1.1.2 Lecturer perspective

The lecturer of BUIL 1225 took down notes regarding the experience of developing and delivering the course throughout the teaching period for evaluation.

4.1.1.3 Evaluation of course assessments

Two assessments of the course were analysed to improve for the upcoming year and serve as an example for lecturers who are intended to convert their courses to blended mode.
4.1.1.3.1 Discussion Board sessions

Two Discussion Board sessions were held for the students to review and discuss Global and National Issues and Responses. Each session was open for two weeks. The lecturer provided the students with a number of online sources (e.g. newspaper article, journal article, etc.) to direct the discussions and the students were also required to provide at least one source of their own (student source). The quality of the student source was evaluated through whether it kept on topic and what type of source it was (e.g. newspaper article, discussion forum, scientific paper). Sources as scientific papers, scientific reports, government websites, books and newspaper articles were generally judges to hold good quality while discussion forums, blogs, and personal websites were deemed to be of poor quality. Sources such as websites for organisations and magazines were judged from case to case.

The Discussion Board sessions were analysed to find out whether the students achieved a higher order of critical thinking. The sessions were also used to identify how many sources each student used, which type sources were successfully used (content/media type), how well the discussion flowed, and if interventions from the lecturer were required.

A list of the online sources provided by the lecturer prior to the Discussion Board sessions is tabulated below.

Global Issues and Responses

- Lecture 1: key environmental issues and what is sustainability?
- Lecture 2: problems in the built environment and towards a sustainable built environment
- Lecture 3: sustainability assessment, case study, and building rating tools.
- Video 1: sustainability explained
- Video 2: Al Gore – New thinking on the climate crisis
- Report: IPCC – Climate Change 2013 the physical science basis. Summary for policy makers.
- Newspaper article: UN climate proposal paves way for rich-poor discord (The Sydney Morning Herald)

National Issues and Responses

- Lecture 1: sustainable issues in Australia and Sustainable responses
- Lecture 2: sustainability assessment, case study, and building rating tools
- Newspaper article 1: alternative emissions trading scheme (Sydney Morning Post)
- Newspaper article 2: cheaper to run & build, so reach for the stars (The Age)
- Video 1: the story of cap & trade
- Video 2: Cool it - Bjørn Lomborg

4.1.1.3.2 Final assessment

The final assessment consisted of a report essay (3000 words) representing 40% of the total mark of the course.

When grading the final assessment the results were analysed in order to evaluate if the format of the final assessment were satisfactory. The support, assignment description, timeframe, and background knowledge were analysed to find out whether they are sufficient to complete the assignment successfully. Student feedback in the form of emails where also evaluated, as well as the feedback from the lecturer.

Assignment description

A brief description of the assignment was published in ‘Part B-Course Description’, which is available online upon enrolment. The complete description, including assessment criteria were published on Blackboard before the start of final assessment, prior to this a Discussion Forum, which provided general pointers was created for the final assessment two weeks before the assignment was given.
out. During Workshop Two the lecturer explained and highlighted the assignment criteria and demonstrated how to submit the report for the final assessment online. The lecturer also opened up for questions time during the workshop.

The evaluation of the assessment is made through assessing how well the students complied with the assessment criteria in their reports.

**Support**
The support during this time was available through email, online Discussion Forum, and two planned Blackboard Collaborate sessions.

**Timeframe**
In Figure 1 a timeline over the final assessment is shown together with the timeline of Workshop Two since they were proceed in parallel to each other.

In total the final assessment was conducted with roughly two and a half weeks solely with support for the essay, but the students were encouraged to start early through confirmation of case study building, presentation during Workshop Two, and support offered over four weeks prior to the due date.

![Timeline for final assessment](image)

**Figure 1: Timeline for final assessment.**

### 4.1.1.4 Review of the effectiveness of the new Blackboard shell

For this course a new Blackboard shell was designed. The new features are: a new banner which will be specific for the School, a new background colour which will be specific for the course, and a new tab system (side menu) which, if successful, will be made standardised. The aims of the new Blackboard shell is to make it easier for students to recognise the course taught and easy identification of which course the site belongs to. To standardise the tab system will hopefully make it easier for the students to navigate on Blackboard. The new shell was developed with the help of the Collage.

### 4.1.2 Informal feedback sessions

Internal and External Engagement sessions were planned to get an expanded view on issues regarding online/blended courses. These sessions were held as informal meetings where a written account was kept over the feedback and outcomes.

#### 4.1.2.1 Internal feedback session – School management

The internal meetings within the School were held with staff within the School management; the Program Managers of the Master Program and the Construction Management Program.
4.1.2.2 External feedback session – Industry

The external meetings with professionals from the industry were conducted in two ways: through email and informal face-to-face meeting. The informal face-to-face meeting was conducted over a lunch meeting with a group of industry professionals. A brief presentation of the research project and the two programs, Bachelor of Applied Science (Construction Management) and Master of Energy Efficient and Sustainable Building, was held, before an open discussion. The discussion regarding how to improve the ‘industry readiness’ of the graduates, how the skills of the existing staff can be improved, and what their views on the possible changes in the new course delivery mode (transition into blended mode from face-to-face). The participated professionals were also able to choose the option of receiving similar questions through emails and leaving written feedback instead of joining the lunch meeting.

4.1.3 Online teaching and learning supporting methods

Three online teaching and learning supporting methods were explored during the research project in order to find possible ways to implement them into online/blended courses in the School of Property, Construction, and Project Management. As far as possible emphasis on easily available and learnt technologies were chosen. A mix of literary study and tests were used during the evaluations.

4.1.3.1 Virtual case study models

The software Second Life was tested after an initial literary review. The tests were aimed at finding out how easily the software could be run at school premises with a wireless network, evaluating the learning threshold, costs related to the use of the software and how easy models are constructed with the software. In order to evaluate the capability of wireless internet at the RMIT’s city campus in supporting the software, tests were carried out on a number of common areas within Building 8. The software was tested to see if it could be self-taught with the help functions available online alone. Costs related to the program were explored through using the program and carried out an internet search. Tests on building creations in the program were carried out through the use of a so called ‘sand box’ and online tutorials.

A literary study was carried out to find out game based programs used for building construction and management training and learning. The use of such programs was evaluated and a search for available programs was carried out. In addition to this one of the software’s which was found, SBL Interactive, was tested to evaluate the easiness to use, possible application and computer requirements. The easiness to use was evaluated through tests using a tutorial published online to create a scenario. The scenario can be found on the SBL Interactive website under support – SBL Interactive tutorials (SBLInteractive.org 2014a). A current scenario, which was accessible on the website, was also tested to evaluate the possible application of the tool Engineers without borders – Kandal Province, Cambodia (Scenarios – Featured Scenarios).

4.1.3.2 Online real-time case studies

One of the online teaching methods, used by universities in Hong Kong, which was found during the literary review, was tested. Possible applications and uses were discussed for this method to be used in Australia.

4.1.3.3 Virtual problem-based workshops

It was explored if this could be carried out with technologies already used by the School.
4.2 Framework and recommendations

The Framework is a guide for lecturers standing in front of the challenge of converting their courses into blended delivery mode. A number of issues which have been made clear throughout this research were discussed, which the School is recommended to address.

4.2.1 Framework

The Framework was created using the result and findings from the literature review, lessons learned from delivering the blended mode course BUIL 1225, and research on online teaching and learning support methods. The Framework was created to be a guide for lecturers to convert their courses into blended courses. It breaks down the conversion process into different stages, providing the lecturer with suggestions as well as useful information in each stage. The information provided is on methods which can be utilised, problems that might occur and tasks that need to be performed in a blended course.

4.2.2 Implementation of Framework

The course chosen to test out the Framework was Building Systems (BUIL 1005). A plan of how the course could be converted into blended delivery mode was suggested.

4.2.3 Recommendations for the School

A number of issues which have surfaced during the research are proposed for the School to address.
5 Delivery of BUIL 1225, feedback sessions and online supporting methods

In this Chapter, the results collected during the project will be presented: the main Section, Lessons learned from BUIL 1225, has been complemented with Informal feedback sessions and online teaching and learning support methods. At the end of the Chapter, a summation of the important findings is presented.

5.1 Lessons learned from BUIL 1225

During this research project, the blended course ‘BUIL 1225 - Sustainability in the built environment’ was used to extract information regarding learning and teaching in a blended mode. This was the first course within the School of Construction, Property, and Project Management using this delivery mode. During the course there were only two face-to-face workshops.

5.1.1 Student feedback

The student perspective consists of feedback collected during BUIL 1225 from the students in the form of email and a questionnaire.

5.1.1.1 Student emails

During the course, a number of student emails were received. These emails have been divided into twelve different categories depending on their content: Specific course questions, IT problem, Timetabling problem, Information available in course guide, Extension request, Personal scheduling problem, Access problem, Group for workshop, Course format misconception, Lack of resource, General course question, and Others.

Specific course questions

Emails generally enquiring for advices about assignments or assessments. There were also some questions from the students aimed to better understand the course guide and the aspects of the course. Many of these questions are a natural part of blended courses, since students often ask their questions via email instead of after/during a face-to-face class.

There is, however, a surfacing problem in students asking similar questions, and sending emails instead of going to the Blackboard Collaborate session created for questions regarding the final assessment. These questions are scattered over August and September, but increase rapidly during October when the students are working on their final assessment.

IT problem

IT problem mainly consists of students experiencing problems with software, or when trying to join Blackboard Collaborate and/or Discussion Board sessions. All questions regarding Blackboard and Discussion Board occurred during July and August, and there are only IT-problems during the first session when the students are participated in. From one student’s feedback, it is also clear that Blackboard is not compatible with iPhones.

Timetabling problem

These emails were either regarding Blackboard Collaborate sessions clashing with other course lectures (within RMIT University, and occasionally other institutions), or due to confusion caused by the unusual timetable. Causes of confusion regarding the timetable mainly involved the fact that the Blackboard Collaborate sessions did not reflect on the RMIT student website. Some students have complained that dates and times for the Blackboard Collaborate sessions were not mentioned in the course guide. The majority of the emails regarding timetabling problems were received in July, at the beginning of the course.
Information available in course guide
Students enquiring about time, date and place for workshops, general information regarding course, where to download software etc. All of this information was already available in the online course guide. This could indicate that the information is hard to find on the Blackboard, or students preferred to find out these information directly from the lecturer.

Extension request
Emails requesting an extension of the completion time for an assessment. The main reasons were medical difficulties.

Personal scheduling problem
Students are unable to attend a Workshop or Blackboard Collaborate session due to personal commitments. One student has mentioned that the Blackboard Collaborate sessions were not scheduled in the timetable for the course. These problems were scattered throughout July, August and September.

Access problem
During Workshop One in August a number of students experienced problems getting to the workshop venue due to not being able to access certain areas of the university over the weekend.

Group for Workshop
Students wanted to change group or inform lecturer of group changes.

Course format misconception
Some students have misunderstood the format of the course; most of the course work was to be done independently and assessed through Discussion Boards and reports. Students mainly believed that the workshops were the only assessments for the course. There is also a student with misconceptions regarding the resources used for the course; independent studies using the online published material without online lectures. These problems occurred in late July after course started and continued for approximately two weeks.

Lack of resource
Students not having the equipment required to perform the work in Workshop 2, e.g. computer with Windows operating system.

General course question
Students wanted to know more details (e.g. assessments) regarding the course before enrolling.

Other
Students wanting to know how to catch up after signing up late for the course, wanting an additional discussion session, wondering if the assignment submission have been received and when feedback will be provided.
Table 1 shows the number of emails in each category and in which time period they were received. This table is complemented with Figure 2 showing the distribution of the emails over time, and number of emails received on each date throughout the semester. Figure 2 shows the top six categories that received the most emails.

Table 1: Number of student emails in each category.

<table>
<thead>
<tr>
<th>Category</th>
<th>Total number of emails</th>
<th>Received (time period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific course questions</td>
<td>19</td>
<td>1 Aug - 6 Oct</td>
</tr>
<tr>
<td>IT problem</td>
<td>19</td>
<td>25 Jul - 14 Oct</td>
</tr>
<tr>
<td>Timetabling problem</td>
<td>18</td>
<td>17 Jul - 1 Oct</td>
</tr>
<tr>
<td>Information available in course guide</td>
<td>12</td>
<td>25 Jul - 13 Oct</td>
</tr>
<tr>
<td>Extension request</td>
<td>6</td>
<td>18 Sep - 11 Oct</td>
</tr>
<tr>
<td>Personal scheduling problem</td>
<td>5</td>
<td>22 Jul - 19 Sep</td>
</tr>
<tr>
<td>Access problem</td>
<td>5</td>
<td>23 Aug</td>
</tr>
<tr>
<td>Group for workshop</td>
<td>4</td>
<td>17 Sep - 26 Sep</td>
</tr>
<tr>
<td>Course format misconception</td>
<td>4</td>
<td>25 Jul - 6 Aug</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>18 Aug - 21 Oct</td>
</tr>
<tr>
<td>Lack of resource</td>
<td>3</td>
<td>9 Sep</td>
</tr>
<tr>
<td>General course question</td>
<td>3</td>
<td>18 Jun - 24 Jul</td>
</tr>
</tbody>
</table>

Figure 2: Distribution of the student emails over the course for the top six categories receiving the most emails.
A number of interesting problems surfaced when analysing the student feedback received through email. It seems that the students are unwilling to use the Discussion Forum. The students instead prefer more traditional communication, such as email, and consequently create extra work for the lecturer. The extra work is created since most questions are of similar nature, and the rest of the students would benefit from taking part in it. Some ways to encourage the students to use the forum would therefore be beneficial. Alternatively try to use another type of forum such as Facebook. Since the course is the first in its form for the School, there are a number of students who have misunderstood the course format. There are only four emails regarding this, but it is probable more students would have misconceptions, which were cleared out during the beginning of the course (e.g. during Blackboard Collaborate sessions). It is, therefore, very important to make the assessments and expectations of the course very clear in the course outline. Since the School does not have computer laboratories, it is important that all programs used would run on both Windows and Apple computers; and there are extra Windows computers available for students to use. Two issues surfacing, which the School needs to address, are the timetabling problem and the IT problem. Both of these issues resulted in extra work for the lecturer, taking focus away from the course delivery.

5.1.1.2 Student questionnaire

Around half of the class has answered the student questionnaire. Out of these, four students were female and seven were male. There were two studying Engineering, three Urban Design, two Business, one Sustainability and two Property/Project Management. There were five students from developing countries, and six from developed countries. One student did not leave any information regarding gender, originating country, or program enrolment, and one additional student left out program enrolment. It should also be noted that this questionnaire was answered after Workshop Two, before the final assignment.

The results from the questionnaire are shown in Table 2; it shows the total average scores as well as the average scores after dividing according to gender, originating country, and program enrolment. The question numbers refer to the questions asked in the student questionnaire (see Appendix II). The numbers presented in the table are average values of the answers the students gave for each question. In the questionnaire, the students were asked to pick a value from 1-5 depending on how well the statement matched their experience. A higher score shows a good match between the statement and the student experience. The statements were formed to reflect a positive view of the course, meaning the high scores indicate better student satisfaction. Scores under three can be interpreted as the student being dissatisfied.

An example is the average scores regarding the course content, from students with different program backgrounds. The students from an engineering background gave average scores of 2.5, showing they did not agree with the statements that there was a sufficient amount of course content and that the course content held a good quality level. Students from all other program backgrounds gave these statements a score of four or higher, showing they agreed/strongly agreed with the statement and thereby was satisfied with the amount and quality of the course content.

A few of the questions in the questionnaire are written in a way where the reason for the student satisfaction/dissatisfaction is unclear. In this case the comments from students were used to interpret the answer. The full list of comments is presented in Chapter 4.1.1.2.1.

The overall result shows the students being satisfied with the course content, delivery, assessments, feedback and Blackboard shell. The two questions with the lowest result were: level of difficulty for course content, and level of difficulty for Workshops. The group of students giving the lowest scores in these categories provided comments requesting more information regarding sustainable building techniques. They also wanted the course to include more aspects on sustainable design technologies, assessment methods and to have a field trip showing good sustainable design practice.

Comparing the results for female and male students, there was no difference in the overall satisfaction. The female students did, however, have more issues with using/participating in the

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
Blackboard Collaborate sessions, and were less satisfied with the timing and the completion time for the assessments. The male students gave the lower results for the level of difficulty of course content and Workshops.

The students originating from a developing country were more satisfied than students from a developed country. The area the students from the developing countries were least satisfied with was the easiness to use/participate in the Blackboard Collaborate sessions. The students from the developed countries were least satisfied with the amount of course content and the level of difficulty of the Workshops.

The group of students least satisfied with the course came from an Engineering background. These students were the only ones leaving written comments indicating being dissatisfied with parts of the course: course amount, level of difficulty of course content, level of difficulty of Workshops, the number of course assessments, and the level of difficulty of course assessment requirements. They indicate that the course was too easy, and that they would like a higher level of difficulty as well as more course content. These students found that there was too much time spent on the global issues of sustainability and climate change. One of the students suggested a maximum of two weeks spent on these issues. The students also wanted more emphasis on technologies and assessment methods of sustainable design. The students from other program backgrounds were very satisfied with the course.

All students were satisfied with the lecturer's feedback, both with the feedback itself and the response time. Some other areas with high student satisfaction are Blackboard Shell as an online platform, online materials, Blackboard Collaborate sessions, Workshops as a compliment to the course, and online materials providing background knowledge to Workshops.

Table 2: Results from student questionnaire, divided into total average score and average for different gender, originating country, and Program enrolment.

<table>
<thead>
<tr>
<th>Question number</th>
<th>Course content</th>
<th>Delivery</th>
<th>Assessments</th>
<th>Feedb.</th>
<th>Blackb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 4, 5, 6, 7, 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9, 10, 11, 12, 13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14, 15, 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1, 2</td>
<td>3.9</td>
<td>4.3</td>
<td>4.1</td>
<td>4.3</td>
<td>4.2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total average score</td>
<td>4.0</td>
<td>4.0</td>
<td>3.8</td>
<td>4.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Female</td>
<td>3.9</td>
<td>3.7</td>
<td>4.3</td>
<td>4.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Male</td>
<td>4.4</td>
<td>4.4</td>
<td>4.2</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Originating country</td>
<td>3.5</td>
<td>3.7</td>
<td>4.2</td>
<td>4.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Developed country</td>
<td>4.4</td>
<td>4.0</td>
<td>4.4</td>
<td>4.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Developing country</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Program background</td>
<td>4.5</td>
<td>4.0</td>
<td>5.0</td>
<td>4.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Engineers</td>
<td>2.5</td>
<td>2.5</td>
<td>3.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Urban design</td>
<td>4.7</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Business</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Sustainability</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Property/Project manag.</td>
<td>4.5</td>
<td>4.0</td>
<td>5.0</td>
<td>4.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>
In Table 3 the questions receiving a score of lower that three (indicating dissatisfaction) by any student is presented. Unlike in Table 2, the average scores where shown. In addition, two questions used to interpret the results are also included in Table 3: Questions 7 and 8. The scores from each student answering the questionnaire are shown in the rows under student scores. This table is used to investigate more closely into the areas causing dissatisfaction. By not averaging the individual scores, all student scores are reflected clearly, especially beneficial to highlight the perception of the student not giving any information regarding gender, originating country and program enrolment.

Two students indicated being dissatisfied with the course content: one of whom was dissatisfied with both the amount and the quality, while the other was dissatisfied only with the amount. Judging from the comments that the students provided, they found the amount insufficient and wanted more content. The reason for this was expressed by the student who wanted more focus on sustainable design technologies and assessment methods. This is likely to be the same reason for the low score for the course quality.

When it comes to the reason for being dissatisfied with the assessments, it is hard to connect the comments to the reason. The questions can be interpreted as both the assessments being too difficult/easy and/or too many/few. The students being dissatisfied with the level of difficulty of the Workshops was, however, satisfied that the Workshops being a good compliment to the course and having sufficient background for them (Questions 7 and 8). Since they found the Workshops to be a good complement and felt they had sufficient background knowledge it is likely the students found the Workshops are too easy.

<table>
<thead>
<tr>
<th>Area</th>
<th>Question no.</th>
<th>Question</th>
<th>Student scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course content</td>
<td>1</td>
<td>There was a sufficient amount of course content</td>
<td>3 2 2 5 5 5 4 4 4 4 4</td>
</tr>
<tr>
<td>Delivery</td>
<td>2</td>
<td>The course content held a good quality level</td>
<td>3 2 3 5 4 5 4 3 4 4</td>
</tr>
<tr>
<td>Assessments</td>
<td>7</td>
<td>The Workshops content provided a good supplement to the course</td>
<td>5 3 5 5 4 4 4 3 5</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>The online resources provide sufficient background knowledge for the workshop</td>
<td>4 4 4 5 4 5 4 4 3 5</td>
</tr>
<tr>
<td>Assessments</td>
<td>9</td>
<td>The Workshops held a good level of difficulty</td>
<td>3 2 3 4 5 4 4 4 4 2</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>The number of assessments in the course are appropriate</td>
<td>3 2 4 5 4 4 4 4 4 4</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>The assessment requirements held good level of difficulty</td>
<td>3 2 3 4 5 5 5 4 4 4 2</td>
</tr>
</tbody>
</table>

The results from the student questionnaire show the students being satisfied with the delivery of the course, the feedback throughout the course, and the Blackboard shell used. There are differing opinions regarding the course content and assessments, ranging from dissatisfaction to high satisfaction. A reason for this is likely to be that the course has been open for students from various discipline backgrounds, making it hard to develop the course since the previous knowledge of the students was unknown. The course is, however, going to be part of the Master program which will make it easier to adjust.
5.1.1.2.1 Student comments

“Too much emphasis on global issues of sustainability at the beginning of the course. Incorporate a field trip of good sustainable practice e.g. the new RMIT Swanston Academic Building.”

Male Engineering student from a developed country

“There was far too much time spent on the issue of climate change. One or two weeks maximum will be more than enough before moving on to sustainable building techniques – This is what we signed up for with the course. More detail should be given on actual sustainable design technologies, assessment methods, etc.”

Male Engineering student from a developed country

“Need more of a focus on sustainable design technologies. More in depth of study into specific technologies and materials for innovative sustainable design rather than overviews of concept designs (e.g. high rise overseas).”

Female from developed country

“Overall good course content. Helped to gain deeper understanding about sustainability, not only in architecture, but on a global level.”

Male Urban Design student from developing country

“Loved the entire session. Very easy to understand. The course has been designed very efficiently, it helps students update and increase their knowledge about sustainability.”

Female Urban Design student from developing country

“Great delivery, good work [lecturer’s name]”

Male Property student from developed country

“I would like to see and study more about design examples and case studies”

Male Project Management student from developing country

“Time, technology should have been more.”

Student (no information given)

5.1.2 Lecturer perspective

In this Section, the lessons learnt from the lecturer of BU11 225 during course development and delivery is presented.

5.1.2.1 Course development

In redeveloping the course, BU11 225, to go from an intensive to a blended learning mode, all course content needed to be reviewed to address the new delivery mode and enhance student learning. The following section is lessons learnt by the lecturer of BU11 225 regarding the course development.

The course objectives and outcomes need to be reviewed in order to address the new delivery mode and to enhance student learning. The assessments for the course need to be reviewed or redeveloped into new assessment methods, for example online discussion sessions/forums, online tests. Following this, the 12 weeks teaching plan for the course delivery structure was reviewed. When it comes to the online materials it is important to liaise with library staff in order to provide copyright articles for online publishing. In order to be able to design the assessments with these new methods, it is first necessary that staff receive training in the new online methods, which can help them in delivery and development of their courses. It is, however, not only the staff members that need help. The students must also be provided with clear information and instructions to make it easier for them to navigate and obtain important course information online.
A helpful guide for redesigning a course into blended learning, in addition to the information in this research paper, can be found in Appendix 3 of *Blended Learning in Higher Education* (Garrison and Vaughan 2008). In this Appendix 3, a redesign guide for blended learning is given in the form of questions for the educator to ask themselves through the stages of redesigning the course. The stages are divided into Analysis, Design, Development, Implementation and Evaluation phase, advising the educator to ask themselves what to preserve from the existing course format.

### 5.1.2.2 Course delivery

During the delivery of the course, a number of issues need to be addressed, for example, Blackboard Collaborate sessions and the Workshops.

- The Blackboard Collaborate sessions, which were run at night, needed to be repeated a number of times in a week due to clashes with other courses timetables.

- During the first Blackboard Collaborate session the students experienced a lot of technical difficulties. This resulted in the lecturer having to give students assistance over email while holding the session. A helper would have been required in running the first session, in order to resolve the technical issues, so that the lecturer could have concentrated on the delivery of the Collaborate session.

- For the lecturer’s presentations in Blackboard Collaborate, it is important to note that certain video files do not play directly from a memory stick; they need to be copied onto the desktop.

- The Blackboard Collaborate sessions in the beginning of the semester helped students better understand the requirements and expectations of the course. Some students dropped out of the course as a consequence of learning the extent of commitment and expectation the course actually required, after the initial sessions.

- During the last scheduled Backboard Collaborate session, no students showed up. Instead students sent emails regarding the final assessment, mainly concerning building choice, which was the topic intended for the Collaborate session.

- Some students tended to email the lecturer directly for course issues instead of looking at the information published online. Another part of this was that students did not get accustomed to the Discussion Forum to post questions and find out information about the course, instead they tended to email the lecturer directly.

- The Discussion Forums generated interesting and in-depth discussions amongst the students in regard to the specific issues/topics.

- Face-to-face workshops provided a good compliment (with online sources providing required background material for the Workshops) to the delivery of the content of the course. Students seemed to learn better with hands-on in-class experiences. There was, however, an issue with the students’ access to the learning facilities during one of the workshops. There are clear problems with access during weekends and evenings; the lifts do not stop at all levels, and main access doors are closed after certain hours. Evening and weekends are usually the times when blended courses tend to schedule workshops, since several students have full-time jobs.

- It was not possible to schedule a site visit in this course, since it was impossible to find professionals willing to perform the site visit on the weekend.
5.1.3 Evaluation of course assessments

Two assessments in the course were chosen in order to extract lessons learned: Discussion Board sessions and Final assessment.

5.1.3.1 Discussion Board sessions

Two discussion board sessions were held during the course. Each session had a timeframe of two weeks, with sources provided from the lecturer and the requirement that the students need to provide at least one source of their own. A full description of provided sources can be found in the Method section (4.1.1.3.1 Discussion Board sessions).

The discussions flowed well without interference from the lecturer, and it seemed students are able to keep the discussion to the subject. It was clear that most students used critical and creative thinking during the participation of the discussion board sessions. When discussing National Issues and Responses it does, however, seem like the discussion had a tendency to remain on a global level. Thesteam had also gone somewhat out of the discussion during the second discussion board session. This can be seen in the decrease in posts; the global discussion had a total of 74 posts, while the national discussion had 56.

Figure 3 illustrates the number of sources used per student during the discussion board sessions. During the discussion of Global Issues and Responses, almost 50% of the students used one provided source during the discussion, while 19% did not appear to use any provided source at all. About a third of the students used more than one source, and the number of students using three sources was larger than the ones using two, 14% compared to 10%. Even though it seems like many students were satisfied with restricting themselves to one source, the ones going through the material more thoroughly appear to read/view most of the provided material.

Most students used one source during the National Issues and Responses discussion, just like in the case of the previous discussion, but the students using two or more sources have, however, increased to almost half. This could mean that the students found the sources that were provided were easier to raise a discussion. No student used more than three sources, which indicates that the students are not as energetic in this discussion as they were in the first one. The number of students who appeared to not use any source that were provided declined to 14%.

![Figure 3: Number of provided sources used per student during Discussion Board sessions.](image-url)
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

Figure 4 illustrates the type of provided source that was used during Global Issues and Responses. The most frequently used source during the discussion was the newspaper article. This source held the most “explosive” content, which caused conflicting opinions. The lectures were the second most used source. This source was usually used to provide background information for the opinions expressed in the post. The videos and the report have been used both for information in order to build up an argument and as a source for discussion.

Figure 5 illustrates which provided source the students used during National Issues and Responses. As in the case of the first discussion, the most “explosive” source was the second video. The amount of students referring to the lectures kept at a bit above a third of the students. It continues to be a source for information in order to build up an argument, showing its value for the student’s gain of knowledge.

Among their own sources that the students were asked to provide during the discussion, there were articles from: newspapers, governmental sites, scientific journals, magazines, organization’s websites, company sites, and free daily newsletters. There were also a number of reports from governments and large international organizations, and videos.

The sources provided by the students during the discussion of Global Issues and Responses held good quality in around 85% of the cases. Most students also provided extra own sources, with a
maximum of five. The sources centred on a wide spread of subjects, all keeping within the topic of the discussion even though some were more relevant than others. The main topics of the sources were (from most to least popular): sustainable buildings and cities, personal savings tips, building energy rating, solar panels, and climate crisis. About a quarter of all sources were about sustainable buildings and cities, while the other four subjects held slightly under 10% of the sources. Most of the student sources are relevant to the topic of the discussion, even though personal saving tips are a bit outside the subject area.

The quality of the students’ sources increased to around 90% for the discussion on National Issues and Responses. It seems like the students have improved their critical evaluation of sources by identifying and comments on what other students have referenced. Over ten own sources were used by some of the students during this discussion. The sources tended to slide back into a discussion on Global Issues and Responses. The main subjects (in order of most to least frequently use) were: sustainable buildings, global warming, sustainability, Australian mining industry/resource boom, Australian energy rating system, and Australian carbon tax. Only about 40% of the sources were directly related to Australian issues and responses. Therefore, there might be a need for the lecturer to direct this discussion when handling the narrower subject area.

5.1.3.2 Final assessment

This Section addresses how well different aspects of the assignment worked. The evaluated parts are: assignment description, support and timeframe. It also presents student feedback and the lecturer perspective.

5.1.3.2.1 Student feedback

In Figures 6 and 7, the number of course related questions in each category, as well as a breakdown of the emails within the category course related questions, are shown. A description of the different categories can be found in Chapter 5.1.1.1. The number of student emails regarding the final assessment increased linearly from the beginning of September until the due date in October. Amongst the emails received from students regarding the final assessment there were a strong majority asking about course related questions. Figure 7 shows a breakdown of course related questions to illustrate the type of information the students required from the lecturer.

The IT problems experienced were mainly due to the inability to submit properly through Blackboard or to find out whether the submission was received. There were a number of students requesting an extension, amounted to 13% of the total number of students taking the course, mainly due to medical reasons. The breakdown of the course related questions shows that there were mainly inquiries regarding the building selection choice but, also a substantial part regarding the use of Green Building assessment tools.

The students do not indicate any issues in the execution of the final assessment. There were a few questions regarding how to hand in the assignment or whether it had been received, but in large these questions were prevented through explanation provided during Workshop Two. The vast majority of the questions were course related questions, asking about the lecturer’s opinion regarding, for example, building selection choice and how to analyse the performance of the case study building.
5.1.3.2.2 Lecturer perspective

The lecturer started discussing about the final assessment very early in the course to allow the students to have sufficient reflection regarding the analysis and choice of building for the case study. Prior to Workshop Two (see timeline in Figure 1) the students were asked to confirm their case study building, but only 10% of the students did it. During Workshop Two, the lecturer also perceived that very few of the students were thinking about the final assignment, and that they had not chosen their case study buildings yet. All but two students (91%) attended Workshop Two. Only two students were actively asking questions regarding the assignment during the workshop.

5.1.3.2.3 Assignment description

In the description, it appears that both an international and a national comparison were required have to be made clear, since only one or the other was analysed in most of the submitted report. There were also a number of emails asking about the use of a Green Building rating tool for the assignment, which was optional, and which could be made clearer in the description. There is, however, a larger issue in the fact that students didn't seem to read the assessment criteria for the assignment.

There was a detailed description of the assignment including assessment criteria online, pointers provided during a Discussion Forum, and a presentation was held during Workshop Two. Despite all this, it appears that a number of students were still unaware of the assessment criteria and only partly fulfilled it. This is shown through the number of students completely disregarding, for example, the criteria of using a specific reference system and performing a literature review.

5.1.3.2.4 Support

There was a Blackboard Collaborate session scheduled to answer questions regarding the final assessment, but no students choose to participate in it. The second session was cancelled due to the lack of interest from the students. There was also a Discussion Forum set up but was not used. Students preferred to use emails to communicate. Half of the class used email to ask questions regarding the assignment. It is clear that the students didn’t make use of all the resources of support that were offered. Other channels of support, or further encouragement to use them, might need to be considered.
5.1.3.2.5 Time frame

It was clear that a large majority of the students did not start reflecting on the final assessment until after the submission of the report for Workshop Two, which leaving only about two and a half weeks to complete the assignment. Pressure from having a tight timeframe might have been a contributing factor for students disregarding some of the assessment criteria.

In evaluating the submitted reports, it did not seem that the students were unable to successfully complete the assignment due to time constraint. Generally, when students are pressed for time they tried to cover all assessment criteria but do not provide an in-depth analysis, which wasn’t the case in these reports. The level of analysis generally indicated sufficient background knowledge.

5.1.4 Review of the effectiveness of the new Blackboard Shell

From the student feedback there are three areas which related to the effectiveness of the new Blackboard Shell: the last question asked in the students’ questionnaire regarding the easiness to use the Blackboard Shell, emails regarding *Info available in course guide*, and *IT problems*.

The student feedback from the questionnaire shows that they found the Blackboard Shell easy to use. The emails regarding *Info available in course guide* provide information for the students’ use of the Blackboard Shell since this information has been published online through the Shell. There were a number of emails in this category. This might indicate that the students had problem finding the information. Considering the questionnaire results the students found the Shell easy to use. It is possible that these emails were from students who do not bother to look for the information online. The IT problems related to Blackboard are not dependent on the Blackboard Shell since they related to Blackboard Collaborate sessions and the Discussion Board. The problems could, however, be solved through providing instruction videos describing the features of the Shell. The lecturer on a whole found the new Blackboard Shell provides clear format to put various information online related to the course for the students. The new design of the Shell with specific banner and colour provide identity and professionalism for the course and program.

5.2 Informal feedback sessions

This section presents the information gathered during the informal feedback sessions. The aim of the sessions is to explore how blended/online learning is seen from school management and industry viewpoints.

5.2.1 Internal feedback session – School management

The focus has been put on the Post-Graduate courses, since it was made clear during the interview with the Program Manager of the Construction Management program that the Undergraduate courses are going to remain in a face-to-face delivery mode for the time being.

5.2.1.1 Timetabling

The Program Manager of the Master program (Master of Energy Efficient and Sustainable Building) expressed concerns regarding the timetabling of the program, due to the blended teaching mode. During the first year of the Master program, there are going to be two face-to-face courses running parallel with two blended courses. This is solved by scheduling the face-to-face classes of the blended courses during the weekend. The face-to-face classes make it possible for the students to network and for the educators to organise site visits or lectures held by industry professionals. The issues in the Master program will be intensified during the second year when all four courses are going to be run as blended courses. This results in a total of four weekends of face-to-face classes or two intensive weeks of classes. Both of these options would make the Master program less appealing to students. Since to have four weekends of classes for a 12 week course is quite demanding, and to
have two intensive weeks would require students to take time off work, which is especially problematic for students stationed in other cities.

An additional issue regarding timetabling is the elective courses students are taking. These courses can be taken in other Schools, or from other streams. To minimise issues with courses from other streams, the Program Manager suggested it might be necessary to restrict which courses the students are allowed to enrol in.

5.2.1.2 IT-support issues

IT related issues usually arise which taking up lots of the lecturer’s time. The Program Manager of the Master program suggested that a full time teaching assistant with expertise in e-learning could be a solution. The assistant could take care of the IT related issues so that the lecturer could concentrate on the course delivery. An example of when IT related issues have affected the course delivery was when a number of students experienced problems with participating in the first Blackboard Collaborate session. This resulted in the lecturer being required to provide IT support for the students while at the same time conducting the session. There is always a frustration factor for students in trying to solve computer problems on their own, and it is therefore very important for the School to have a support system available.

5.2.1.3 Staff training

When it comes to staff training, the Program Manager of the Master program suggested having a formalised set of courses sent out to educators preparing to start a blended course. The courses could, for example, address issues with teaching in a blended mode, available technologies, and information regarding harassment. Having the courses available online would make it possible for the educator to refer to them at his/her convenience.

The coordinator of the blended course, which has gone through the transition from an intensive face-to-face to a blended course, remarks that the transition is very huge. All material and all assessments need to be adjusted, which is very time consuming. It is also necessary to know that all sources posted online need to be cleared with the library for copyright purposes. Since the coordinator of the blended course was the first in the School to change his course to blended mode, he received a lot of help from the Collage, which is something that might not be available to other educators within the School. It is therefore very important that the School provides necessary assistance to the staff to help keep the quality level consistent.

A helpful guide to introduce educators to e-assessment is Teacher’s handbook on e-Assessment by Geoffrey Crisp (Crisp 2011). Crisp (2011) describes different assessments, which are available and what they could be used for.

5.2.1.4 Staff workload

The Program Manager for the Master program expressed concerns about the risk of the staff getting an increasing workload with blended courses, since it is necessary to hold classes and Blackboard Collaborate sessions during nights and weekends. The staff workload planning issue has to be resolved so that the staff will be compensated for their time, for example through time-off.

5.2.1.5 Issues with overlapping courses

The Program Manager for the Construction Management program raised the issue of overlapping courses’ contents which lead to unnecessary repetition for the students’ learning. In order to compare the course content to eliminate any avoidable repetition, a matrix of the courses comparing their aims, contents, and assessments will need to be compiled.
5.2.1.6 Issues with involving other Schools

The students taking the Master program will be allowed to take elective courses from other Schools. Since these courses are independent of the School of Property, Construction, and Project Management. There is no way to control them, but there are definite needs for collaboration between Schools. The Program Manager for the Master program identifies two issues: repetition, since the elective courses from other Schools might hold some joint material with courses taught in the Master program, and the courses might not be taught in a blended learning mode. The future aim is, however, to offer all courses within the School for the Master program.

The benefit of having control over all courses in Master program is the possibility to streamline the education for the industry. Teaching in a blended mode will be attractive for working professionals, since it will be possible to study while working full-time. This would make it possible for alumni to return to take a different stream of the Master program to build their career.

5.2.1.7 Other

A factor that would make the Master program more attractive is to allocate Certification points towards becoming an Energy Efficiency Assessor. This does, however, need to be negotiated with the respective professional bodies.

Something that has to be taken into consideration when planning the Master program is that the international students might have visa restrictions, for example regulating how many face-to-face classes there need to be in a week in order to be granted a visa.

5.2.2 External feedback session – Industry

An informal feedback session was held with industry professionals from professional bodies and a private construction company. The questions sent out to industry professionals via email did not generate any replies.

5.2.2.1 Gaps of knowledge

Both the professional bodies and the private construction company have experienced disconnect between what students learned and the expectations from the industry. One of the professional bodies expressed concern for the fact that our graduates are lacking in basic skills such as Math and English.

The general knowledge gaps of our graduates experienced by the private construction company have been within programming, contractual information, and how a building is put together. The graduates have especially good computer skills, but lack the knowledge of how to actually apply what they learned, since they aren’t familiar with how a construction site actually works. An example is graduates know how to use Microsoft Project software but can’t program actual project tasks together in proper sequence. In this company, hired graduates will go through a test where their knowledge is evaluated in a graduate program to discover gaps of knowledge.

5.2.2.2 Graduate program

The private construction company currently have around 10 graduates from RMIT University in their graduate program. The graduate program stretches over approximately three years where the graduates are retrained before they gain a specific set of skills and can perform the tasks required of them. It was expressed that the skills of RMIT graduates are well rounded, but that there still a need for a lot of training to up-skill the graduates. This partly could have been carried out at the university level. The private construction company has used simulated real industry scenarios to train their new employees in the graduate program, this as a way to expose them to different real life problems which
can occur at actual work place and train them in problem solving.

5.2.2.3 Soft skills

Both the private construction company and the professional bodies expressed the importance of soft skills in the education. Graduates are not only valued for what they do but how they do it. Whether they show enthusiasm, have a positive attitude, how they interact with other staff and clients, whether they hold human values, and possess problem solving abilities. Especially interpersonal skills, problem solving abilities and being able to work in a team, were singled out as important soft skills to possess.

5.2.2.4 Blended delivery mode

The general opinion of the invited industry professionals was that to acquire the technical skills needed, a ratio of 80/20 between online and face-to-face teaching would work (80% online and 20% face-to-face). To get the soft skills needed in the industry, there need to be more face-to-face sessions where the students have more opportunities to interact with each other directly, for example, giving presentations and working in groups. One of the professional bodies suggested a percentage of 30-35% face-to-face time.

There are also issues raised against blended learning due to the lack of physical contact and the contrived environment. For example, online pictures and photos will only offer certain perspectives of a building, and to actually be at the building site will give you valuable information on how materials were used, the context of the surrounding environment, etc. There is a need for more hands-on classes to actually understand the subjects and basic construction concepts.

5.2.2.5 Industry exposure

All the industry professionals are in agreement that the students need to be exposed to the real industry world to a higher extent. To get this exposure through vacation jobs and work experience might, however, be difficult. One of the professional bodies gave an example that only 2 out of 2000 applicants were selected for their last vacation job employment. The private construction company and a professional body both expressed that to take work experience students often is more of a hassle for them than of actual use.

The use of mentor programs, site visits, and invited industry lectures are given as examples of other possible ways to help the students gain insight into the real world of construction, since professionals usually are willing to help and pass on their knowledge.

The Awards Nights organised by the School of Property, Construction and Project Management were expressed as a successful and appreciated way to exposure the students to the industry by both the professional bodies and the private construction company.

5.2.2.6 Continuous professional development

The private construction company suggested continuous professional development for teaching staff to up-skill their knowledge through inviting professionals from the industry regularly to present their new products and advanced construction techniques and methods. Since the building industry is a fast moving field, it is important that the teaching staff keep up to date of what are the latest innovations; otherwise the students’ skills and knowledge might be out dated by the time they graduate.

5.3 Online teaching and learning supporting methods

Online teaching and learning support methods have been explored and, in some cases, tested. The
findings are presented in the following Chapter.

5.3.1 Virtual case study model

In virtual case study model, possible virtual platforms were explored for hosting a model that students can independently access and explore. The applicability of the platform within property, construction and project management fields has been explored, as well as cost and computer requirements.

5.3.1.1 Second Life

Second Life is a possible platform for the virtual case study model. The platform is free for students to use, and it has been used in several universities in order to enhance learning (Crisp 2011, Gregory, et al. 2011). The program is free to use to visit others islands and common areas, but to have your own island where you control the people who are allowed to visit and what is built, the land needs to be purchased/rented. If signed up for a premium membership at the cost of US$ 9.95/month, an area of 512 square meters is included. If additional land is needed, there is a so called ‘Land Use Fee’ which is proportional to the size of the additional land (Linden Research 2014).

Second Life can be downloaded from the official site, and each participant can create their own avatar to represent them in the virtual world. A reason to use this platform is that there is a built-in learning ‘island’ in Second Life. This will enable the students to independently get familiarised with the software in what is called Orientation Island, with minimal or no help from the lecturer. It is possible for the lecturer to create a closed off island, where the avatars allowed on the island can be restricted, with up to 15 000 participants. Learning tools can be created inside the virtual world by linking objects to external websites, blogs, discussion forums, quizzes, and survey tools. One of the tools that can be used for this is SLOODLE, which can be linked to Second Life in order to create a quiz or a survey.

(Crisp 2011)

This software could be used to create a building, making it possible for students to take walkabouts and familiarise themselves with the building for a case study. An example of educational use can be seen in Arch Virtual (ArchVirtual 2007), where a house is created from a building plan. By placing learning tools in the building students can, for example, be linked to a video or a website describing a particular shortcoming of the building, and then possibly tested on what they have learnt in a quiz. In order to guarantee that students use the virtual world, tasks with set deadlines can be used, with marks assigned to them for encouragement (Wall and Ahmed 2008).

To be able to run Second life, a ‘viewer’ needs to be installed. It was discovered that this ‘viewer’ sometimes had problems connecting to the internet if a wireless internet connection was used. Upon discovering this, it was tested if Second Life could be used in a number of common areas at RMIT’s city campus, for example in a library and a cafeteria. It was discovered that the ‘viewer’ was unable to connect on all these areas through wireless internet, and therefore Second Life could not be used. In the library, a connection through cable was also tested by using the internet cable connected to one of the stationary library computers, in which case it was successful. It should be noted that a wireless connection can be successful in using the Second Life ‘viewer’, since it has been used in areas outside the campus. The fact that the Second Life ‘viewer’ has issues when using wireless internet on campus can present a problem if implemented into the course. It might also indicate that if the School wishes to transition into blended and online learning, where platforms like Second Life might be used, the wireless internet needs to be improved. The time required to construct a building in Second Life was also tested. It was deemed easy and quick, depending on how complicated the building structure was.

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

33
5.3.1.2 Computer based game

A second proposal for a virtual case study model is to use a computer based game. This method of learning in the construction sector was described in the literature review (3.3.2.4 Construction site visits and management training), and examples of games that are already used at other universities are given in Goedert et al. (2011) and Wall and Ahmed (2008). In these cases, a computer based game has been used to let the students go through the entire building process of a house, or work in teams over a seven week period as managers of a construction company. The game described by Wall and Ahmed (2008) for managing a construction company is available for purchase, while a game similar to Goedert at al. (2011) with going through the construction stages of a house probably would have to be constructed or programed. In the use of games it is important to control that the game is used to reach the course goals, and that the students are not only learning how to play a game. This can be done, for example, through group based presentations or pre- and post-game questionnaires (Hegazy, et al. 2013).

A simpler tool to create a computer based games was tested: the free eLearning tool SBL interactive (Scenario Based Learning Interactive) (SBLInteractive.org 2014a). The easiness to use this game was tested by using a tutorial published online to create a game scenario. The program was found to be very easy to use, and after completing the tested tutorial, which took approximately one hour, it was possible to start creating own scenarios. The tool could be helpful in a learning environment, since it is possible to add videos, images, and information to the game, as well as making certain aspects of the game only appear after completing set tasks. The game can also be made quite interesting by setting it up in, for example, a detective scenario. There is, however, no interaction with others students or the lecturer.

A scenario created by the Australian branch of Engineers Without Borders was tested to see which kind of games it would be possible to create with the tool. This game was aimed at familiarising people with the difficulties of working in a certain part of Cambodia. In this game, environment information is first given and it then requires the user to complete a task. A number of links connected to this scenario were, however, broken. Lecturers using the tool should, therefore, be aware of the possibility of this happening when using external web pages. When possible, the information should be given inside the scenario so that it is not dependent on outside sources. The aforementioned tutorial is described under the Method section (4.1.3.1 Virtual case study models).

When testing the computer requirements, there was special interest in finding out whether it would be possible to publish scenarios online, since the SBL viewer (which is used to play the games) required a computer with Windows. Free hosting was found to be available for non-commercial scenarios if the lecturer contacts SBL Interactive and provides basic information about the scenario. On free hosting it is, however, not possible to track user’s actions and test results. It is therefore not suitable for assessments purposes. There is a premium account available where the actions and test result can be tracked, if wanted. (SBLInteractive.org 2014b)

5.3.2 Online real-time case study

The CIVAL project in Hong Kong, described in the literature review, opens up interesting possibilities in getting insight into an actual construction site by making pictures and videos from actual sites available to students. This project was, however, carried out in Hong Kong.

There is a similar project in Adelaide, related to the construction of the new Royal Adelaide Hospital (Partnership 2013a). The project has a website where pictures from the construction are published, along with footage from a webcam that publishes a picture every 15 minute of the construction site. In Figure 8, an example of a webcam picture is shown.
Figure 8: Webcam picture from the construction site of the new Royal Adelaide Hospital (Partnership 2013b).

A project of this kind would be very valuable in its potential to give students important insight to actual construction projects and experience of a real-time development. They can get familiarised with, for example, the timeframe of a project and the gradual construction stages. This could be implemented into a course by publishing pictures of the construction, like the webcam pictures from the new Royal Adelaide Hospital, every day/week allowing students to follow the progress. There could also be videos showing certain tasks being carried out on the construction site (e.g. constructing the foundation or laying brick walls). This would be possible as long as the identities of the workers were not revealed, by only showing their backs or blurring out their faces. The pictures, and possibly the videos, could be accompanied with voiceovers created by the lecturer, pointing out notable features.

The use of these kind of techniques in the construction industry is also described in Akanmu et al. (2014). Time-lapse photography and videotaping were used as tools to capture construction activities, and in combination with other tools they are used to monitor and detect discrepancies between as-built and as-planned models. The photos can be integrated in the actual progress bar chart to estimate the progress that have been made on the project (Memon, Majid et al. 2005).

5.3.3 Virtual problem based workshop

One of the main components of a problem based workshop is the discussion between the participants. Students can achieve this virtually by creating their own space to communicate with each other. In Blackboard, it is possible to create different forums for different groups within a class. In online courses, Discussions Board sessions have successfully been used in order to help students achieve a higher order of critical thinking, both in the blended course in this research and in the study by Windeknecht (2003).

There are also several tools available for students who wish to work on the same report at the same time, from different locations; an example is Google Documents, which allows multiple persons to view and edit a document at the same time.

Presentations are vital to both allowing the students learn from each other, and to give and receive feedback. This can be achieved through Blackboard Collaborate sessions, by the student groups appointing a presenter from each group. This student can then be given moderator privileges from the lecturer, allowing them, for example, to show PowerPoint presentations.
5.4 Summary

The following section will tie together the lessons learnt and challenges from delivery of BUIL 1225, the feedback sessions and online supporting methods; together they highlight issues with a course delivered in a blended mode.

There was a rapid increase in student emails regarding detailed course questions in BUIL 1225 when the final project started. Despite this, no students attended the Blackboard Collaborate session created to address questions regarding the project. The Blackboard Collaborate sessions did, however, work very well in the beginning of the semester to clear out questions and help with understanding expectations. But it seems that students in an online environment, just as in a face-to-face course, have a tendency to ‘skip’ classes at the end of the semester in order to work on the final assessment. The rapid increase in emails created an issue by taking up the lecturer’s time, especially since many questions were very similar. A possible solution to this is to create a forum addressing questions regarding the final assessment, with usual questions and answers as well as being a platform available for students to ask specific questions. This would also be beneficial since all students could take part of the answers, receiving information about things they might not have thought about asking. It is likely that students need to be encouraged to use the forum since students in course BUIL 1225 preferred to send emails directly to the lecturer rather than using the Discussio Forum. A possible encouragement would be to state clearly from the start that questions regarding the course should be published on the Discussion Forum. Students who still email questions can be referred to the Discussion Forum, and asked to publish their questions in order to receive answers.

A large number of students also sent the lecturer emails regarding information that was already published on the Blackboard. Despite the fact that the student questionnaire showed that the students found it easy to access information on the Blackboard. This could be because they were unsure whether the online information was up to date, or simply because they found it easier to send an email. This highlights the importance of always making a post or sending an email to the students before upcoming events (e.g. Workshops, start of assignments), in order to lessen the number of unnecessary emails. The post/email should have information such as: date, place, time, and possibly refer to where on Blackboard it is described in more detail.

Both the lecturer and students agree that the Workshops in BUIL 1225 were a good compliment to the course. The lecturer also found it helped the students in their learning, providing hands-on face-to-face exercises. Workshops in blended courses can hold a significant importance over the learning and satisfaction of the students; it should therefore be planed very carefully.

During Workshop One there was, however, an issue with access to the learning facilities during the weekend, making it difficult for students to get to the workshop. Since most face-to-face classes in blended courses take place during evenings or weekends educators should always be aware that this might present an access problem to the venue for the students.

The Discussion Board sessions were also a successful part of the course, encouraging a higher order of critical thinking, which is a usual problem in online/blended courses. One of the successful elements in the Discussion Board sessions was the requirement for the students to provide a source of their own, which encouraged students to extend their reading. It would be possible to divide a class into smaller groups making it easier to control the discussion and enforce active participation. A group of 5-8 students was recommended by Benfield (2002) to encourage active participation. The lecturer should also keep in mind that depending on how specific the subject is, the discussion might need some directing. A few students did, however, wanted less time spent on the Discussion Board sessions.

Timetabling was a large issue from both perspectives, which needs to be addressed by the School. During the delivery of the blended course there were several clashes with other courses at Blackboard Collaborate sessions. This resulted in the lecturer having to hold three sessions during the same week, taking up a substantial part of the lecturer’s time. Students also pointed out that the
Blackboard Collaborate sessions weren’t in the timetable. Blackboard Collaborate sessions allocation in the timetable might be helpful to resolve clashes with other classes. But it would be very important to clearly state which sessions, if any, are compulsory. It might be possible to make use of a tool such as Doodle, to schedule sessions during the semester where the largest number of students would be able to attend. Doodle is a free tool, which allows you to propose up to five possible times, and where the students then can log on and provide their preferences.

The lecturer of BUIL 1225 had to deal with several IT-problems; for example, students being unable to join the Blackboard Collaborate session, which took focus away from the course delivery. This is also reflected in the student emails, as the category received the third most emails. The Program Manager of the Master program suggested a possible solution in having a full-time teaching assistant with expertise in e-learning within the School. In a blended/online course, the technologies used will understandably play a substantial part, which is why it is important that staff receives sufficient training. The lecturer of BUIL 1225 also emphasised that the conversion process of a face-to-face course to a blended course is substantial and very time consuming, which is why the educators converting their courses will need guidance. As mentioned earlier, the sessions in a blended course are usually held on weekends and evenings, this presenting an issue with staff workload. How the educators can be compensated for their time is something the School needs to address.

There are several interesting learning and teaching supporting methods available to enhance student learning in online/blended courses. Among which only a few were explored in this research project. The focus was set on: virtual case study models, online real-time case study and virtual problem based workshops. Two very interesting possibilities for creating virtual case study models are: using Second Life or computer based games. The virtual reality Second Life have a built-in learning module, is free for students to use, the lecturer can create his/her own ‘island’ where the access is restricted, and learning tools (e.g. quizzes, blogs, webpages, discussion forums) can be used in the environment. Computer based games can be used to familiarise students with, for example, the stages of the building process or how to manage a construction company. Some are available for purchase or freely accessible, while others would have to be developed. To develop a game would be time consuming but would make it possible to customise it for the School’s needs. In Hong Kong four universities have come together to create a webpage where students can view videos and pictures from actual construction sites, an interesting prospect for an online real-time case study. Information directly from a construction site could familiarise students with its different aspects, such as the different tasks and their timeframe. To conduct virtual problem-based workshops, very simple tools can be used, for example, using ones that already available on Blackboard such as Discussion Forum and Blackboard Collaborate.
6 Framework and recommendations

This Chapter has been divided into three parts: a ‘Framework’ that educators can use to convert their courses into a blended delivery mode, an example of an implementation of the ‘Framework’, and recommendations for the School illustrating the issues that need to be addressed.

6.1 Framework

The Framework is meant to be used by educators, mainly within construction management discipline, in order to guide them through the process of converting their face-to-face course to a blended course. The Framework is presented graphically in Figure 9, which is then followed by an extended tabular form of the Framework.

The Framework is created with the course objectives and outlines as the central part, which all other parts are dependent on. From the objectives and outlines, a theme or themes for the course is created. Seven other stages are then followed in order to gradually go through the different parts of a course in the process of converting it into a blended course. The course objectives and outlines are generally fixed by guidelines and the theme of the course will be closely tied to these. The first and second part of the framework can therefore be seen as fixed, while the following seven parts are dependent of the first two parts, as well as of each other. Developing and planning the last seven parts will therefore not be a linear process, but an iterative one.

Figure 9: Graphical representation of the Framework.
<table>
<thead>
<tr>
<th>Stage</th>
<th>How to</th>
<th>Questions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review course objectives and outlines to meet the online delivery requirement</td>
<td>Review the course objectives to meet the national guidelines for post-Graduate courses, and your own guidelines.</td>
<td>Are you fulfilling the national guidelines? Are you meeting your own objectives for the course?</td>
</tr>
<tr>
<td>2</td>
<td>Formulate theme(s) of course</td>
<td>Brainstorm to formulate the overall theme of the course. Focus on the goals and try to see possible ways of taking them into a blended environment.</td>
<td>What theme would be able to tie the course objectives and goals together? How can the goals be reached in an online environment?</td>
</tr>
<tr>
<td>3a</td>
<td>Development of subthemes</td>
<td>Develop subthemes to link the various subject topics of the course together.</td>
<td>What subtopics will help addressing the course goals?</td>
</tr>
<tr>
<td>3b</td>
<td>Relate to industry</td>
<td>Relate subject topics to the industry. Make sure the students know how to apply the skills they learn. E.g. when teaching how to use Microsoft Project make sure the students learn how to put actual construction project tasks together. Try to expose the students to real industry scenarios to train them in solving problems that they will face in their professional life. Recommended delivery methods: <em>Insight into industry</em> Site visits, lectures held by industry professionals, and mentor programs <em>Problem based learning techniques</em> Role playing e.g. put together a real construction scenario and let students play different industry roles in solving a problem. Hands-on exercise during Workshop such as the construction of the CN Tower described in the literature review (3.3.2.3 Problem based learning). Independent group work after presenting students with a real construction problem presented through report or presentation.</td>
<td>How can you relate the content of the course to the industry?</td>
</tr>
<tr>
<td>3c</td>
<td>Development of course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>-----------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Plan out Part B of the course. Plan as if it was a face-to-face course that runs for 12 weeks. Make a copyright check on all material published online. Timetable venue for face-to-face sessions, online discussion sessions, and feedback.  
Recommended delivery methods:  
**Blackboard collaborate sessions (BCS)**  
Deliver in the beginning of the semester to clear out questions and help with understanding expectations. At the end of semester students have a tendency to 'skip' classes in order to work on final assessments. A possible solution to this is to instead of using BCS create a forum addressing questions regarding the final assessment, with usual questions and answers as well as having a platform available for students to ask specific questions.  
If possible it might be helpful to timetable the BCS. In order to be able to clear out timetabling clashes, but make sure it is clear if the sessions are compulsory or not. If timetabling BCS after course start tools such as Doodle could be used to avoid clashes with other classes. For the lecturer's presentations it is important to note that certain video files do not play directly from a memory stick, they need to be copied onto the desktop.  
**Discussion Forum**  
It is likely that the students will need to be encouraged to use the Discussion Forum, since students in BUIL 1225 generally preferred to send emails directly to the lecturer rather than using a forum. A possible encouragement would be to state clearly from the start that questions regarding the course should be published on the Discussion Forum. Students who still email questions can be referred to the Discussion Forum, and asked to publish their question in order to receive an answer. Or test out another platform e.g. Facebook. If using Facebook, make sure that you create a professional account, to not mix professional life with personal life. You can also tip your students to use 'Restricted list' (found under Settings - Blocking) if they don’t want you to see their updates. This will allow them to add persons in a 'Restricted list', only allowing the persons to see content they make viewable for the public.  
**Site visit**  
Be aware that it might be hard to schedule site visits for blended courses since they need to be held on the weekend. Other possible ways to give the students insight into the industry are lectures or mentoring programs involving industry professionals.  
**Online teaching and learning support methods**  
Consider the use of alternative methods to enhance your students’ learning, such as virtual case study model (e.g. Second life, computer based games), online real-time case study (e.g. insight into actual construction sites through photos and videos), and virtual problem based workshops (e.g. Blackboard Collaborate and Discussion Boards). |

|  | What aspects of the course can be kept in its current form?  
What aspects need to be changed?  
What additional resources are needed to compensate for the lack of face-to-face classes?  
Which existing resources can you use?  
Is all of your online material 'stand-alone'? For example, can the slides be understood without you explaining them?  
Have you made a copyright check on all online published material with the library?  
When will be the best time period to incorporate the workshops?  
Will Blackboard collaborate sessions be helpful to clear out questions?  
When should they be placed and what will be their focus?  
A site visit can be made to give an insight into construction site safety in order to be able to evaluate risks and consequences.  
A site visit could also be made in order to help the students better understand how surrounding and external features can influence the property value. |
| 3d | Develop course assessment(s) | Review or redevelop the assessments. Plan in view of the online tools e.g. Discussion boards, online hand-in of reports, online presentation on Blackboard. Also consider assessments during the face-to-face sessions and the resources the students will need to execute them (e.g. computer with Windows). Recommended assessment methods:  
**Workshops**  
Hands-on face-to-face Workshops can help the students in their learning and can be a good compliment to a course. This is a good opportunity to develop the students’ soft skills such as interpersonal skills, problem solving abilities and team working abilities. These face-to-face sessions can be used, for example, for site visits, workshops, focus groups, role playing, lectures held by industry professionals and small scale building projects.  
Since most face-to-face classes in blended courses take place during the evenings or weekends lecturers should always be aware that this might present an access problem and as far as possible prepare for it and prevent it.  
**Discussion board**  
Discussion board can be a helpful tool to help the students reach a higher order of critical thinking. Plan the timeframe, choose and provide suitable material (giving both background and starting discussions through being controversial), plan the need for directing the discussion, and consider a requirement for the students having to provide a source of their own to encourage extended reading. | How and what type of assessments will best address the course outcomes?  
What online assessment tools do you have access to? | Role playing could be used as an exercise to familiarise the students with different types of property stakeholders and the roles they have. Dividing the students into groups and assigning each student with different property stakeholder’s roles when playing out a real world industry scenario.  
To train students in writing, for example, method statement, cost estimation and construction schedule, they could perform a small scale building project. Building a physical building in small scale within a set timeline. Handing in all documentation prior to construction and updating the documentation as the construction is performed. (See section 3.3.2.3) |
| 3e | Provide a subtopic for each week and plan online correspondence | Develop the Part B of the course with a topic for each week and details of tasks for each week.  
**Recommended methods:**  
**Course description (Part B)**  
Make the course format as clear as possible since misconceptions are usual, especially for blended courses.  
**Online correspondence**  
Set up an e-correspondence plan stating how you will correspond with your students and how often. See Bowen's (2012) advice under 2.3.1.4 *Technical issues and feedback.* Always make a post or send an email to students before upcoming | How can you best reflect the course outcomes in subtopics?  
What online resources and assessments should be connected to the topics?  
How can you best encourage and support the students through online correspondence? |
| 3f | Plan feedback | Workshops and assignments, in order to lessen the number of unnecessary emails. In the message state: time, date, place, and possibly refer to where on Blackboard the event is described in more detail. | Which forums will you use and how often will you post information on them? |
| 3g | Plan support | Collect feedback from students, e.g. collect student feedback at half-way and at the end of the course. Also note down your own experience from constructing and conducting the course, e.g. compile teacher notes as the course goes along. Together with student feedback such as questionnaires, consider the information obtained during the delivery of the course emails, assessments, conversations with students etc. | What kind of feedback will you need in order to improve the course for the next semester? |

Find out what support will be available for the students from the School and inform them of it. Plan the support you will offer your students: e.g. discussion forums, email, Blackboard Collaborate sessions, Facebook, instruction videos, guides. Also consider that even though you offer them support on a certain forum they might not use it. Therefore chose with care and try to encourage the students to use the support that you have offered. | What support can the students receive from the School? What kind of support will the students need? How can you encourage the students to use the forums? |
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

6.1.1 Recommended resources

  - Area of interest: subsections 4.3.1-4.3.5 gives an example of best practice online program, an award winning online Master program. Describes methods used during the course to give it a human touch as well as program content and sequencing.

  - Area of interest: Embracing e-communications, Facebook, Twitter and Skype (subchapters of 2. Social Proximity and the Virtual Classroom) describes how to connect with your students and three possible channels which can be used to do so. 5. Technology for information delivery further information regarding e-communication and how you can improve students’ learning experience through use of technology.

  - Areas of interest: overview of e-assessments: ones that are available, guide in chosing what might suit you, and what you can do with the different e-assessments.

  - Area of interest: 7. Strategies and tools (Under Part Two: Blended Learning in Practice) presents tools and strategies to engage students during a course delivered in a Blended mode. Appendix 3. Redesign Guide for Blended Learning describes questions to ask during the different stages of redesigning the course.

  - Area of interest: example of the different stages a group goes through in a virtual environment, advise on how to facilitate groups in the virtual environment, and recommendations for how to divide into groups.

6.2 An example of implementation of the Framework

The course chosen for a theoretical implementation of the framework was Building Systems, a face-to-face intensive course which is to be taught during the first year of the new Master of Energy Efficient and Sustainable Building. It has four three hour lectures scheduled at evenings, and four full day workshops scheduled during the weekend. There are four assessments; three handed-in in the form of reports and one through an online discussion forum. The aim of the course is to give the students a solid knowledge of building systems including architectural design building materials and construction techniques.

The proposed redesign of the course using the Framework is based on information found in Part A and Part B of the course.
6.2.1 Proposed redesign using the Framework

An example of how to redesign the face-to-face course Building Systems into a blended delivery mode, going through all the stages described in Section 6.1 Framework.

6.2.1.1 Review course objectives to meet with the online delivery requirement

- Go through the objectives/guidelines for the course to see how well to fulfil them.

6.2.1.2 Theme of course

- Overall focus: residential and commercial buildings.

6.2.1.3 Development of subthemes

- Create subthemes:
  1. Materials, design concepts and new technologies.
  2. Australian standards and building choices.
  3. Architectural design and implementation impacting the use of building.
  5. Design, planning and construction techniques.
  6. Relationship between cost, time and value, and relation to design.

6.2.1.4 Relate to industry

- Making a site visit.
- Using computer based game showing how a building is put together and asking the students to identify and suggest solutions for problems solving (relating to the fourth subtheme).

6.2.1.5 Development of course

- Review all lecture slides. The need to be stand-alone and understood without comments. Alternatively record podcasts.
- Prepare materials such as videos, articles and reports to explain the topics of the lectures and engage the students. Try to relate it to the industry through current articles and reports. Make sure providing the students sufficient amount of materials without overwhelming them.
- Book Workshop venues and site visits.
- Create a timetable for workshops, site visits and possibly Blackboard Collaborate sessions.
- Copyright check for online materials with the library.
- Create online game/s using SBL Interactive.
- Plan the Workshops:
  o Group exercises - to learn to work in group and develop interpersonal skills.
  o Site visit/s.
  o Simulate real industry problems - collaboration in groups finding a solution to a structural and design problems; exercise showing the cost, time and value relation to design; testing out design, planning and construction techniques using software (e.g. FirstRate 5) to find an optimal solution.
  o Workshops should either have assessments or exercises that would be assessed to encourage students’ participation.
6.2.1.6 Course assessments

- Assessments in this course can be kept with moderations.
- Discussion Board: Materials, design concepts and new technologies.
- Discussion Board: Australian standards and building selections.
- Assessment reports kept the same with the addition of:
  - Providing literature review for the research topic/s. Assessment on building defects with suggested solutions, backed up with literature review.

6.2.1.7 Provide each week with a subtopic and plan online correspondence

- Tie together the subtopics with the assessments and recourses. Make a detailed teaching schedule stating the topic of each week, what resources the students will be expected to go over, when the assessments are and how much of the total grade they are worth.
- Make an e-correspondence plan:
  - Which forums to use (e.g. Blackboard Collaborate session, Blackboard discussion forum, email, Facebook). When to use the different forums (e.g. forum for asking course question, explaining assessments, posting information, posting study questions). How often to use them (e.g. twice a week, once a week, every month, before every event such as Workshops and assessment initiations).
  - Use emails to send information before all events. Blackboard discussion forum as a place where students can ask course questions, try not to answer questions via email but refer them to the forum when they aren’t personal. Email for personal questions.
  - Facebook group to post study questions and post information twice a week (one question and one post on what the theme and resources are for the week).
- Always remember to keep a log of what posted on the different forums.

6.2.1.8 Feedback

- Make sure to keep notes during the semester, which providing feedback on the course delivery as well as the development phase.
- Planning a student feedback. When will be a good time? (e.g. at the end of the last workshop).
- Map the critical areas which you should keep a tight check on to see if they work properly, for next semester (try not to make any changes mid-semester). Evaluate these areas in your own feedback and the student feedback:
  - Workshops. Are they a useful complement to the course? Did the students have sufficient background information? Was the timing, placement in the course satisfactory?
  - Discussion Boards. Are the students keeping on track with the topic? Are the students using critical thinking?
  - Assessment reports. Where did the students struggle? Is the timeline of the assessments appears to be appropriate (was it too short resulting in lack of analysis)?
  - Online resources. What kind of sources did the students use e.g. videos, reports, articles, lecture slides, game (try to find out through, for example, Discussion Boards, and/or ask during student feedback)? Did they provide sufficient background knowledge? Where and how they engaging the students?
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

6.2.1.9 Support

- Plan and prepare support to be provided:
  - For example, guides on how to hand in assignments, video tutorials describing how to use programs required in the course, guides how to do proper referencing, forums use for asking questions and for discussion.
- Find out what type of supports are available to the students. Is there, for example, an IT support they can turn to?
  - IT Help and support at RMIT: [http://www.rmit.edu.au/students/it/support](http://www.rmit.edu.au/students/it/support).

6.3 Recommendations for the School

During the external feedback session with industry professionals it was clear that face-to-face time is valued. The importance of hands-on face-to-face time in acquiring soft skills (e.g. interpersonal skills, problem solving abilities and team working abilities) was emphasised, as well as the fact that a virtual learning takes place in a contrived environment. The School should therefore carefully assess the amount of face-to-face time in blended courses. The industry professionals suggested a percentage of 30-35% face-to-face time to get the soft skills needed in the industry.

Five issues which were found during the research project are recommended to be addressed by the School of Property, Construction and Project Management.

6.3.1 Timetabling

During BUIL 1225 delivery there were several clashes with other courses for Blackboard Collaborate sessions. This resulted in the lecturer having to hold three sessions during the same week in order to tend to the students’ needs, taking up a substantial part of the lecturer’s time. There is a clear problem when it comes to timetabling in blended courses which needs to be addressed.

6.3.2 IT-support

The lecturer of BUIL 1225 had to deal with several IT-problems, for example students being unable to join the Blackboard Collaborate sessions, which have taken focus away from the course delivery. This is also reflected in the student emails, in it being the third most important reason for emailing the lecturer. The Program Manager of the Master Program suggested a possible solution in having a full-time teaching assistant with expertise in e-learning within the School.

6.3.3 Staff training

In a blended or fully online course the technologies used will understandably play a substantial part, which is why it is important that staff receives sufficient training. The lecturer of BUIL 1225 also emphasise that the conversion process from a face-to-face course to a blended course is substantial and very time consuming, which is why the educators undergoing it will need guidance and help. Since the College might not offer sufficient support for the lecturers converting their courses into blended mode, the School will need to provide additional support for the lecturers.
6.3.4 Workload

Sessions within blended courses are usually held on weekends and evenings, which presents an issue with staff workload. There might be a need for compensating lecturers for their time through, for example, time off.

6.3.5 Internet resources

Some students might use Apple computers, while a lot of programs are written for Windows platform. Since the School do not have a computer lab it is important to make sure that there are ‘spare’ computers available to the students if needed.
7 References


Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level


8 Appendix I: Part A and Part B of BUIL 1225

The course description of ‘BUIL 1225 – Sustainability in the Built Environment’ in the form of Part A and Part B for the second semester 2014 is presented.

8.1 Part A: Course Overview

Course Title: Sustainability in the built environment: A focus on building and design

Credit Points: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Campus</th>
<th>Career</th>
<th>School</th>
<th>Learning Mode</th>
<th>Teaching Period(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUIL1225</td>
<td>City Campus</td>
<td>Postgraduate</td>
<td>325H Property, Constr &amp; Proj Mgt</td>
<td>Face-to-Face</td>
<td>Sem 1 2011,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sem 2 2009,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sem 2 2010,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sem 2 2014,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring 2013</td>
</tr>
<tr>
<td>BUIL1231</td>
<td>City Campus</td>
<td>Undergraduate</td>
<td>325H Property, Constr &amp; Proj Mgt</td>
<td>Face-to-Face</td>
<td>Sem 2 2010,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spring 2013</td>
</tr>
</tbody>
</table>

Course Coordinator: James PC Wong

Course Coordinator Phone: +61 3 9925 9701

Course Coordinator Email: james.wong@rmit.edu.au

Course Coordinator Location: 15.3.12

Course Coordinator Availability: By appointment

Pre-requisite Courses and Assumed Knowledge and Capabilities

None

Course Description

The building industry is under increasing pressure to improve the sustainability performance of buildings. This presents a significant innovation challenge for building designers, developers and managers.

In this course you will develop your understanding of the context, principles and practice of environmentally sustainable design (ESD), with an emphasis on the energy and environmental performance of buildings. You will further develop your understanding of the strategies used in
environmentally sustainable design and the performance assessment frameworks used to determine the sustainability of the built environment.

Objectives/Learning Outcomes/Capability Development

In this course you will develop the following program learning outcomes:
• Determine and apply knowledge of complex sustainable building theory, principles and practice, to contribute to the design and management of sustainable buildings
• Critically analyse, synthesise and reflect on sustainable building theory and recent developments, both local and international, to extend and challenge knowledge and practice
• Professionally communicate and justify sustainable building design principles, strategies, solutions and/or outcomes, engaging effectively with diverse stakeholders, including across the government and industry sectors
• Adopt a building performance and systems approach, and apply specialist knowledge and technical skills to creatively address the diverse needs of sustainable building stakeholders

Upon successful completion of this course, you will be able to:
• Identify the characteristics of best-practice in sustainable building initiatives
• Apply sustainability criteria to accurately assess the performance of a building
• Identify and analyse effective strategies for achieving sustainable buildings and sustainable design outcomes
• Critically analyse Australian sustainability policy and project initiatives
• Evaluate and communicate the effectiveness of current sustainability initiatives and assess whether these initiatives are operating in an effective sustainability framework

Overview of Learning Activities

The course consists of on-line course materials, interactive workshops and/or seminars. You will be engaged in hands-on face to face and online interactive class activities, group discussions and/or computer based workshop.

Overview of Learning Resources

RMIT will provide you with resources and tools for learning in this course through our online systems. As part of the learning in this course you will be directed to lecture notes and other related information through links in MyRMIT. Resources you will utilise in this course include lecture notes, case studies, software package and library resources.

Overview of Assessment

You will be assessed on how well you meet the course's learning outcomes and on your development against the program capabilities. Assessment may include, but is not limited to, written report(s), individual/group assignments, online test(s), in-class presentation(s) and building simulation exercises where you will apply selected building design strategies to determine building sustainability performance.
Feedback will be provided on all assessment tasks. If you have a long term medical condition and/or disability it may be possible to negotiate to vary aspects of the learning or assessment methods. You can contact the program coordinator or the Disability Liaison Unit if you would like to find out more. A student charter http://www.rmit.edu.au/about/studentcharter summarises your responsibilities as an RMIT student as well as those of your teachers. Your course assessment conforms to RMIT assessment principles, regulations, policies and procedures which are described and referenced at http://www.rmit.edu.au/policies/academic#assessment

8.2 Part B: Course Detail

The following link provides important information on the following topics that relates to all courses:

Important Information

- Student Feedback at RMIT
- Student Progress
- Special Consideration, appeals, and discipline
- Academic Integrity
- Student Progress Committee (SPC)
- Assessment Grades
- Classification of award

Teaching Period: Sem 2 2014

Course Code: BUIL1225

Course Title: Sustainability in the built environment: A focus on building and design

School: 325H Property, Constr & Proj Mgt

Career: Postgraduate

Campus: City Campus

Learning Mode: Face-to-Face

Primary Learning Mode:

This course is offered in blended learning mode which is combination of online learning activities and face to face intensive classes

Credit Points: 12
Teacher Guided Hours: 15 per semester
Learner Directed Hours: 72 per semester

Course Coordinator: James PC Wong
Course Coordinator Phone: +61 3 9925 9701
Course Coordinator Email: james.wong@rmit.edu.au
Course Coordinator Location: 15.3.12
Course Coordinator Availability: By appointment

Offering Coordinator: Dr James PC Wong
Offering Coordinator Phone: +61 3 9925 9710
Offering Coordinator Email: james.wong@rmit.edu.au
Offering Coordinator Location: Building 15.3.12

Additional Staff Contact Details

Pre-requisite Courses and Assumed Knowledge and Capabilities
None

Course Description

The building industry is under increasing pressure to improve the sustainability performance of buildings. This presents a significant innovation challenge for building designers, developers and managers.

In this course you will develop your understanding of the context, principles and practice of environmentally sustainable design (ESD), with an emphasis on the energy and environmental performance of buildings. You will further develop your understanding of the strategies used in environmentally sustainable design and the performance assessment frameworks used to determine the sustainability of the built environment.

Objectives/Learning Outcomes/Capability Development:

In this course you will develop the following program learning outcomes:
• Determine and apply knowledge of complex sustainable building theory, principles and practice, to contribute to the design and management of sustainable buildings
• Critically analyse, synthesise and reflect on sustainable building theory and recent developments, both local and international, to extend and challenge knowledge and practice
• Professionally communicate and justify sustainable building design principles, strategies, solutions

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level

and/or outcomes, engaging effectively with diverse stakeholders, including across the government and industry sectors

• Adopt a building performance and systems approach, and apply specialist knowledge and technical skills to creatively address the diverse needs of sustainable building stakeholders

Upon successful completion of this course, you will be able to:
• Identify the characteristics of best-practice in sustainable building initiatives
• Apply sustainability criteria to accurately assess the performance of a building
• Identify and analyse effective strategies for achieving sustainable buildings and sustainable design outcomes
• Critically analyse Australian sustainability policy and project initiatives
• Evaluate and communicate the effectiveness of current sustainability initiatives and assess whether these initiatives are operating in an effective sustainability framework

Overview of Learning Activities

The course consists of on-line course materials, interactive workshops and/or seminars. You will be engaged in hands-on face to face and online interactive class activities, group discussions and/or computer based workshop.

Details of Learning Activities

Learning experiences planned for this course include on-line course materials, group discussions and/or forum, interactive face to face workshops and/or seminars and environmentally sustainable design appraisal using building simulation tools.

The course starts with introduction of key concepts of sustainability and what this means in relation to buildings and the built environment. You will delve further into the topic of energy and environmental performance of buildings through case studies, group discussions, critical reviews and building simulation tools during the intensive workshops.

You will read contemporary literature relating to the sustainability of buildings, building energy and environmental performance, and strategies for reducing their impact on the environment. Active and constructive participation in group discussions is expected in addition to regular readings and careful planning of assessment tasks.

Teaching Schedule

Most of the Learning Activities will be delivered online with two (2) Intensive Workshops in Weeks Five (5) and Eight (8).

Week 1 – Global issues and responses in the built environment
• Course introduction
• Reading on global issues and responses (online lecture notes, newspaper article, published articles, video)
Week 2 – Global issues and responses in the built environment
• Reading on global issues and responses (online lecture notes, newspaper article, published articles)
• Blackboard Collaborate – Q&A for global issues content

Week 3 – National issues and responses in the built environment
• Reading on national issues and responses (online lecture notes, newspaper articles, published articles)
• Online discussion – generate discussions on global issues

Week 4 – National issues and responses in the built environment
• Reading on national issues and responses (online lecture notes, newspaper articles, published articles)
• Online discussion – generate discussions on national issues
• Provide links to software installations and demonstrations for Week 8
• Discussion Board (20%)

Week 5 – Integrated sustainable building design
• Interactive Workshop 1 (10am-5pm, 23 August)
• Discussion in am (Introduction, Lecture & Activity: in-class exercise, software installation)
• Exercise in pm (team building role play exercise: each has a role to achieve certain targets / fictitious real life scenario / assessed in group)
• In-class integrated sustainable building design exercises (20%)

Week 6 – Building industry responses
• Reading on building industry responses (online lecture notes, published articles)
• Blackboard Collaborate – Q&A for content

Week 7 – Building industry responses
• Building industry and designer responses (online lecture notes, published articles)
• Confirmation of case study building for Final Report Essay

Week 8 – Building assessment and evaluation
• Interactive Workshop 2 (10am-5pm, 20 September)
• Use of building performance assessment software for building performance analysis
• In-class building performance assessment exercises (20%)

Week 9 – Sustainability in the built environment
• Support for Final Report Essay
• Submission of building performance assessment analysis from Week 8

Week 10 – Sustainability in the built environment
• Support for Final Report Essay
• Submit draft Final Report Essay for feedback

Implementing lessons learnt from the development and delivery of blended course on ‘Sustainability in the Built Environment’ at broader program level
Week 11 – Building assessment and evaluation
• Blackboard Collaborate – Wrap up
• Support for Final Report Essay

Week 12 – Building assessment and evaluation
• Support for Final Report Essay
• Submission of Final Report Essay (40%)

**Interactive Workshop One: Integrated Sustainable Building Design**
Time and venue: Saturday 23rd August 10:00 am to 5.00 pm; Building 8, Level 8, Room 44/47, RMIT City
Topics: Integrated sustainable building design from the perspectives of building design and construction, operations, technologies, and performance feedback. Team building exercises on sustainable building design processes.

**Interactive Workshop Two: Building Performance Assessment**
Time and venue: Saturday 20th September 10:00 am to 5.00 pm; Building 8, Level 8, Room 44/47, RMIT City
Topics: Introduction to building simulation performance tools; Energy and environmental impacts of sustainable building design.

**Overview of Learning Resources**
RMIT will provide you with resources and tools for learning in this course through our online systems. As part of the learning in this course you will be directed to lecture notes and other related information through links in MyRMIT. Resources you will utilise in this course include lecture notes, case studies, software package and library resources.

**Learning Resources**
null

**Prescribed Texts**
null
References

**Recommended readings:**

- 7group & Reed, B. 2009. The Integrative Design Guide to Green Building: Redefining the Practice of Sustainability.

**Other Resources**

There is no prescribed text book for this course.

The University Library provides extensive services, facilities and study space as well as comprehensive collections of books, periodicals and other course related materials, such as DVD’s, magazines, slides, films etc. Computer laboratories with access to a wide range of desktop publishing software are also available. The library also has an expanding virtual collection of electronic resources and networks, including product data, e-books, electronic journals and newspapers, web based tutorials, online reference and document delivery services etc. all of which are accessible on and off campus 24 hours per day. More information on library resources and services can be found at http://www.rmit.edu.au/library. If you need additional support, visit RMIT’s Learning Lab, either in person, or on line: http://disweb.rmit.edu.au

**Overview of Assessment**

You will be assessed on how well you meet the course’s learning outcomes and on your development against the program capabilities.

Assessment may include, but is not limited to, written report(s), individual/group assignments, online test(s), in-class presentation(s) and building simulation exercises where you will apply selected building design strategies to determine building sustainability performance.

Feedback will be provided on all assessment tasks.

If you have a long term medical condition and/or disability it may be possible to negotiate to vary aspects of the learning or assessment methods. You can contact the program coordinator or the Disability Liaison Unit if you would like to find out more.

A student charter http://www.rmit.edu.au/about/studentcharter summarises your responsibilities as an RMIT student as well as those of your teachers.

Your course assessment conforms to RMIT assessment principles, regulations, policies and procedures which are described and referenced at http://www.rmit.edu.au/policies/academic#assessment
Assessment Tasks

This course is assessed with two (2) discussion sessions, two (2) workshop exercises and a Final Report. There is no final exam for this course.

Discussion Sessions: 20% (Individual work)
You are required to participate and contribute in group discussions on topics pertaining to global and national sustainability issues in the built environment. Discussion sessions will be monitored and moderated during the assigned discussion periods through Blackboard Discussion Board.

Interactive Workshop 1: Integrated Sustainable Building Design: 20% (Individual work)
Submission date: 23rd August 2014
Team building exercises will introduce students to the importance parameters in integrated sustainable building designs and ways to achieve them.
These exercises will develop your capability to critical thinking and analyse important criteria that impacted in sustainable building designs. Grades will be awarded according to the Assessment Criteria for the Integrated Sustainable Building Design.

Interactive Workshop 2: Building performance assessment: 20% (Group work)
Submission date: 26th September 2014
Working in groups of 2, you are required to analyse the energy and environmental performance of a selected building using building performance assessment tool. You are required to submit tabulated assessment results and their analysis with recommendations on what constitute energy and environmentally efficient building.
These exercises will develop your capability to research and analyse important criteria that impacted onto the energy and environmental performance of buildings. Grades will be awarded according to the Assessment Criteria for the Building Performance Assessment.

Final Report: Critical review the sustainability of a building/ dwelling: 40% (Individual work)
Submission date: 15th October 2014
Length: 3000 words
You are required to critically assess the sustainability of a case study building and formulate recommendations for possible improvements. The report required in-depth literature review and comparison of sustainable performance and improvements of similar building nationally and overseas and possible lessons learned that could be implemented to the case study building.
This exercise will develop your research, analytical and critical thinking skills. Grades will be awarded according to the Assessment Criteria for the Research Essay

Please refer to your Blackboard site for further details relating to assessment in this course, including the assessment criteria.

Other Relevant Information
Applying for an Extension
Extension of time for assessment tasks may be granted where circumstances beyond your control prevent submission by the published due date. An application for extension of time must be lodged with your tutor or the course coordinator as early as possible, and no later than one working day before the due date for submission.

You can apply for extension using the University’s Extension Application Form – http://mams.rmit.edu.au/seca86tti4g4z.pdf – or by emailing your course coordinator or tutor directly. An extension of up to seven calendar days may be granted if good reason can be demonstrated. Include supporting evidence (such as medical certificates) with your application. Extensions beyond seven calendar days cannot be granted by course coordinators, tutors or the School. To apply for an extension of time greater than seven calendar days you must lodge an application for Special Consideration.

Applying for Special Consideration
If you are seeking an extension of more than seven calendar days (from the original due date) you must lodge an Application for Special Consideration form, preferably prior to, but no later than two working days after the official due date. Late applications will only be accepted in exceptional circumstances. For information about Special Consideration and how to apply, see:
http://www.rmit.edu.au/students/specialconsideration

Assessment Appeals
If you believe your assessment result or final result is wrong please contact the course coordinator and provide the reason why you think your result is incorrect. Valid reasons for seeking a review of results include:

• You believe an error has occurred in the calculation of the grade; or,
• You believe the assessment did not comply with criteria published in the Course Guide; or,
• You believe the assessment did not comply with University Policies on Assessment (i.e. an error in process has occurred).

Full details of the procedure (including appeals procedure) can be located at:
http://www.rmit.edu.au/policies/academic#assessment

Other Relevant Information
Academic Integrity
Academic integrity means honesty and responsibility in scholarship through respecting the work of others whilst having the freedom to build new insights, new knowledge and ideas. RMIT University upholds the values of academic integrity as fundamental to the scholarship undertaken by all members of its community. Whenever you refer to another person’s research or ideas (either by directly quoting or paraphrasing them) you must acknowledge your source. If you are even in doubt about how to properly cite a reference, consult your lecturer or the academic integrity website:
Plagiarism and Collusion
Plagiarism and collusion constitute extremely serious academic misconduct, and are forms of cheating. You are reminded that cheating, whether by fabrication, falsification of data, or plagiarism, is an offence subject to University disciplinary procedures. Plagiarism is the presentation of the work, idea or creation of another person as though it is your own. It is a form of cheating and is a very serious academic offence that may lead to expulsion from the University. Plagiarised material can be drawn from, and presented in, written, graphic and visual form, including electronic data, and oral presentations. Plagiarism occurs when the origin of the material used is not appropriately cited. Plagiarism is not acceptable. Examples of plagiarism include:

- Copying sentences or paragraphs word-for-word from one or more sources, whether published or unpublished, which could include but is not limited to books, journals, reports, theses, websites, conference papers, course notes, etc. without proper citation;
- Closely paraphrasing sentences, paragraphs, ideas or themes without proper citation;
- Piecing together text from one or more sources and adding only linking sentences;
- Copying or submitting whole or parts of computer files without acknowledging their source;
- Copying designs or works of art and submitting them as your original work;
- Copying a whole or any part of another student’s work;
- Submitting work as your own that someone else has done for you; and
- Enabling Plagiarism: the act of assisting or allowing another person to plagiarise or to copy your own work is also an offence.

For further information, please see the RMIT Plagiarism Policy: http://www.rmit.edu.au/browse;ID=sg4yfqzod48g1 – and the RMIT Student Discipline Statute and Regulations - http://www.rmit.edu.au/browse;ID=11jgmnjgg70y

**Course Overview:** [Access Course Overview](#)
## 9 Appendix II: Student questionnaire

The student questionnaire distributed at the end of Workshop Two.

<table>
<thead>
<tr>
<th>Gender:</th>
<th>☐ Female</th>
<th>☐ Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originating country:</td>
<td>☐ Developed country</td>
<td>☐ Developing country</td>
</tr>
<tr>
<td>Program enrolled:</td>
<td>........................</td>
<td>........................</td>
</tr>
</tbody>
</table>

Each question is formed as a statement. Please check the box indicating to which degree you agree/disagree with the statement. Where: 5=Strongly agree, 4=Agree, 3=Neutral, 2= Disagree and 1=Strongly disagree.

### Part 1: Course content

| 1. There was a sufficient amount of course content | ☐ ☐ ☐ ☐ ☐ |
| 2. The course content held a good quality level | ☐ ☐ ☐ ☐ ☐ |

### Part 2: Delivery

| 3. The online course materials (lecture notes, articles and videos) were helpful | ☐ ☐ ☐ ☐ ☐ |
| 4. The Blackboard Collaborate sessions were helpful | ☐ ☐ ☐ ☐ ☐ |
| 5. The Blackboard Collaborate sessions were easy to use/participate in | ☐ ☐ ☐ ☐ ☐ |
| 6. The Discussion Board sessions helped to understand global and national issues | ☐ ☐ ☐ ☐ ☐ |
| 7. The Workshops content provided a good supplement to the course | ☐ ☐ ☐ ☐ ☐ |
| 8. The online resources provide sufficient background knowledge for the workshop | ☐ ☐ ☐ ☐ ☐ |

### Part 3: Assessments

| 9. The Workshops held a good level of difficulty | ☐ ☐ ☐ ☐ ☐ |
| 10. The timing of the assessments were satisfactory | ☐ ☐ ☐ ☐ ☐ |
| 11. The completion time allowed for the assessments were sufficient | ☐ ☐ ☐ ☐ ☐ |
| 12. The number of assessments in the course are appropriate | ☐ ☐ ☐ ☐ ☐ |
| 13. The assessment requirements held good level of difficulty | ☐ ☐ ☐ ☐ ☐ |

### Part 4: Feedback

| 14. I got sufficient feedback from the lecturer | ☐ ☐ ☐ ☐ ☐ |
| 15. I got my feedback within a good timeframe | ☐ ☐ ☐ ☐ ☐ |

### Part 5: Blackboard Shell

| 16. It was easy to find information on the Blackboard Shell | ☐ ☐ ☐ ☐ ☐ |

Do you have other comments regarding the course? (E.g. difficulties, benefits, additional comments regarding the questions above)