



THE UNIVERSITY OF  
MELBOURNE

# Developing capstone experiences

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This guide was developed for the University of Melbourne by Ms Annie Holdsworth, Associate Professor Kim Watty and Dr. Martin Davies of the Teaching and Learning Unit, Faculty of Economics and Commerce, in consultation with the CSHE.

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ISBN 9780734040985

ISBN 9780734040992 (electronic copy)

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## Introduction

Internationally, capstone experiences and subjects typically provide the culmination of theoretical approaches and applied work practice experiences in the senior year of an undergraduate degree. They ensure that graduates will be able to move successfully to graduate studies or gain employment in an increasingly uncertain, competitive and globalised workplace. The University of Melbourne seeks to have outstanding capstone experiences.

Capstone activities include a range of experiences that may lie outside the purview of those offered by traditional university subjects. These activities include project based learning, case study analysis, service learning, work placements, internships, simulations, and immersion experiences. None of these activities is necessarily “new”; rather they are well-established practices. However, they have taken on renewed importance with the development of new approaches to graduate level education such as those offered by the Melbourne Model.

Many universities in Australia and internationally have considered the need to provide students with a culminating academic experience that brings together the knowledge of an academic discipline and student transition to the world of work. The research on this topic indicates a need to carefully consider how capstone experiences provide development of these transitional skills and attributes. It is also important to identify how capstone experiences help students transition from their graduate studies to their chosen career path (Henscheid, 2000) or help them to progress to further studies at the graduate level.

This guide was developed from a report, *Capstone Experience* (2009), prepared by the authors for the Faculty of Economics and Commerce (Holdsworth, Watty and Davies, 2009). The guide provides an overview of the key features and considerations in developing capstone experiences, and it offers practical advice and examples on incorporating capstone experiences in curriculum design. We encourage users of this guide to consider the variety of experiences that can be designed to enhance student learning as part of their undergraduate or graduate study. Effective capstone experiences should be tailored for specific disciplinary requirements, be mindful of student cohort size, and provide a variety of assessment tasks.

The guide is divided into four sections. The first two sections explore the notion of a capstone experience and discuss this in relation to the objectives of the Melbourne Model and the concepts of knowledge transfer and generic attributes. This is followed by a section outlining common ways in which capstone experiences are integrated into the curriculum, and a section on key issues for consideration in designing and implementing a capstone subject. A capstone template, checklist and examples are provided in the appendices.

# 1. What is a “Capstone”?

The term “capstone” is widely used to describe a course or experience that provides opportunities for a student to apply the knowledge gained throughout their undergraduate degree. This involves integrating graduate capabilities and employability skills, and occurs usually in the final year of an undergraduate degree.

Gardner, van der Veer and Associates (1998) broadly define ‘capstone’ experiences as:

- ‘Freestanding courses;
- Components of existing advanced courses in discipline-specific studies; and
- Out-of-class programs, events or activities’. (p.301)

all of which may be **assessable or non-assessable** learning activities.

Capstone experiences are varied. They may consist of experiences that illustrate a student’s skill development and/or experiences that broaden a student’s understanding of the work environment and the communities with which they will engage and contribute to.

Capstone experiences can be designed to address:

- Connecting discipline-specific curriculum to general education objectives
- Assisting students to reflect on and demonstrate what they have learnt over the course of their degree
- Relating discipline-specific learning outcomes to the world of work
- Providing a forum for students to participate in interdisciplinary activities
- Enabling students to reflect on and imagine personal, social, emotional and practical issues of transition beyond the university into the world of work
- Providing a bridge between final year of an undergraduate degree and graduate programs and lifelong learning
- Directly engendering the development of graduate capabilities that employers are searching for in graduates
- Linking undergraduate students to employers and employment arenas
- Connecting graduates to alumni in their chosen fields
- Linking major subject students to another discipline
- Preparing graduates to become active alumni (Gardner et. al., 1998, pp.301-302).

Baker (1997) argues that a senior capstone course should be one in which ‘students and faculty as co-investigators of knowledge [can] engage in critical theoretical professional debates and dialogues’. She adds that the essential element of a capstone course is to allow students to critically reflect on their discipline, as well as their experiences leading to the capstone. Shoaf’s (2000) research emphasises capstone courses as providing authentic experiences, collaboration and integration of knowledge across the curriculum.

It is important to note that capstone courses or experiences are not themselves generic in content (even though the skills gained from capstones may be). Capstone subjects should be designed to provide students with activities that *synthesize discipline specific knowledge*, such as communication skills, with the ability to *apply* this knowledge to real world scenarios. Capstone subjects are subjects that are *integrated* into the curriculum.

Levine (in Gardner et. al., 1998) discusses the importance of making the senior year of a degree “special”. He describes the capstone experience as marking the final year as a transition or conclusion, and an opportunity to provide a retrospective and prospective experience for students. He uses the terms *integration, breadth, application and transition* to define the realities of a capstone experience (p.52).

The key features of a capstone subject can be summarised as follows:

- Free-standing and authentic or “real-life”;
- Involving out-of-class events as a component of existing courses; and
- Involving skill-development leading to work-readiness and/or entry to graduate studies.

The following diagram is an attempt to summarise the relationship between capstone experiences, employer-desired skills, graduate attributes and life-long learning. There are a number of ways that capstone experiences can be integrated into the curriculum. These are discussed in Section 3 of this guide. Examples of capstones experiences are provided in Appendix 2.

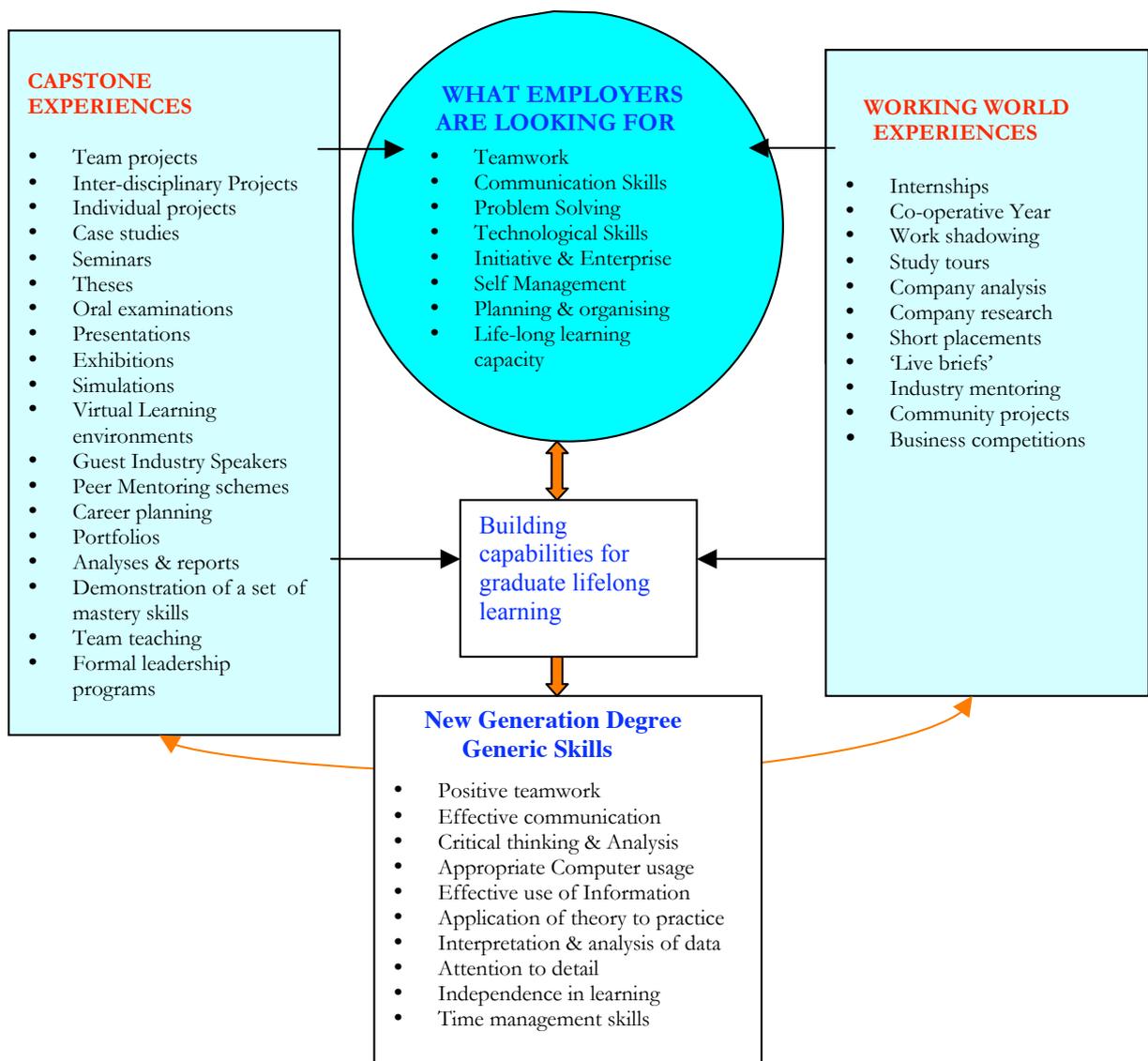


Figure 1: Linking capstone experiences, graduate attributes, employer desired capabilities, and lifelong learning

## 2. The Melbourne Model and capstone subjects

Under the Melbourne Model, capstone subjects are a vital component of the final year of undergraduate degrees. These subjects enhance students' capacity to apply their theoretical knowledge to applied real world issues and demonstrate their ability to provide appropriate solutions. Capstone subjects are understood as offering 'both disciplinary and cohort coherence and a bridge between undergraduate experience and what lies beyond' (The Melbourne Model Report of the Curriculum Commission, 2006, p.7). This is an important feature of the New Generation degrees.

The important notions of "knowledge transfer" and "graduate attributes" at the University of Melbourne also form part of the rationale for the development of capstone subjects. Each of these is discussed below.

### ***Knowledge Transfer***

Knowledge transfer is a feature of subjects, which can occur in relation to degree sequencing, entire program levels and supplementary levels. It refers to engagement of the university with external communities. Melbourne's knowledge transfer develops intellectual capital 'through a two-way mutually beneficial interaction between the University and non-academic sectors' (The Melbourne Model Report of the Curriculum Commission, 2006, p.8). Examples of engagement with the community include:

- case-based learning
- core practical skills
- field and placement experiences.

Integration and interdependence in research experiences are also crucial in knowledge transfer. Interdependence of researchers within the community allows the development of generic skills (See Figure 1). Generic skills refer to a capacity to communicate with non-academic audiences, develop cross-cultural communication, be fluent in languages other than English, and core commercial and business skills.

In the case of experiential learning, undergraduate students are expected to undertake assessable knowledge transfer course components. The emphasis is placed on opportunities to study abroad, work online with students in partner offshore institutions, work with industry, professional and community projects, engage with case studies, multi-disciplinary work, industry mentors, develop conduits for information exchange and advice, and joint university and industry supervised research projects. (The Melbourne Model Report of the Curriculum Commission, 2006, Appendix 6, p. 33-34).

E-portfolios that support a student's development are also highlighted and these are discussed in the literature (e.g. Cambridge, 2001; Huffaker, 2004; Laurillard, 2002; Richards, 2005) as a crucial component of how graduates can develop stronger critical reflective capabilities. Reflection is a key element in assessment of many capstone experiences and is viewed as being essential for student aptitude for lifelong learning.

At a non-assessable level students may be encouraged to undertake activities that could include community arts projects, student leadership, volunteering, editing a journal or newspaper, or any other activity that assists students to develop generic skills.

### ***Generic and graduate attributes***

The University of Melbourne's graduate attributes emphasise attaining a 'set of flexible and transferable skills for different types of employment', being able to 'be well informed citizens able to contribute to their communities wherever they choose to live and work, and to 'initiate and implement constructive change in their communities, including professions and workplaces' (The Melbourne Model Report of the Curriculum Commission, 2006, p.27). Specifically, the University hopes that Melbourne graduates will be:

- academically excellent;
- knowledgeable across disciplines;
- leaders in communities;
- attuned to cultural diversity; and
- active global citizens.

(See <http://www.unimelb.edu.au/about/attributes.html> for more information on the graduate attributes).

Common generic skills related to these attributes include: problem-solving skills, critical thinking skills, analytic skills, teamwork skills, effective oral and written communication skills, and time management skills. These skills, when seen in relation to what employers have named as desired attributes in potential employee graduates, are essentially compatible (see Figure 1). A generic skills/capstone experience matrix that can be used in planning and revising capstone subjects is provided in Appendix 2.

### 3. Integrating capstones into the Curriculum

The design, type and scope of the capstone experience will depend on the individual curriculum development in discipline-specific and multi-discipline settings. It is important to be clear about the reasons for designing the capstone experience and how it relates to the overall course or undergraduate program.

Questions to consider when designing a capstone experience include:

- What are the aims of the capstone experience in terms of student learning outcomes?
- What type of capstone experience will be the most effective learning approach in the subject/course?
- What will students learn and be able to reflect on in this capstone experience ?
- What are the factors that will assist or hinder this capstone experience?
- How will this capstone be conducted and what resources do I need to make it effective?
- How will this capstone experience be assessed?
- How might the students respond to this capstone experience and how will their feedback be gathered for continuous improvement?

There are a number of ways in which capstone experiences can be integrated into the curriculum. These include the following:

#### ***Problem Based Learning (PBL)***

PBL is 'a pedagogical methodology that presents the learner with a problem to be solved to stimulate and situate learning' (Zolin 2008). In Problem Based Learning, students are assessed on their ability to move through a problem solving process which can be hypothetical in execution but may be a "real world" problem. Assessment of PBL is tailored to ensure that students have successfully identified the problem, gathered appropriate resources to use to critically think and analyse all questions that are related to the problem as part of developing the solution, and argued or recommended a potential solution/s effectively. This form of learning is common in disciplines such as Medicine, Law, Engineering, Economics, Management and Marketing, Accounting, Humanities, Fine Art, Architecture, Design and Psychology and Social Work.

#### ***Project Based Learning (PjBL)***

PjBL requires students to work with specific project content to a specific goal and timeline that more closely mirrors the workplace environment. Sometimes these are known as "client-sponsored" projects if there is a close involvement of a company or employer in assessing the project outcomes (Bove and Davies, forthcoming). PjBL involves contextualisation and reasoning and results in specific project learning (MacDonald and Issacs, 2001; Barron, 1998; Blumenfeld, Soloway, Marx, Krajcik, Guzdial and Palincsar, 1991). Key characteristics of project based learning include:

- a increased degree of realism, relevance and rigour
- importance of the design of the project is emphasised
- a longer time duration, more direct involvement working with a team
- professional personnel involved in assessing project outcomes
- students fulfil specific roles as part of the project team, and report writing must contain recommendations or actions required. (Zolin, 2008).

## **Case Study Analysis**

In case study analysis, current cases are used to engage students in a student-centred learning approach which involves complex problem solving, discussion and oral presentations (from both staff and students). The emphasis is often on understanding team dynamics through participating in group activities where the focus is on collaboration, cooperation, self-observation and reflection.

The teaching approach adopted in case study analysis often means that students are expected to assume responsibility for their own learning as well as demonstrate the 'everyday leadership' that will be at the basis of their careers. For example, in the Harvard Business School (a best-practice model for case study capstones), the teaching staff assume the roles of 'planner, host, moderator, devils' advocate, fellow student and judge' to assist students in their learning.

The expected student learning outcomes from participating in a case study capstone might be:

- Confidence in analysis and decision making that is strengthened by the complexity, volume and pace of the case study process.
- The ability to listen, communicate, behave effectively in a team, develop strong lasting relationships, and challenge fellow students for the most appropriate business solutions.
- The ability to review expert's commentary, complete individualised homework, develop proposals for the case protagonist or compare textbook theory and the case for presentation to the class at the teachers' discretion.

## **Field, clinical or work placements**

Work placements are usually described as any work experience, work placement, practicum, clinical or field placement undertaken as part of an academic program of study. These capstone experiences are long-standing practice in undergraduate degrees in Medicine, Science, Engineering, Business, Law and the Humanities.

In establishing work placements there is a fine distinction between work experience and work-integrated learning. Work Integrated Learning (WIL) differs from Work Experience in Industry (WEI) in the following ways:

- The supervisor of the unit facilitates any interaction between the organisation's staff and the students
- Site visits by the supervisor usually occur during a WIL placement
- The supervisor organises student placements, and ongoing monitoring of student work and progress, and
- Assessment of student learning and performance occurs during the placement.

It should be noted that there are legal requirements for the provision of work placements that fall under the Commonwealth Department of Education, Science and Technology definition of Work Experience in Industry (WEI). A set of guidelines that cover School, student, host organisation and university responsibilities for the provision, undertaking, and insurance and indemnity arrangements of work placements have been developed by the University of South Australia (*Guidelines for best practice in UniSA work placements within Australia*, 2007).

Given the large student cohorts within certain degree programs at the University of Melbourne, work placements are not always feasible to organise for all students.

### ***Internships***

Internships are defined as structured work-based learning in industry and some internships in Australia are also referred to as WIL programs. Internships have come under some scrutiny in recent times. Research undertaken by Universities Australia (2007) points to the fact that 85% of all students worked in paid jobs during their university degree study and this work is not linked directly to their discipline studies or to opportunities to enhance employability skills. The aim of internships on the other hand, is to provide structured work based learning in industry for Australian university students, as an approach to enhancing employability skills (Universities Australia 2007).

### ***Simulations or Virtual Situated Learning Environments (VSLE)***

Virtual Situated Learning Environments (VSLE) provide students with the opportunity to learn how to engage with industry and professional practice in a simulated setting, using available university ICT platforms such as BlackBoard or WebCT.

In a VSLE, students can work individually, and in local or international teams, to share and network their knowledge, experiment with differing approaches to challenges situated in 'real-world' scenarios, and gain benefit from social as well as work-related networks. An advantage of this approach is that it can be delivered to large numbers of students who might be geographically widely-dispersed.

Crucial elements of this capstone approach might include:

- online reflections,
- observations,
- role-playing, and
- scenario planning.

Students may also be engaged in group decision-making, project scoping, negotiations, mediation, and the use of critical industry friends and advisors to complete a series of assessable tasks. The simulated environment encourages and builds student confidence in decision-making in a safe and secure context that the facilitator establishes during the project work. This approach requires careful initial development of the brief, considerable expense in design and implementation, and then ongoing support as students work through their assessment tasks.

### ***Travel study tours and immersion experiences***

These are similar to internships or work placements. However, they differ in terms of student learning outcomes and duration. Both are participant-centred, short-term, field-based approaches that can include activities such as:

- site visits locally, nationally or internationally;
- acculturation activities;
- business case competitions;

- entrepreneurship ventures; and/or
- community projects.

Travel study tours can also include visits to academic institutions as part of expanded curriculum activities such as collaborative interdisciplinary student projects. Some activities in study tours may be assessable, some not.

Excellent international competitions that involve student immersion are available in a number of institutions. What all these competitions have in common is a sight unseen case study or challenge that requires a team of students to work collaboratively and quickly to solve a real problem, formulate workable recommendations, and present solutions to a panel of “experts” which may include external case company members, business community leaders and a sponsor company alongside academic staff. Students are exposed to new contacts, and senior industry representatives and other students’ viewpoints. This assists students to expand their skills, enable them to gain new knowledge from others students, and to meet potential employers. International competitions also provide an element of diverse cultural experiential learning.

### ***Service Learning***

Recommendation 1 in the Melbourne Model Report notes the importance of designing external experiences such as community work as part of the ‘major academic and experiential benefits for students’ (p.4).

Service learning is defined by Bringle and Hatcher (1996, p.2), as a credit-bearing educational experience in which ‘students participate in an organised service activity that meets identified community needs’. Service learning is most meaningful when it is related to educational course material and not seen in the same light as volunteer service which can be generated by student organisations, community agencies, youth work, or religious organisations for example. Reflective writing, small group discussion and class presentations are the most widely integrated assessable activities.

A number of researchers (Barber and Battistoni, 1994; Boss, 1996; Cohen and Kinsey, 1994; Giles and Eyer, 1994; Mentkowski and Rogers, 1993; Rubin, 1991) have articulated the impacts of service learning on students’ personal, attitudinal, moral, social and cognitive outcomes. Ruch and Trani (1990-91) suggest that for effective service learning, the interactions between university and community must be mutually beneficial and valued by both partners.

Bingle and Hatcher (1996) developed an implementation model of service learning, the Comprehensive Action Plan for Service Learning (CAPSL). According to this research, the main features of service learning implementation are to concentrate on the four constituencies that are affected by service learning; faculty; students, community and institutions and provide a comprehensive strategic plan for each constituency.

### ***Volunteering***

Volunteering, as a subset of service learning, is becoming a growing area of interest for current students within the University of Melbourne. Students currently volunteer to be ambassadors, mentors, PASS (Peer Assisted Study Scheme) leaders, and so on. A study conducted by Astin and Sax (1998) involving a survey of 3,450 students in the U.S. showed that students who participated in a volunteering program benefited in all 35 outcome measures that covered academic outcomes, life skills and civic responsibilities. Notable

among these item measures were:

- preparation for graduate professional school;
- academic self concept (this includes academic ability, self drive, mathematical ability intellectual self-confidence and writing ability);
- leadership opportunities;
- student satisfaction with college opportunities; and
- understanding problems faced by communities, conflict resolution and knowledge of different races and cultures.

These items are crucial when considering the overall benefits of capstone activities for both undergraduate and graduate students.

## **4. Considerations in designing and implementing capstone experiences**

There are a variety of challenges associated with establishing and assessing capstone courses and experiences. These challenges emanate from both the students' and academics' viewpoint. These issues should be carefully considered to ensure the capstone experience leads to optimum learning outcomes for students.

### ***Teaching considerations***

#### *Resources and contacts*

To design and implement an effective capstone experience, teaching staff will need to develop a number of additional resources and contacts. These might include:

- suites of case studies
- assignments
- online materials
- simulation games
- guidelines for student teamwork
- assessment criteria explanatory worksheets
- alternative assessment tasks
- new industry contacts
- external assessors
- industry mentors.

This can mean a significant shift of approaches to managing workload and teaching. New approaches to embedding graduate attributes as part of the learning outcomes in a highly focused manner takes time, reflection and ongoing evaluation with the students.

#### *Teaching with teams*

Capstone courses may involve multi-disciplinary teaching teams that require a high degree of co-operation and collaboration with colleagues, as well as a capacity to discuss and describe differing discipline requirements, language and "culture". The evolving nature of these courses may pose numerous challenges for academic staff who may not be naturally accustomed to working in this model.

#### *Professional development*

Teaching staff may find that they need to induct students in a deliberate manner to ways of working in classrooms and off campus that includes skills in leadership, team dynamics, facilitation, conflict negotiation and resolution. How will teaching staff know that their students have developed or had these skills? Have students acquired enhanced skills to transition to graduate studies or the world of work? Can teaching staff identify what their students have actually learnt? These are obvious questions but ones which require critical analysis of demonstrable learning outcomes.

### *Building trust*

Academic staff need to develop a lateral degree of trust in student participation, student leadership, and student facilitation skills. This direct involvement may not have previously been a major component of their teaching approach. Keeping a multi or single disciplinary project on track can present the teaching staff with daily issues that require flexible thinking and a deft touch with students so as to build their confidence, skills and capacities.

## **Student learning considerations**

### *Building new skills*

In capstone subjects, students will have to analyse and adopt new stances in the classroom. A student's previous educational experiences may not have prepared them for taking on a role play, leading a class discussion, being a team member, or working through multiple case studies all of which require discussion to make these activities more meaningful to them. The aim of the capstone is to build and assess these skills, but it should not be forgotten that skill building will take guidance, time and patience.

### *The teaching environment*

Students need to understand and experiment with making mistakes in their thinking and assessment tasks. The capstone experience can provide a safe and secure environment in which to do this. It is important to make this a clear purpose and provide explanation of the value of learning from mistakes from an educational viewpoint.

### *Working in teams*

Students may be concerned about working in teams as they can feel that a team is not evenly balanced with workload, knowledge, research, presentation and preparation skills. Highly competitive students often feel a degree of frustration working with others. The development of team spirit, commitment and work ethos is paramount for success and must be decisively built and structured, not assumed in any group activity. Reflection on both the team process and output is an integral part of successful teamwork and must be seen to be important in the assessment process. Similarly, students have concerns when external mentoring or assessment does not match their understanding of what they have achieved. Clear and succinct guidelines that explain groupwork as a form of assessment are needed (see Davies, 2009).

These are a few of the issues to consider when designing and implementing a capstone experience. Other challenges will no doubt arise, but a clear sense of learning purpose, the benefit that students receive from a culminating knowledge based course or experience, a sense of humour and "thinking on one's feet" will be important.

## **Assessment considerations**

James (2008) suggests that there is no tradition of capstone testing in Australia. Assessment, at best, is an imperfect process; however it provides academics with rich insights into the ability of students to integrate, reflect and complete their undergraduate degrees with a sense of the meaning of their learning (Gardner

and Van der Veer 1998).

To address assessment of capstone experiences, it is essential to articulate what is most meaningful for students. Assessment of a capstone experience focuses on application of knowledge acquired in a more “authentic” context, that may closely approximate the real demands of a chosen field (Gardner et.al., 1998, p.252). Performance assessment for example, may be one way of providing opportunities for students to demonstrate their learning (Schilling and Schilling; cited in Gardner et.al., 1998).

The National Centre for Expertise in Assessment for Learning (CETL) at Northumbria provides six conditions for assessment innovation, and development. These are:

- An emphasis on authenticity and complexity in the content and methods of assessment rather than reproduction of knowledge and reductive measurement;
- Using high stakes summative assessment rigorously, but sparingly rather than as the main driver for learning;
- Offering students extensive opportunities to engage in the kinds of tasks that develop and demonstrate their learning, thus building their confidence and capabilities;
- Providing an environment that is rich in feedback derived from formal mechanisms, e.g. tutor comments on assignments, student self-review logs;
- Providing an environment that is rich in informal feedback e.g., peer review of draft writing, collaborative project work, which provides students with a continuous flow of feedback; and
- Developing students’ abilities to direct their own learning, evaluate their own progress and attainments and support the learning of others (National Centre for Expertise in Assessment for Learning, 2007).

While these conditions are applicable to the assessment design of most subjects, they are of particular relevance to the assessment design used in subjects that offer a capstone experience.

An important aspect of assessing capstone experiences is often the assessment of attributes such as teamwork, communication, planning, self management, initiative and innovation. The “Griffith Toolbox”, developed by Griffith University, provides resources to assist academic staff with the development and assessment of specific graduate attributes. This set of resources explores how each attribute can be designed and assessed, within the curriculum framework (Griffith University Toolbox Kit).

## Appendix 1: New capstone proposal template

When considering the design of a capstone subject the following template may be useful. The template is broad in scope and non-prescriptive and can be used as a guide in discipline-specific instances where discipline examples may be used to supplement these questions.

<p><b><i>What is a capstone experience?</i></b></p> <p>It is important that the design of the capstone experience be aligned with the key characteristics opposite. To what extent this alignment occurs depends on individual curriculum development in discipline and multi-disciplinary settings.</p>	<p><b><i>Key Characteristics</i></b></p> <ul style="list-style-type: none"> <li>○ Course, activity, program, or event</li> <li>○ Disciplinary or interdisciplinary</li> <li>○ Relating discipline-specific learning to real world scenarios</li> <li>○ Assisting students to critically reflect on and demonstrate learning to enhance employability</li> <li>○ Engendering graduate attribute development</li> <li>○ Linking student, alumni and employers</li> <li>○ Providing a bridge between undergraduate and graduate study</li> </ul>
<p><b>Reasons for development</b></p> <p>Describe the reasons for designing this capstone experience in relation to the overall course or undergraduate program.</p>	
<p><b>Aims of this capstone experience</b></p> <p>What will the capstone experience aim to achieve in terms of student learning outcomes?</p>	
<p><b>Teaching Approaches</b></p> <p>The emphasis in capstone experiences is best placed on developing self-directed and facilitated student learning that is student centred and student driven.</p>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>○ Courses</li> <li>○ Projects</li> <li>○ Examinations</li> <li>○ Problem based tasks</li> <li>○ Case study analysis</li> <li>○ Service projects</li> <li>○ Field work</li> <li>○ WIL</li> <li>○ Internships</li> <li>○ Simulations</li> <li>○ Immersion experiences</li> <li>○ Volunteering</li> </ul>

<p><b>Student Learning Outcomes</b></p> <p>What outcomes do you want your students to achieve through their capstone experience?</p>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>○ Learning outcomes linked to employability</li> <li>○ Opportunities for self-directed learning</li> <li>○ Commercial and global business awareness</li> <li>○ Application and transfer of discipline-specific knowledge</li> <li>○ Development of graduate attributes</li> </ul>
<p><b><i>Resources needed</i></b></p> <p>Is there a gap in the current resources or a need to consider what extra resources you will need to achieve student learning outcomes?</p>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>○ Extra staffing</li> <li>○ Multi-disciplinary staff participation</li> <li>○ Online communications and tools</li> <li>○ Research funding</li> <li>○ Specialised facilities</li> <li>○ Teaching materials</li> <li>○ Employer inputs</li> <li>○ Internal or external agencies involvement</li> </ul>
<p><b>Capstone assessment</b></p> <p>A variety of reasons and approaches may be used to assess the student learning outcomes depending on the type of capstone experiences you design and whether the assessment tasks are:</p> <ul style="list-style-type: none"> <li>○ assessable or non-assessable</li> <li>○ authentic and complex in content and context</li> <li>○ summative and formative</li> <li>○ giving students every opportunity to demonstrate learning, confidence and capabilities</li> </ul>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>○ Critical analysis/judgements</li> <li>○ Argument presentation</li> <li>○ Problem solving</li> <li>○ Setting goals</li> <li>○ Self management</li> <li>○ Reflectiveness</li> <li>○ Coping with ambiguity and complexity</li> <li>○ Risk taking</li> <li>○ Innovation and creativity</li> <li>○ Leadership</li> <li>○ Flexibility</li> <li>○ Teamwork/working with others</li> <li>○ Conflict resolution</li> <li>○ Negotiating</li> <li>○ Commercial awareness</li> <li>○ Global awareness</li> <li>○ Cross-cultural sensitivity</li> <li>○ Ethical sensitivity</li> <li>○ Communication skills (written, verbal and visual)</li> <li>○ Technological literacy</li> </ul>
<p><b>Student and Stakeholder Evaluation</b></p> <p>What will be the most <u>meaningful</u> way to gather student and other stakeholder feedback and how will it be used to make curriculum improvements?</p>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>○ Anecdotal informal evidence</li> <li>○ Formal surveying</li> <li>○ Student and employer testimonials</li> <li>○ Qualitative reflections</li> <li>○ External participants feedback</li> </ul>

## Appendix 2: Generic Skills/Capstone Experiences Matrix

This template may be used to:

- (1) Determine if existing subjects 'fit' a definition of a capstone subject;
- (2) Identify where subjects may be modified
- (3) As a basis for the development of new capstone subjects

### Example from Management Accounting Systems

Generic skills	Positive teamwork	Effective communication	Critical thinking & Analysis	Appropriate Computer usage	Effective use of Information	Application of theory to practice	Interpretation & analysis of data	Attention to detail	Independence in learning	Time management skills
Capstone Experiences										
Connecting discipline specific curriculum to general education objectives		✓				✓	✓		✓	
Assisting students to reflect on and demonstrate what they have learnt over the course of their degree		✓	✓		✓	✓	✓		✓	
Relating discipline-specific learning outcomes to the world of work		✓	✓			✓	✓		✓	✓
Providing a forum for students to participate in interdisciplinary activities										

<i>Enabling students to reflect on and imagine personal, social, emotional and practical issues of transition beyond the university into the world of work</i>										
<i>Providing a bridge between final year of an undergraduate degree and graduate programs and lifelong learning</i>		✓	✓		✓				✓	✓
<i>Directly engendering the development of graduate capabilities that employers are searching for in graduates</i>	✓	✓	✓			✓	✓	✓	✓	✓
<i>Linking undergraduate students to employers and employment arenas</i>		✓	✓		✓	✓	✓		✓	✓
<i>Connecting graduates to alumni in their chosen fields</i>										
<i>Linking major subject students to another discipline</i>										
<i>Preparing graduates to become active alumni.</i>										

## Appendix 3: Examples of capstone experiences

1. Project Planning Studio, Architecture Building and Planning, University of Melbourne
2. Business Practicum, Faculty of Economics and Commerce, University of Melbourne
3. Capstone Design projects, Civil and Environmental Engineering, University of Melbourne
4. Experimental Research project, Zoology, University of Melbourne
5. Knowledge Transfer Project (Case Study), Management and Marketing, University of Melbourne
6. Internship Experience, London School of Economics and Political Science
7. Virtual Learning Environment, RMIT/IESEG School of Management
8. Master of Public Administration Capstone, London School of Economics and Political Science

### 1. Project Planning Studio

#### Faculty of Architecture, Building and Planning, The University of Melbourne

*(notes from handbook entry)*

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##### **Aim:**

To develop a complete project management plan for a given project considering all the fundamental aspects of project planning and development

##### **Context:**

This capstone subject brings together and builds on an understanding of construction technologies and introduces project management concepts. Using an integrated project involving a series of studio-based exercises, students will translate a design proposal into operational construction and project management plans. A project based learning environment will be formulated for students to experience construction and project management decision making from concept through to completion.

##### **Description:**

Students will form teams and work on assigned projects appropriately selected from the industry. Different roles in the project will be played by the teams. For example, the tenderers are to prepare a project development proposal based on the requirements of the client and then develop operational plans to implement the project. To accomplish this, the tenderers need to plan the construction project based on the development proposal, clients' requirements and resources available. The planning processes will be assisted by introducing commercial computer applications.

##### **Learning objectives:**

On completion of the subject students should be able to demonstrate an understanding of:

- Market analysis for selecting project development proposals
- Stakeholders and their requirements
- Procurement processes and underlying considerations
- Method statements and planning for construction
- Alternative construction techniques
- Cost estimating and planning
- Site team management and communication requirements
- Project management functions such as scope, cost, time, quality, risk, procurement and integration management
- Systematic approaches to develop project develop proposal in a competitive market environment.

##### **Generic Skills:**

- An appreciation of the roles of client/engineer/architect/project manager;
- A commitment to and fundamental appreciation of, the concept of successful teamwork;
- An ability to communicate effectively, clearly and concisely ideas, concepts and solutions within the project team and between the project team and stakeholders;
- An ability to apply fundamentals along with the basics of science and mathematics to problem solving in specific scenarios.

##### **Assessment:**

One major group assignment equivalent to 3000 words (60%) (assessed over a number of staged submissions).  
One two-hour closed book examination equivalent to 2000 words (40%)

## 2. Business Practicum (3rd year)

### Faculty of Economics and Commerce

(Notes from Catherine Meredith)

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#### **Aims:**

Business Practicum (*formally Management Practicum*) offers our highest achieving students the opportunity to apply their university learning in a real business environment and to engage with a business challenge of genuine strategic importance working in groups.

#### **Description:**

Contact time at University includes six two hour seminars held during semester on Monday mornings and three consultation periods of up to one hour. Contact time at the organisation includes a half-day each week for ten weeks. A half-day is a block of around four hours, either in the morning between 8am and 1pm or in the afternoon between 1pm and 6pm. Exact times of attendance depend on the organisation's normal working hours. In addition, groups have to undertake significant research and development of their ideas and findings. As a guide, a typical average commitment per week for a group of four is 30 to 40 hours (i.e., divide by four for the individual commitments in a group that has allocated its work effectively).

Below are the features of a suitable project:

- Capable of being completed within a ten consecutive week timeframe involving approximately 600 hours of work, in total, by a team of four students.
- Addresses an open ended question for which various approaches can be applied and recommendations made. i.e., there is unlikely to be a single, best and only answer possible.
- Is not simply or predominately an interview or survey, i.e., data gathering exercise, but also requires synthesis and analysis of data as the basis for recommendations.
- Must primarily require the application of business disciplines. Should some knowledge and understanding on non business, professional and or scientific discipline be required, it is anticipated that advisory assistance will be available from within the Host organization.
- Be conducted at a workplace wherein students can observe and participate in a "real world" business and commercial experience.

Many of these have encompassed:

- Development of Enterprise Risk Governance policy and Management systems.
- Brand development, market positioning and penetration strategies in the Community Service, FMCG and Telecom sectors.
- Business commercialisation opportunity analysis and development pathways for a Bio Medical Product, a Bio Medical Service, an Industrial process and an Industrial Product.
- Corporate Reputation review and business process re-engineering to improve Strategic Marketing plan development and implementation for a telecommunication opportunity; a Career Service for technical professions and for the Financial Services sector.
- Supply Chain analysis and business process re-engineering in fast moving consumer goods and Media sectors
- E Comm Business Strategy formulation and implementation.
- Business process re-engineering for program reporting and performance evaluation across a diversity of countries in an international "not for profit" context.
- HR Strategy and employee evaluation systems in a research context.
- Identification and facilitation of emergent "Green Technologies" of distinctive benefit to Australia

Students successfully enrolled in the subject provide brief CVs which, in conjunction with information about their previous studies, are matched to the skills and experience required. By successfully completing this subject, students gain invaluable experience in learning how to operate effectively within a real time workplace environment.

#### **Assessment:**

The major assessment items for this subject are the Final Report and File, due at the start of Swot Vac. The Final Report is substantial, typically around 20 000 words, and together with the File of Contents accounts for 60% of your total marks. The remaining 40% of the marks are for small assessment items due throughout the semester. Each individual has to prepare two short pieces of written work on behalf of their group. Each group also has to prepare a short video presentation. Marks are also allocated for participation and effective teamwork.

### 3. Capstone Design projects (System Modelling & Design)

Melbourne School of Engineering, The University of Melbourne

*(notes from handbook entry)*

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#### **Aim:**

To have students experiencing realistic engineering modelling and design problems by working in groups and as individuals.

#### **Description:**

This subject contains capstone design projects with an emphasis on geotechnical and hydraulic engineering but may include requirements for an understanding of other fields. Students will be given briefings on special topics in geotechnical and hydraulic engineering but there will be great emphasis put on self learning. Designs may vary from year to year but might typically constitute: the design and operation of a coffer dam; and the design of a pipeline or open channel system. Lectures may vary with the designs chosen but will generally provide a framework for students self-learning in Darcy's Law, coefficient of permeability, hydraulic gradient, flow velocity; Pore pressure in soil and effect of seepage on effective stress; The flow net, flow in two dimension, flow through anisotropic material, boundary conditions; The use of computer model to solve seepage problems; and aspects of runoff and channel flow. Some experimental work is involved.

#### **Learning objectives:**

On completion of this subject students should be able to:

- exhibit significant modelling and design skills initiative;
- prepare and document engineering designs for simple earthen structures, pipelines and channels; and
- demonstrate competency in discussing and presenting engineering designs.

#### **Generic Skills:**

- Ability to communicate effectively, not only with engineers but also with the community at large
- Ability to undertake problem identification, formulation and solution
- Ability to utilise a systems approach to design and operational performance
- Understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development
- Understanding of the principles of sustainable design and development
- Capacity for independent critical thought, rational inquiry and self-directed learning
- Intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity
- Openness to new ideas and unconventional critiques of received wisdom
- International awareness and openness to the world, based on understanding and appreciation of social and cultural diversity and respect for individual human rights and dignity

#### **Assessment:**

Three design reports (maximum of 2000 words each) based on group work (60%) spread throughout the semester; three in-class tests (one related to each design) on material given in lectures (30%), plus a laboratory report (1000 words) (10%).

## **4. Experimental Research project (Zoology)**

**Faculty of Science, The University of Melbourne**

*(notes from Assoc Professor Raoul Mulder)*

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### **Aim:**

To provide students with an opportunity to engage in an authentic experience of scientific research as part of a group, and apply the knowledge and skills they have learned in previous subjects to challenging areas relevant to careers in the relevant zoological specialisation.

### **Context/Description:**

Three capstone subjects at third year level are the trio of 'Experimental Zoology' subjects: Experimental Behavioural Zoology, Experimental Wildlife Zoology and Experimental Marine Zoology.

These subjects explore the techniques and methods of undertaking research in zoology, including experimental and sampling design, data collection, statistical analysis of data, presentation of the research results and peer review. Students will participate in a group project, in which they will design, execute, analyse and interpret observational and experimental studies of animals in either natural or captive populations.

### **Generic skills:**

The subjects build upon existing generic skills, including an ability to:

- assimilate and critically evaluate new knowledge within a scientific paradigm, and
- communicate that knowledge to others
- manage a group research project,
- analyse, interpret and evaluate scientific data critically
- write a scientific report, providing and responding to peer reviews,
- make an oral presentation

## 5. Knowledge Transfer Project, Case Competition (Marketing)

Faculty of Economics and Commerce

*(Notes from Dr Alison Lim)*

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### **Aim:**

Applying consumer behaviour theory to solve real-world, marketing problems.

### **Context:**

Student participants were from the 325-202 or 325-666 classes, taking the respective subject as an elective. Students worked in teams of three to five to develop analytical and problem-solving skills as well as presentation skills in working on a real-world problem faced by the client (P & G). A project brief, developed by Dr. Alison Lim in consultation with Procter & Gamble, was distributed to the students during the official launch of the project by a P & G representative.

### **Description:**

In the first round, all students participated in the case competition by working on a 20-page report to solve the problem identified in the project brief. This report accounted for 25% of their overall grade. Teams that produced the top three reports from 325-202 and 325-666 respectively were selected to enter the second and final round of the case competition. This final round of the case competition was judged by a panel consisting of senior academics from the Faculty as well as industry representatives from P & G.

### **Industry Partner:**

Procter & Gamble (Australia)

### **Learning Objectives:**

In addition to developing generally important skills (e.g. analytical skills, presentation skills, teamwork), this case competition provided an opportunity for students to apply the technical skills developed in the subject to solve real-world Marketing issues. Further, bringing industry partners into close contact with the students provided a preview of the importance of the Consumer Behaviour subject in the real-world.

### **Assessment:**

A 20 page report worth 25% of overall grade. In addition to the case project, the students have to do a poster presentation and a team/paired case report. The idea behind the poster presentation is to get students thinking about the relevance of the subject in their everyday life/environment and see how the subject "comes to life" in their surroundings. The team/paired case report is an applied (theoretical) exercise in which students have to think about issues faced by real-world companies.

## 6. Internship Experience

London School of Economics and Political Science

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### **Aims:**

To provide final year students with the opportunity to apply theory to the practicalities of working in a relevant sector and build experience, transferable skills and future career networks.

### **Context:**

Postgraduate students from all disciplines competitively apply to participate in the areas of Politics, Policy and Public affairs, Media policy and development, corporate social responsibility, small business, start up companies, investment banks, financial services, think tanks, charities, NGO's research organisations, public affairs consultancies.

### **Description:**

Students work 1-1.5 days up to 15 hours per week supporting the office of the organisation and also work on discrete research projects or they work exclusively on research projects. Summer internships last 8-12 weeks Winter internships last 1-2 weeks. Some are paying Internships.

### **Learning Objectives:**

- To gain insights into how new business projects are developed, managed and financed across different sector.
- To gain experience of a real working environment.
- To enhance employability skills and allow students to decide their strengths and commitment to their chosen career.
- To develop networks and 'foot in the door' opportunities.
- To develop Resume, CV and letter writing skills

### **Assessment:**

Non-assessable

## 7. Virtual Situated Learning Environment Case Study

RMIT School of Management and IESEG School of Management, University of Lille, France

*(With permission, Associate Professor Sandra Jones RMIT University)*

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### **Aim:**

To provide students with the opportunity to actively engage in authentic learning experiences that simulate situated learning real work environments, which relates learning activities to industry and professional practice.

### **Context:**

This VSLE is a simulation between the final year students in the Bachelor of Business RMIT University and the final year students of the Bachelor of Business Lille University. Associate Professor Jones develops and facilitates this annual capstone experience.

### **Description:**

The VSLE is a virtual environment that students access through the university ICT system. Students work collaboratively in a real situation where they develop virtual businesses in areas such as service, public and community sector, and manufacturing. Industry partners act as advisors, critical friends and assessors.

### **Learning Objectives:**

- To provide immersion in a common context that enables students to find meaning and purpose in their learning
- To facilitate sharing and networking of knowledge and experience
- To provide a 'safe and secure' learning environment
- To provide students with opportunities to experiment with different responses to the challenges of an increasingly complex global world
- To enhance employability skills such as planning, organisation, communication, problems solving, negotiation, conflict resolution, self management, and interdisciplinary approaches to knowledge development and knowledge transfer.

### **Assessment:**

Formative and summative, individual and group, demonstrable contributions to an e-portfolio, reflections and online forums.

## **8. Master of Public Administration Capstone**

**London School of Economics and Political Science, School of Business**

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### **Aim:**

To meet the needs of highly skilled and professional policy-makers working for government in public and private sectors via an interdisciplinary program that uses interdisciplinary training in economics and political science and 'real' public policy client issues.

### **Context:**

The 'capstone' is designed to be an intensive closely supervised experience. In the second year of the program, using group work that extends capability development and application of all MPA core subject learnings. Students are often highly qualified professionals, from all continents and are bilingual. Clients have included: The World Bank, OECD, Deloitte Touche, Accenture, UK Department of International Development and UK Audit Office.

### **Description:**

- This 5 year old, two stream Masters degree is taught over 21 months and is a unique combination of academic rigour and interdisciplinary application.
- There are 3 core units and stream specific units in the first year. In the second year there are 5 units, one core, one 'capstone', two options, and one dissertation. Second year runs for 9 months.
- The capstone groups are 3-5 people, working for 1 to 2 days per week over 16 weeks with a dedicated supervisor. The groups advise a public sector organisation, international body, or a private sector consultancy on a current policy challenge and prepare a dissertation. Students are individually matched to select companies to ensure mutual benefits.

### **Learning Objectives:**

- To equip talented students with professional skills and knowledge to undertake and advise on public policy-making in a range of contexts.
- To provide an opportunity for students to undertake 10 months of their degree at Columbia University, New York; Fondation Nationale des Sciences Politiques, Paris; Hertie School of Governance, Berlin; or Lee Kwan Yue School of Public Policy, Singapore University to further networks in government and international organisations.
- To combine rigorous academic development with strong practical applications through individual and group based work.
- To understand and manage group dynamics and role accountability.

### **Assessment:**

The capstone has a collective grade mark for a summative dissertation and presentation.

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