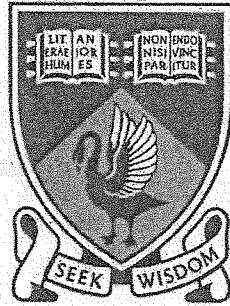
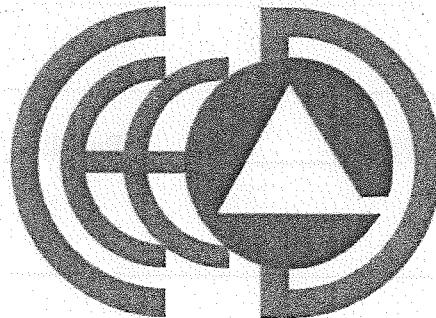


The University of Western Australia



CEED Project Manual for Students



Co-operative Education for Enterprise Development

This manual is produced for the use of students conducting their projects under the Co-operative Education for Enterprise Development (CEED) program at the University of Western Australia. Separate manuals are produced for Client Mentors and the Academic Supervisors of CEED projects

First published 1992 Last revised February 2010

All rights to this manual are reserved. No part of this manual may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any mean without the written permission of the CEED Office, University of Western Australia.

© CEED Office, University of Western Australia 2010

Contacts for Students

Client Mentor

Name: _____

Phone: _____ Fax: _____ Email: _____

Client Deputy Mentor

Name: _____

Phone: _____ Fax: _____ Email: _____

Other CEED Client Staff

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

CEED Office

Director
Administrative Officer:

Phone: 6488 3130
Fax: 6488 7235
Website: www.ceed.uwa.edu.au

Dr. Jeremy Leggoe
Ms Amanda Bolt

Email: CEED@uwa.edu.au



Supervisor(s)

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Other Students

Name: _____

Phone: _____ Fax: _____ Email: _____

Address: _____

Name: _____

Phone: _____ Fax: _____ Email: _____

Address: _____

Phone: _____ Fax: _____ Email: _____

Address: _____

CEED Office

Director

Administrative Officer:

Dr. Jeremy Leggoe

Ms. Amanda Bolt

Phone: 6488 3130

Fax: 6488 7235

Email: CEED@uwa.edu.au

Website: www.ceed.uwa.edu.au



Contents

1. Executive Summary.....	1-1
2. Introduction	2-1
Requirements of CEED projects.....	2-1
Measurement of success in CEED.....	2-2
3. Project Supervision	3-1
4. Planning for Success	4-1
Importance of planning	4-1
Laying the fundamental groundwork - Research the topic!	4-1
Getting the facts.....	4-3
5. Project Brief.....	5-1
What is the Project Brief?	5-1
The Project Brief in detail	5-2
Project Brief Preparation and Sign off.....	5-12
6. Getting Started	6-1
Early meetings with the CEED Client	6-1
Check list for initial meeting with Mentor	6-2
Measure of project preparation.....	6-3
7. Work Scheduling.....	7-1
Time Management	7-1
Keep your Gantt chart up to date.....	7-3
8. Communication.....	8-1
Importance of Communication	8-1
More effective communication.....	8-1
Monthly written progress reports.....	8-2
Communication with the CEED Office	8-2
In case of problems	8-2
9. Work Your Network.....	9-1
Build your Success Network	9-1
Extending your network.....	9-1
Making better use of your network.....	9-2
10. Workload.....	10-1
Location of work.....	10-1
Special requirements for Honours workload.....	10-1
11. Talks and Seminars	11-1
Presentations.....	11-1
Industry seminar and dinner	11-1
Seminar papers	11-2
Seminar presentations	11-3



12. Project Agreement.....	12-1
CEED student agreement.....	12-1
Confidentiality	12-1
Intellectual Property	12-1
13. Project Expenses.....	13-1
Agreement on funding	13-1
Responsibility	13-1
Minor personal expenses	13-1
Travel expenses	13-2
Project expenditure through the university	13-2
Specific procedures for expenditure.....	13-2
14. Insurance and Safety.....	14-1
Insurance.....	14-1
Insurance while employed by the CEED Client.....	14-1
Safety on site	14-1
15. Studentship.....	15-1
Arrangement for Studentship	15-1
Students with another scholarship or cadetship.....	15-2
CEED Studentships and Austudy	15-2
Conditions of Tax-Exempt CEED Studentships	15-2
16. Arrangements for Site Work.....	16-1
Opportunity with site work	16-1
Site work dates and status	16-1
Extending or changing the site period	16-1
Expectations during site work	16-2
Course Requirements for Professional Practicum	16-2
17. Research and Assessment.....	17-1
Academic assessment	17-1
Features of a good research project and Thesis	17-1
Identifying the knowledge bases for your work	17-2
Building on the knowledge base.....	17-3
Structuring your thesis.....	17-3
Polishing your thesis document	17-3
Identifying further work	17-3
Approach to referencing	17-4
Harness the experience of others	17-4
Mentor approval of thesis	17-4
18. Planning Techniques.....	18-1
Introduction	18-1
Mind mapping	18-1
19. Collating Information.....	19-1
Introduction	19-1
Importance of structure for creativity	19-1
Information to collate	19-1
Option 1: Collating by project "activity"	19-2



Option 2: Collating by project "object"	19-3
Advantages of collating by "object"	19-3
20. Grouping information with an Open Mind	20-1
Introduction	20-1
Breaking down by "function"	20-1
Structuring groups of functions	20-2
Identifying interfaces and links	20-3
Breaking down functions into sub-functions	20-4
Summary of processes to break down functions	20-5
21. Project Close Out	21-1
Introduction	21-1
Deliverables	21-1
Close Out Meeting	21-2
CEED Office	21-2
22. Advice from Past Students	22-1
Introduction	22-1
Advice from Past Students	22-1
Communication	22-1
Initiative and Perseverance	22-1
Guidance and Networking	22-2
Planning	22-3
Project Brief	21-3
Documenting	22-4
Scheduling & Time Management	22-5
Thesis	22-7
Extra Suggestions Resulting from CEED Student Feedback	22-7



1. Executive Summary

- CEED Projects combine your academic project with research effort commissioned by a CEED Client
- Working on your project with a CEED Client provides unparalleled experience, but imposes extra demands
- This Executive Summary is a "must read"

Introduction

CEED projects link academic projects at undergraduate and postgraduate levels with research commissioned by CEED Clients. You will need to work closely with your CEED Client and your Academic Supervisor(s) to manage your project. Effective communication is essential and requires continuous attention.

All CEED projects include a period of time spent working on your project at the Client's premises. At postgraduate levels, CEED projects are of normal duration. At Final Year/Honours level, they start in the later part of the semester prior to final year or Honours year.

How you handle your CEED project influences others' opinion of your school, the university, and yourself. It is not enough to be good at what you do, you must be seen to be good!

Project Supervision

Your Academic Supervisor provides the main supervision. Input and guidance from the CEED Client is provided via a "Mentor". Your client Mentor in particular should appoint deputies to assist you when their many commitments require their absence.

Planning for Success

The first and most vital part of your project is the initial literature review, discussions, negotiation and planning. Results of this are encapsulated in the "Project Brief" which defines project benefit to the Client and your activities. This must be done early so you can confidently begin work on your project.

The Project Brief

The Project Brief defines and agrees the potential benefits to the client from your completed research, responsibilities, and commitments associated with the project for all parties. Without it, your project is likely to "drift", leaving you uncertain of what is required. The Project Brief is produced by you, and formally signed by the Mentor, Supervisor, yourself and the CEED Office.

Getting Started

Important strategies discussed in this section will help you clarify project outcomes, and agree on how your team will communicate and interact during the project. There is a detailed list of important questions to ask your Mentor.



Work Scheduling

Organising your time and the resources necessary for your CEED project will be demanding. This section offers a simple method for handling this.

Communication

Communication is a vital key to the success of CEED projects. Keep all parties informed at all times. As a minimum, you are required to present brief written reports monthly to your Mentor, Supervisor(s), and the CEED Office. A simple skeleton report is shown

Develop Your Network

Creating an environment where you can succeed requires consciously developing the "network" of people who will help you. This section contains useful tips on how to increase your effectiveness.

Workload

Your project includes a period working on your project at the CEED Client's premises. This section outlines constraints and conditions which ensure this period is effective.

Talks and Seminars

As part of the process, CEED requires students to attend several informal or formal functions where brief presentations may be expected. These are designed to assist you, as well as offer extra career development opportunities. In this section, presentation techniques and pitfalls will be reviewed.

Project Agreement

CEED projects have a formal Project Agreement between UWA and the CEED Client. You will have already signed a Project acceptance and an addendum to the Agreement (Student Undertaking) to acknowledge your responsibilities. The Agreement also contains provisions for handling issues of Intellectual Property (IP) and confidentiality. Some CEED Clients may agree to pay a fee surcharge to obtain full ownership of IP produced by the project. In this case, your Studentship is increased as compensation for the concession.

Project Expenses

A small sum is budgeted for your personal expenses. What this covers and how it may be extended is shown in this section. Your project may also incur costs recoverable from the CEED Client. Minimise the effort by adopting the approaches outlined. All extra expenditure, including travel expenses, must have prior written approval from the CEED Client.

Insurance and Safety

Insurance issues are important, so be sure to check this section. You are not an employee of the CEED Client, even during the period working on your project at their site. The university provides indemnity for the CEED Client while you are on site - provided you are not employed. Any periods of "employment" arranged between yourself and the CEED Client must therefore be clearly identified in advance to avoid problems with insurance liability.



Studentship

You will receive a tax-free Studentship as part of your project. Details of payment times and implications for tax and Government study support are given in this section. Payments are conditional upon your making satisfactory progress on the project and being up-to-date with reports.

Arrangements for Site Work

You are responsible for arranging site work dates with your Mentor. Some flexibility is allowed, as discussed in this section.

Managing Your Research Project

Academic assessment for CEED projects differs little from the norm. Extra time and resources you may have had could influence expectations. This section also contains some useful information on how to manage your project and produce a good thesis.

Planning Techniques

Some useful techniques are outlined in this section for developing maximum flexibility in handling your project, and ensuring you do not miss potentially useful creative opportunities.

Collating Information

Handling the information required to do your project is a non-trivial task. This section introduces some of the issues.

Grouping information with an Open Mind

This section outlines an approach that can help you handle the project information, and make your work more useful to the CEED Client.

Advice from Past Students

Get some powerful hints from students who have already travelled the road you are following.



2. Introduction

- Undertaking a CEED project is an opportunity and a privilege.
- You will work in a "real world" environment with opportunities to develop your communication and "people skills" as well as your technical skills.
- Be continuously aware of what others expect of you.
- Your attitude will affect how others perceive your performance.

Congratulations on obtaining your CEED project! Your CEED project is in many respects a typical academic project, but you have an opportunity available to only a few students. This manual equips you to make the most of that opportunity.

1. CEED projects involve more work, but offer greater and broader experience. You can expect to make much greater progress than is possible with regular projects, and you will be rewarded correspondingly. At Final Year/Honours level, CEED projects last longer than conventional projects.
2. You have been successful in your course to date, and have been awarded your CEED project in competition with other students. We are confident you can also do an excellent job with your CEED project, but first you need to know what makes a successful CEED project.

Requirements of CEED projects

The question "What makes a successful CEED project?" can be answered by looking at some key features of CEED projects.

1. Real world environment

CEED projects require you to operate as a professional in your chosen field. You will need to liaise with a number of people to carry out your work. This is true for most "real life" situations, but not always evident in academic studies. Apart from your academic Supervisor, you will also be accountable to your CEED Client Mentor and the CEED Office.

2. Formal research situation

Your project is more formalized than its regular equivalent because you are effectively part of a team working on behalf of the CEED Client. Results will need to be presented in a form suitable for the Client's use.



3. Academic demands

In addition to achieving useful results for your CEED Client, your project needs to demonstrate your academic skills. In general, an academic project should demonstrate your ability to:

- a. Find, review and assess critically the past work of others in the field;
- b. Design and conduct experimental or other work to test some hypothesis;
- c. Analyse results, draw sensible conclusions and recommend further work;
- d. Write a concise, well structured, coherent, and comprehensive report on your work.

At PhD level, you will also need to demonstrate a new contribution to knowledge (check university guidelines for the appropriate academic level). Remember, your *academic performance* will be assessed on criteria like these, rather than the value of your work to the CEED Client (which is an additional goal with CEED projects).

4. External demands

Your handling of the project will be under continuous scrutiny from your CEED Client. Your performance will reflect on you, your school, and the University as a whole. You will need to demonstrate skill in managing your project, including an ability to accommodate the CEED Client's administrative needs (eg. regular reporting).

Measurement of success in CEED

To be successful within its broader context, your CEED project needs to achieve much more than a good thesis mark. It needs a favourable assessment from your CEED Client. A successful CEED project requires you to meet needs, *real and perceived*, of the various people and organisations involved. Will your Mentor, the CEED Client's management, and the University, be glad you worked on the project? If the answer is a definite "yes", you will have successfully completed your CEED project. You will have developed and demonstrated capabilities which will stand you in good stead, no matter what career you choose.

Your CEED project will stretch your planning skills. However, even at Final Year/Honours level, its time-scale will allow you greater flexibility in planning, and make your project less susceptible to delays. Your attitude and willingness to plan carefully will make all the difference. You will gain the confidence and respect of all parties if you handle your project in a professional manner. This manual is designed to help you achieve that.



3. Project Supervision

- **You will receive guidance and help from your Supervisor and your CEED Client Mentor.**
- **It is your responsibility to ensure this is effective.**
- **Get to know the strengths and limitations of your advisors.**
- **Expect to be the "initiator" in your dealings with others.**

You are responsible for your project. You and your "team" are seeking to achieve much more than a regular project. In addition to any other CEED students engaged upon the same project, your team comprises yourself, one or more academic Supervisors, and a CEED Client "Mentor" (each of whom is asked to appoint a deputy).

Your academic Supervisor (or Supervisors) will be your primary guide and will be involved in assessing your thesis. It is vital to maintain regular contact with this person (eg fortnightly), *even when you are working on site*.

In case your (lead) Supervisor is absent for any period of time, you should ask your Supervisor to nominate a deputy. This is especially important if you only have one academic supervisor. Unless specifically requested otherwise, you do not need to keep your Deputy Supervisor informed of progress.

Your CEED project topic (proposed by the CEED Client) is unlikely to fall completely within your Supervisor's area of expertise. You should aim to become the most knowledgeable person in the project team on your topic. This means you must plan very carefully. Your Supervisor(s) will have considerable expertise in such planning, so seek regular advice.

Your Mentor is your initial contact with the CEED Client, and will arrange for resources to be made available to you. Be sure to ask in good time, and allow plenty of time for the necessary budgeting and administrative arrangements. Your Mentor will probably be required to report regularly on your progress, so make that easy by keeping your Mentor informed of progress and planning at all times.

Your Mentor may or may not be an expert on your project topic. The Mentor's task is to help you to define your project and its interfaces with other CEED Client activities, and ensure you receive input in relevant areas of their expertise. *This will occur only at your request*, so make sure your needs are known and understood. It is best to put such requests in writing (even a brief note) including the date by which you need a response.

CEED Client's staff generally will want to help you succeed with your project but, if you do not tell them what you need, they will not know. Always be willing to ask, but remember, they are often busy with matters of higher priority (to them) than your project. Gentle and courteous reminders are appropriate, so long as you consider other person's needs and commitments.



4. Planning for Success

- Failure to plan is planning to fail.
- Establishing clear targets and making plans to meet them is essential for success.
- You should undertake a review of literature in your project area as a first step.
- Obtaining even basic project information, both from the CEED Client and from the literature, may prove to be a challenge.
- Use the "Project Brief" to identify clearly all agreed deliverables and desired client benefits.

Importance of planning

You have already developed many skills during your university course, including the ability to plan your study program. Planning your CEED project is crucial to its success, and its demands differ from what you may be used to.

Your project must satisfy the needs of more than one party:

- You need to demonstrate your academic capabilities, and
- Your CEED Client needs to see real progress on the research topic.

Both requirements must be met. Develop precise objectives for your project, and have a clear understanding of which parts satisfy each need.

Your Mentor will explain what deliverables the CEED Client wants from your project, and how the Client would like to benefit from the application of your findings and recommendations. Check immediately with your Supervisor(s) that the process of generating these deliverables will provide sufficient challenges to meet your academic assessment goals. Should there be insufficient academic hurdles, discuss with your Supervisor(s) the addition of extra material and objectives. Most CEED Clients have no problem with this, and are happy to accommodate such needs. Make sure any such additions are tailored to obtain maximum benefit to the CEED Client.

Selecting wise counselors is an important part of planning. Seek advice from those with greater experience and you will gain enormously from their knowledge and wisdom.

Laying the Fundamental Groundwork – Research the Topic!

The first step in any research effort is to undertake a thorough review of the literature in the project area. A literature review is an essential element of a well-rounded thesis, and provides the impetus for a well-founded research project.

This review should continue as you accumulate experience throughout your project, but the early stages of the review are critical to the planning process. By becoming knowledgeable on your project topic at an early stage, you will be able to ask well-informed questions of your CEED Client and academic supervisor(s) during the planning process.

In addition to the obvious head start this will give you in developing the Project Brief, displaying a knowledge of the topic will impress the CEED Client and give them confidence in your ability to undertake the project. Earning this positive early impression can enhance your project by raising the CEED Client's enthusiasm for you and the project, and may help get you access to additional human and logistical resources as the project proceeds (people want to work with people who are putting in the effort and doing good work!).

Nowadays, there are powerful tools available to support a literature review. The most basic of these are search engines such as Google, and even Wikipedia can help in identifying publications and experts in a particular field. It must be stressed that these sources should only be used as an initial guide; it is generally not acceptable to reference web sites in a thesis, due to the inconsistency of the reviewing of posted material (for example, it is easy to at least temporarily post false information on wikipedia, and there are virtually no controls on blogs and other media sites).

It is generally preferable to use published materials such as books, conference proceedings and (especially) peer-reviewed journal articles as your references. The library makes available a wide variety of books and journals, including a large number of journals in electronic form (which permits the easy downloading of papers in pdf form; it's not that long ago that students were consigned to long afternoons of photocopying from dusty old journals).

The library makes available a variety of web based databases that can be used to search for journal articles, books, and conference proceedings dealing with advanced scientific research. These may be accessed via the "Supersearch" link on the UWA library's main web page. For engineering, two of the major indexes are "Compendex" and the "Web of Knowledge"; both are available at UWA (for other specialities, equivalent databases are available).

Compendex provides a relatively intuitive search engine for technical papers – you may search by keyword, author, or title, amongst many options. The result will be a list of papers drawn from a database including the vast majority of scientific journals. Compendex is accessed from the Supersearch link, under the "Physical Sciences" option.

The "Web of Knowledge" can be a little tougher to find – it can be found under the link [http://www.library.uwa.edu.au/education training and support/guides/rss](http://www.library.uwa.edu.au/education%20training%20and%20support/guides/rss). The effort is worthwhile, however, as it is much more powerful tool in the hands of an expert researcher. The "Web of Science" option under this database provides a Citation index –



so in addition to merely identifying papers, it will tell you how many times they have been cited. This is an important indicator of the importance of a paper for experts in the field. It also permits you to list the papers that have cited a particular paper – when you identify an older, fundamental paper, this can be a very useful tool, as you can follow the citation trail to get the latest thinking and data that has emerged in a particular area.

The important thing to remember when undertaking a literature review is that the word “review” is important – it is essential to read the material find carefully and critically. You must determine how directly the material applies to your own work (Were the conditions the same? How has the field changed? Is your work heading in a new direction?). A good paper or book chapter will also be well supported by references, and in reviewing those references, you can often identify older, more fundamental, material that can help you better understand the topic.

As an important aside - do not limit your consideration of literature to recent works. Older, seminal works are often extremely useful. Often fields evolve their own jargon over time, and the work becomes increasingly specialized. Fundamental papers, especially those in which an area is addressed for the first time, can often make it easier to understand a field – being the first time that a phenomenon is described, the language and terminology can be easier for lay reader to absorb, and the fundamental theory is often more clearly laid out. The basis and limits of a particular approach can also often be more clearly identified in the original papers. So don't ignore the dusty old journals! In many fields, the basis of current thinking was laid out a long time ago.

“If I have seen farther than others, it is because I have stood on the shoulders of giants.”
Sir Isaac Newton

Getting the facts

Getting the facts to plan your project may be simple or quite demanding. CEED Clients' understanding of what the project involves may be clear, or murky. Some know exactly what their desired outcomes are (what they want to achieve), and can give you a precise definition. More often they are not sure what the project can achieve, or even what they want. This is unsettling if you are used to well-defined problems and outcomes, but it also provides you with an opportunity to suggest outcomes that fit best with your academic interests while still meeting their needs.

Whichever situation confronts you, do not allow yourself to become discouraged. Sifting through the facts and defining the problem is not an imposition, it is a vital part of your project! It has a valid place in your final thesis/report and should not be treated as an inconvenient delay. Even if you receive a firm definition of the problem from your Mentor, it is wise to check (even if only to a limited extent) that the resulting outcomes are appropriate to the CEED Client's needs.



5. Project Brief

- The Project Brief contractually defines your project
- It records desired benefits, undertakings and responsibilities
- Special requirements, like confidentiality, are identified in the Project Brief
- Methods of interaction
- Your Project Brief may need updating during the project

What is the Project Brief?

Your *Project Brief* is critical to the success of your CEED project. It is so important that your first studentship payment is conditional upon receipt of a *Project Brief* that has been signed by all parties. In developing your Project Brief, you will need to address some **big picture** issues that relate to your project as well as the details of the project itself.

Your first major CEED project task is to develop consultatively a tight definition of the project, and this will involve several discussions with your Mentor and Supervisor. Your initial literature review will help to inform these consultations.

The *Project Brief*, that you develop in consultation with your Mentor and Supervisor, describes what your CEED project is all about. The *Project Brief*:

- defines the desired bottom line benefits that the client wishes to experience as a result of harnessing your findings and recommendations;
- how the project is to be handled;
- what needs to be done;
- when you expect to reach specific stages;
- identifies any factors which may need addressing and the manner in which the project is done;
- who is to provide the necessary resources;
- identifies interfaces with other parties, be they suppliers of physical resources, finance, or information;
- enables you to co-ordinate your project effectively.

Your *Project Brief* gets signed by you, your Mentor, and your Supervisor(s) to signify that your team is of one mind about the whole project. The *Brief* must also be signed off by the CEED Office to indicate that it is of an acceptable standard.

Plan on developing the *Project Brief* through more than one draft. Regard the first draft as a living document and enthusiastically draw it to the attention of your Supervisor(s) and Mentor. The first draft is your opportunity to test out ideas and raise issues. As it is a "first draft", include in it things that have challenged you during its development and upon which you need guidance. As your Mentor, Supervisor(s) and the CEED office are required to sign the final version, they will ensure that they are happy with what it contains.



Your *Project Brief* is a marketing document. It is your first opportunity to demonstrate to a potential employer your capabilities - especially your abilities to embrace a new environment, communicate, and work consultatively. Do not miss this opportunity which CEED has created for you!

Remember that you are the person responsible for developing and managing your CEED *Project Brief* – no-one else! Others are vitally interested, but you are the creative author and in charge.

Students sometimes discover, after the *Project Brief* is signed off, that it would be desirable to change something significantly from what has been agreed. If this happens it is the student's responsibility to write an Addendum and get it agreed on and signed by their Mentor, Supervisor and CEED Office. This avoids painful disagreements and disputes later about what was supposed to be done.

To start developing your *Project Brief*, you need to meet with your Supervisor(s) and Mentor. Undertake your initial literature review. Visit the CEED Client's site if possible. You can then draft an outline of your understanding of the project, its limits (stating what is *essential*, then moving on to *desirable extras*), and its key interfaces with other people's work, equipment, or other resources.

You should develop your draft progressively, using feedback from your Mentor, Supervisor(s) and the CEED Office until the *Project Brief* is agreed. It is a good idea not to seek any signatures on your Brief **until** you have reached the stage where it is considered satisfactory by **all** parties.

To assist you a "pro forma" (bare-bones framework) *Project Brief* is supplied on the CEED website at www.ceed.uwa.edu.au/forms and each section is explained below. The headings and sub-headings apply to all projects in all Schools and Faculties. All must be addressed.

The Project Brief in detail

The template for the project brief is available at the CEED website, and a print copy is attached to this manual. Instructions for the individual sections are included in that template, and are summarised here.

Cover Page

This page is intended to be a stand alone document as well as being a cover sheet for the detailed *Project Brief*. It is NOT an introduction to the *Project Brief*. Your Mentor should be able to give it to his boss, or his busy boss's boss, so that they can get a snapshot of what you are doing. It gives the following information:

- Project title & CEED Project number
- Client organisation



- Summary project description (which should identify the project deliverables, and the potential benefits to the client)
- Student
- Client Mentor(s)
- UWA Supervisor(s)

The project summary provides a clear, concise summary of the project. It should briefly identify the reasons for undertaking the project (with emphasis on relating those reasons to the needs of the client enterprise), the objectives of the project, and the business value realized by the client enterprise in achieving those objectives. It should then proceed to identify the methods by which the objectives will be achieved, and the total costs that may be expected (excluding the original project fee). The key deliverables must also be identified. The length of the summary must be limited to ensure that the summary, the headings above, and the names below appear together on the cover page.

Section 1 - Project Background

1.1 Problem Statement

The problem statement describes the specific issue (or issues) to be addressed by the project. The nature of this statement will obviously vary according to the nature of the issues. For technical problems, it may be appropriate to incorporate diagrams, graphs or tables illustrating the nature of the problem. For business and financial investigations, it may be useful to present relevant financial data.

This section should also discuss the implications of the issue for the client organisation. For operational problems in a plant, this may include environmental, health and safety issues, potential production loss, or maintenance requirements. For a design problem, the project may investigate improvements that allow the Client to compete more effectively or enter a new market. For projects dealing with organisational practices, the problem may affect the efficiency or effectiveness of operations or the delivery of services. In other cases, the project may simply help the Client develop a thorough understanding of an issue, which will help guide future policy formulation or planning.

1.2 Background Information

This section should consider existing knowledge related to the issue that will affect the progress of the project. If not already covered adequately in the problem statement, this section should start by summarising the current situation of the Client.

- How is the issue presently being handled?
- What is the current understanding of the issue?

You should then proceed to discuss the history of the issue in the Client organisation or other affected stakeholders (internal and external organisations, communities).

- How has the past history influenced the current situation at the Client?
- How did the issue develop?
- Have previous attempts been made to address the issue, and, if so, how successful have those attempts been?



Tracking down and discussing this history is critical if your project is to avoid “reinventing the wheel”

You should then go on to discuss any relevant information that you have gathered through the early stages of your literature review. If there alternate technologies that are to be considered, they should be described here. If similar studies have been reported in the literature, their findings should be summarised (briefly) here.

1.3 Current and Future Client Environment

In planning a project, it is important to understand the ways in which the current environment at the Client organisation can affect the project, and can influence the motivations for undertaking the project.

- Does the client have access to a new piece of technology that can be applied to the project?
- Is there a particular group of staff available to support the project?
- Has new data become available that has not been previously been available for consideration?
- Have new motivations emerged for pursuing an issue? For example, a Client may have adopted a “carbon neutral” approach that dictates the retirement of old technology.
- Are any organisational changes expected to occur in the project time frame?

It is also critical to understand the environment in which the project’s findings and deliverables will operate, and to consider any expected changes in that environment.

- Is new equipment scheduled to come online?
- Will new data become available?
- Are plant upgrades likely?
- Could political change affect organisational policy?
- Are operations subject to fluctuations in the price of a commodity?
- Is an organisational restructure, or a change in ownership, likely to occur in the foreseeable future?
- Will client staff require additional training in order to effectively implement your recommendations?

Any expected changes should be taken into account in the formulation of the project deliverables and project brief.

As an example, in one previous CEED project the objective was to provide a framework for deciding between two options. During the course of the project, it was necessary to base that decision on assumed data (or data sourced from the literature). However, it was known that the Client organisation was establishing a new working group that would gather hard experimental data over the next several years. As a result, the decision framework was designed in a way that will permit it to be re-used in conjunction with the “hard” data as it became available in subsequent years.



Section 2 - Project Objectives and Benefits Analysis

2.1 Objectives

This section will describe in detail the specific objectives to be pursued by the current CEED project. The importance of each objective should be assessed in the context of the background material provided in Section 1.

Note the difference – Section 1 will define the full scope of the issue. Section 2.1 will discuss specifically what is to be addressed in this project.

2.2 Benefits Analysis

This is one of the most important elements of this (or indeed any) project brief. You must describe the business value that will be realized through the implementation of the project deliverables, taking into account the form in which those benefits will be realized by the Client.

In many cases, this will entail assessing the positive financial consequences of achieving the objectives (or, conversely, the negative consequences of failing to address the issue). In such cases, examples would include;

- Cost savings expected from an improvement in practice.
- The cost of production losses that may be incurred if the issue is not addressed
- A reduction in manufacturing costs per unit, and thus an improvement in the competitiveness of the manufactured goods.
- The impact on one or more of the client's Key Performance Measures.
- An increase in sales, market share and/or net profit.

The benefits sought will not always be exclusively financial in nature;

- An environmental, health or safety issue may need to be addressed, or an assessment may need to be made to determine whether there is an emerging EHS issue.
- By assessing current practice, a project may enable more efficient deployment of resources; as an example, for government organisations, there may not be a profit motive, but more efficient deployment of resources may help the organisation improve the delivery of services for a given budget (for example, road improvements may reduce accident rates; targeted police deployment may reduce the number of offences committed, etc).
- The provision of an accurate report may enable the formulation of equitable policies in future (for example, a review of regional aboriginal history may guide the assessment of native title claims and negotiations).

It should be noted that in many cases the benefits may be a combination of financial and non-financial benefits;

- In environmental issues, the direct benefit may be in reducing emissions to an acceptable level, but there will be ultimate financial benefit in that plant may be forced to shut due to excessive emissions.



- In safety issues, it may be essential to eliminate a safety hazard, but again there will be financial benefit in that accidents usually force plants to suspend operations at least temporarily.

In light of the current and future environment at the Client Enterprise, the project deliverables, and the associated benefits, will generally have a finite life. You should discuss the expected future life of the deliverables and benefits within the client organisation.

- Are there any specific conditions that will limit the useful life of the deliverables/ Are these conditions likely to emerge or change?
- How may the deliverables be adapted to extend their life as the client environment changes?
- Are there future changes that will enhance the benefits realized? Will the deliverables enable the client to take advantage of anticipated changes in circumstances?

Section 3 - Project Execution Plan

3.1 Methodology

This section describes the “process” by which the project objectives are to be achieved. The nature of this process will vary according to the type of project, but for all projects you should break down the project into specific tasks, and describe the approach that will be taken to accomplishing each task. It is important that you provide extensive and specific detail on the technical and logistical aspects of the planned process.

For experimental tasks, describe the experimental equipment and specific techniques that will be employed. For modelling tasks, identify the software packages and computing resources that will be used, or the platform for the development of any new software. For theoretical tasks, identify the approaches under consideration or that will be developed. For design tasks, identify the tools or approaches to be used for each task. For literature review tasks, identify the databases/indexes and bodies of literature that will drive the review. Obviously, a single project will often include examples of each of these types of task.

For CEED projects, it is important to identify any constraints imposed on the methodology due to the needs of the Client. Examples of such constraints would include;

- The use of a specific type of test (due to the Client’s need to comply with organisational or regulatory requirements)
- The use of specific modelling software (such as Finite Element or CFD packages)
- The use of specific standards (to comply with Client practice)
- The use of specific programming languages or tools (to comply with the tools available at the Client)

3.2 Project Timeline (Gantt Chart)

The project timeline describes the sequence of tasks, and the expected initiation and completion dates for each task. A graphical approach, in particular a Gantt chart, is usually the best way to describe the project timeline, and as such is required in the brief.



It is important to identify the tasks that form the critical path for the project, and to take particular care in the scheduling and management of these tasks. In the text, you should provide in list or tabular form a summary of the key project milestones and dates.

You must also provide text discussing any key constraints on the proposed timeline;

- The availability of test equipment
- Lead times for expenditure approval and /or equipment delivery
- The availability of personnel to assist in data collection
- Times that a particular site can or cannot be accessed
- Absences of the Client Mentors or Academic Supervisors.
- Lead times for client approvals of publications (the conference paper and thesis).

3.3 Resources

It is important to identify the resources needed to accomplish the processes described in section 3.1. It is critical to provide a breakdown of who will be providing each resource (UWA or Client) – there's no point specifying a test that neither party is capable of doing or arranging. Be sure to discuss the plan with your mentor and supervisor, to make sure there are no misunderstandings as to the availability of equipment. You should also identify whether resources are currently in place, or whether they will be developed during the course of the project.

Provide a detailed breakdown of any costs to be incurred, including an estimate of the costs (as refined an estimate as can be made at the time of writing). Note that the client will have to agree in advance to any expenditure before it can be incurred. Also note any constraints imposed on the cost, such as any upper limit imposed on the total project budget by the client.

3.4 Risk Management

One of the most important elements of project management is to understand potential problems, or "risks", that may affect the project, and to identify "risk management" strategies to eliminate or mitigate these risks. Final year projects are subject to a variety of factors that can prevent a student from successfully completing their project. Examples of risks that commonly affect final year projects include;

- Failure or unavailability of critical experimental equipment
- Unavailability of data or facilities at partner organisations
- Changes in the business situation of industrial partners
- Failure of a key technique to deliver the results needed to achieve the objectives.
- Extended absence of the supervisor or other key personnel.
- Delays in workshop fabrication
- Unavailability of funds to create experimental facilities
- Loss of data (through computer failure)

By recognising risks and developing risks management strategies at an early stage, students can overcome apparently catastrophic circumstances to deliver a successful thesis. Indeed, simply being aware of the risks may enable students to avoid finding themselves in the most catastrophic circumstances. Risk management approaches could include;



- Developing alternate plans or objectives in the event of equipment loss
- Identifying research paths that are not necessarily dependent on the continued cooperation of an industrial partner
- Identifying alternate techniques that may provide useful data in the event that the preferred approach does not work.
- Developing strategies to ensure security of data.

As an element of the project brief, students are required to identify and describe the risks affecting their proposed project, and to describe strategies for eliminating or mitigating these risks. For each risk, you must provide;

- A brief description of the risk
- The likelihood of the risk eventuating
- The consequences of the risk
- The management strategies to be adopted to mitigate the consequences of the risk.

In classifying the likelihood and consequences of the risk, the guide (Based on HB 436:2004 Risk Management Guidelines – companion to Australian Standard AS/NZ 4360:2004) listed in table 1 below should be followed.

Likelihood	Description
Probable	The event is expected to occur within the time frame of the project
Possible	The event is not expected to occur in the time frame of the project
Improbable	Conceivable but highly unlikely to occur during the project
Consequence	Description
Severe	Most objectives cannot be achieved
Major	Some important objectives cannot be achieved
Moderate	Some objectives affected
Minor	Minor effects that are easily remedied
Negligible	Negligible impact on objectives

Table 1 Guidelines for classifying the likelihood and consequences of risk factors. (Based on HB 436:2004 Risk Management Guidelines – companion to Australian Standard AS/NZ 4360:2004)

3.5 Personnel and Communications

To ensure the smooth progress of the project, it is important to list in the project brief the names, positions and contact information of all personnel at the Client organisation who will be involved in supporting the project, along with the staff involved at UWA. This should be done in table form, as illustrated below.

The next step is to set out the planned schedule for meetings and reporting. You should list the frequency (eg fortnightly, monthly, quarterly) and location of any planned project



meetings. If there are any requirements for periodic reporting (above and beyond the monthly reports that you are required to provide), this should be specified in this section.

Finally, you must list any specific reporting requirements for your project. Your client may require that approval be given for you to undertake certain portions of the project. For example, you may need to contact client staff, customers or stakeholders, and the client may wish to pre-approve the contact list and approve the form of the contact (such as the form of any questionnaires or surveys). The client may also need to be involved in approving the design of any experimental equipment or procedures. The project brief must list any such requirements, along with the communication protocols to be followed in each instance.

Name	Position	Phone	E-mail
Joe Bloggs	Operations Manager (Client Mentor)	(08) 9555 3555	Joe.bloggs@company.com.au
John Doe	Operator (Deputy Client Mentor)	(08) 9555 3555	jdoe@company.com.au
Dr. Jane Doe	Academic Supervisor	(08) 6488 5555	Jane.doe@uwa.edu.au
Gary Bettison or Margot Jupp	CEED Business Development Manager	(08) 6488 3130	First.Last@uwa.edu.au
Adrienne Hondros	CEED Admin Office	(08) 6488 3130	ceed@uwa.edu.au
Jeremy Leggoe	CEED Director	(08) 6488 7315	Jeremy.Leggoe@uwa.edu.au

Table 2 Key Project Personnel

3.6 Confidentiality

In many projects, the client's business interests will require that some or all of the information produced during the course of the project will need to be held confidential. It is also common for clients to require students to hold information provided by the client during the course of the project in confidence. In some CEED projects, specific contracts include clauses dictating confidentiality requirements; the standard CEED Project Agreement also includes some generic clauses related to confidentiality.

In the project brief you must define the specific confidentiality conditions and procedures for your project. This will require determining the manner in which you will meet your obligations to the Client while still meeting the requirements for assessment in your School. This section should accordingly include;

- The nature of any material to be held in confidence;
- The nature of the restrictions imposed on any publications and presentations;
- The procedures to be used for approving publications and presentations for release;



- The period over which material must be held confidential (note – some typical conditions are included in the CEED Standard Project Agreement; additional conditions may be imposed if there is a specific contract for your project).

Note that in addition to the CEED seminar, your project unit will usually require some form of public presentation – it is your responsibility to ensure that you are able to comply with the requirements of both the Client and your unit. In determining the confidentiality conditions for your project, you should inform the Client of the assessment procedures in your School; they should be aware of the materials you will be expected to submit for assessment, and the range of people that will be involved in the handling of these materials. This will help the client to plan any approval procedures.

Your unit coordinator will be able to assist if you need to arrange a confidential presentation – but you must give them enough lead time, and you must make them aware that a research agreement exists between the University and the Client (in the form of the CEED contract and the project brief) that sets out the University's obligations for handling confidential material.

If there are no confidentiality requirements, this section should still be included, and may simply state "There are no confidentiality requirements associated with the project at this time". If this situation changes during the course of the project, which is not unusual, an "Amendment to the Project Brief" can be formulated to set out any confidentiality conditions that emerge.

Section 4 - Deliverables

List the deliverables, specifying the format they are to be delivered in. The deliverables should be arranged as a bulleted list, as follows (with examples);

- Project Report – This may simply be your thesis. If so, it should be specified as such; if not, the way in which the report provided to the client differs from a conventional thesis should be described.
- Matlab Program for performing Model Calculations (to be provided on a CD-ROM)
- Manual for the Matlab Program – a text document containing comprehensive instructions for Client staff using the program.
- etc, as necessary.....

Section 5 - References

References should be listed on a separate page. The Harvard citation style must be used



Project Brief Preparation and Sign Off

Your Project Brief must be signed by your Mentor, Supervisor, the CEED Office, and you. As such, all parties must be involved at all stages of the process of preparing the brief. When you have completed the first draft, it should be sent to your Mentor, Supervisor, and the CEED Office (where it will be reviewed by the appropriate Business Development Manager and/or the Director).

You should expect all parties to provide feedback on the document, and be prepared to act on the feedback. It is imperative that you be responsive to the comments of all parties; in cases where conflicting feedback is received, it may be necessary to convene a meeting of the parties to achieve consensus on the point in question. You should expect a brief to go through one to two revisions before acceptance – further iterations are usually only necessary when students repeatedly fail to respond to required changes, and we do not expect that from CEED students.

Do not circulate a final copy for signature until you have agreement from all parties that the document is acceptable. This will only lead to embarrassment if a party that has been out of contact requires changes to a document that has already been signed by others.

The brief becomes final ALL signatures have been placed on the same original document and delivered to the CEED Office. The CEED office requires a document with the original signatures; this document will be scanned and circulated to all parties via e-mail.

The project brief should be completed within 10-12 weeks of starting the project. Its importance is reflected in the fact that the first studentship payment is tied to submission of the brief. If the brief has not been finalised by the end of the first semester of the project, then in the absence of professional justification the CEED office may also make arrangements with the relevant faculty to have your grades withheld until such time as the brief is completed.



6. Getting Started

- Effective use of the first project weeks is essential for a productive time on site.
- A good quality Project Brief is essential.
- Make all meetings productive.
- Use prepared lists of questions to ensure important matters are not forgotten.
- Always remain aware of your next deadline.

The first few weeks is a crucial period for your project. How well you use them will affect its success. We have already discussed the importance of your initial literature review. You will need one or two combined meetings (probably including at least one on site meeting) with your Supervisor(s) and Mentor to determine and define the key features of your project.

You may find your Mentor unsure of what can be achieved by your project, or even what is desired. To clarify this, you need to:

- define the existing situation,
- define the final outcomes desired by the CEED Client,
- define the problem to be handled and its boundaries,

This might be achieved easily, or it may take a while. Either way, defining your project properly is vital. Keep a record of all ideas considered; they may become significant later. Factors "eliminated" can still play a role in defining the project problem, even though they may not appear directly. It is a good idea to note them as they are discussed, so you can re-visit them later if you need to retrace your steps.

Early meetings with the CEED Client

Meetings with your Mentor during the first project weeks are important to:

- start developing a good working relationship with your Mentor;
- gain an understanding of your project and its constraints;
- determine and document *primary* outcomes for your project and outcomes that are desirable if you have sufficient time;
- draft a preliminary timetable (*don't* agree to commercial deadlines!);
- ascertain which UWA resources may be relevant and available;
- discuss any special equipment or expenditure required, and agree how these will be provided (CEED Client pays);
- confirm procedures for obtaining approval on any expenditure;
- identify other CEED Client personnel with expertise useful for your project;



- agree on communication channels and reporting frequency (at least monthly);
- exchange the names of “deputy” Mentor and Supervisors;
- familiarise yourself with the project’s working environment;
- discuss special requirements for the site work period, (eg. locations, medicals, safety training, special clothing, etc.);
- confirm dates and duration for project work on site;
- find out which Human Resources Department people need to be contacted.

Check list for initial meeting with Mentor

Add extra questions as appropriate, but use the following check list to help you obtain the necessary information from your Mentor at your initial meeting:

- what are the CEED Client's desired outcomes in initiating your project?
- what does your Mentor see as the *primary* and *secondary* outcomes of your project? These may be adjusted as the project progresses. Ensure your Mentor understands the project needs adequate hurdles for you to demonstrate your academic prowess (deliberately inserted additions if necessary).
- in what form does the CEED Client want to receive the project deliverables (eg. just a report, software, working item, etc.);
- what would be a suitable preliminary timetable for the project (*don't* agree to commercial deadlines)?;
- what constraints does the CEED Client want to impose on your approach (eg. to fit other activities, methodologies, products, standards, or policies)?
- what sort of resources does the Mentor believe will be needed? Does the CEED Client already have access to all of them?
- what resources (e.g. laboratories, equipment, and expertise) does the CEED Client hope UWA will provide for your project?
- how will your project be handled if any special resources prove to be unavailable when needed?
- will any equipment or other items need to be ordered specially for your project? If so, do you need to provide information? By when? Who will order them?
- will special test rigs be needed? Where will they be built?
- is there any information the CEED Client needs urgently from you for budgeting purposes?
- what are the procedures when obtaining approval on any expenditure (the Project Agreement requires all expenditure to be approved in writing in advance);



- which CEED Client personnel will have an interest in the project outcome, or have expertise relevant to your project?
- what frequency of written reports suits the Mentor (bear in mind that you will already be producing monthly reports). Is email acceptable?
- what days and times are good (or bad) for contacting your Mentor by phone?
- who will act as a "deputy" contact if your Mentor becomes unavailable for any length of time?
- when can you go to site to familiarise yourself with the project's working environment?
- is there anything special to note about the site work (e.g. location(s), medicals, safety training, special clothing)?
- when would be the most suitable time for the period(s) of site work?
- will any Human Resources Department people be involved? How and when should you make contact?
- raise any other matters you believe to be relevant to your project.

Measure of project preparation

While we all hope your CEED project start-up will go smoothly and according to plan, sometimes there are unavoidable delays. Aim to achieve as much as possible of the following before you start site work. In some cases that will not be possible, in which case, simply achieve what you can and aim to get the rest done in the early part of the first site work period.

The extent to which you are able to make progress on the actual solution of the problem before starting site work will vary depending on your start date. Regardless of the start date, helpful goals would be to:

1. know exactly what you are setting out to achieve, and why;
2. have composed, agreed upon, and signed the Project Brief;
3. have planned how you will set about tackling the work;
4. have requested the resources needed at the CEED Client's site and the university;
5. have started accumulating relevant reference material;
6. have set up the structure for your planning and documentation system;
7. have begun to build up key skills and knowledge;
8. be ready to outline your approach in a brief presentation.

It is very beneficial for you to be ready for targeted work by the time you commence work on site.



7. Work Scheduling

- Proper use of your time requires careful planning
- Use of time management techniques can save stress and time

Time management

Your CEED project will be conducted in parallel with other academic activities. To manage this successfully, you need to establish your workload and time demands, and meter out your resources carefully.

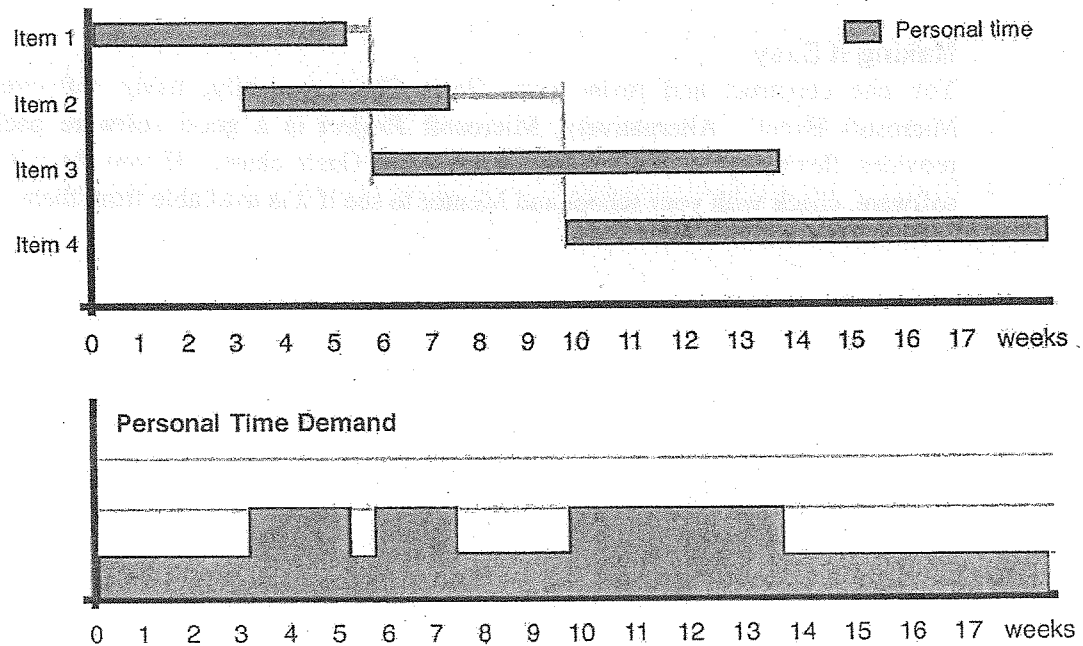
It is essential that you established a schedule for your CEED project, and various methods are available to assist you with this. A simple and useful technique is the Gantt chart, which summarises the resource needs for the various parts of your project.

A simple series of steps can set up a Gantt chart:

1. List the activities in rough chronological order;
2. Establish which activities can be done concurrently, and which depend upon prior completion of others;
3. Estimate how long each activity is likely to take. Consult your Supervisor(s) and Mentor as necessary on this because experience is needed. Always err on the generous side (and then leave an extra margin for delays)! You are otherwise likely to underestimate the time taken.
4. Draw axes, with the horizontal axis divided into convenient time periods, eg. weeks.
5. Starting with the chronologically first activity at the top of the vertical axis, draw a rectangle (or line) representing the estimated time required to complete the activity
6. Add the remaining activities, placing them so that they are not scheduled to commence before completion of any "prerequisite" activity. Where possible, schedule the later activities to allow some "reserve" time in case the prerequisite activity is completed late. You may choose to start scheduling the later activities eg. writing up your thesis and CEED report) from the project completion deadline because that is inflexible. In that case, you would effectively be working from the ends towards the middle.



7. Extend each rectangle forwards with a dotted line (or similar) as far as the next activity for which it is a prerequisite. This indicates the measure of flexibility on this activity (see Items 1 & 2 in figure below). Items without flexibility are effectively "critical". Delay in completing these will delay the whole project.



8. Activities requiring particular resources can be shaded differently, or shown separately if required, to identify easily when they occur.
9. To assess the demands on a given resource (eg. your time) during any period, you can make a histogram at the bottom of the Gantt chart, totaling the number of rectangles in parallel during that period (see diagram below). Having put the project resource demands onto the Gantt chart, it is wise to include your other academic load so you can allow time to complete major assignments and revise for examinations.
10. Pay particular attention to identifying items on the critical path – those items that are pre-requisites for subsequent activities. These items must be scheduled with great care, as a delay in such an item will delay subsequent items and potentially the entire project.

If at the end of this scheduling process, you find insufficient time to complete all the items you expected, or too much occurring at one time, you will need to reassess the workload and project expectations with your Supervisor.



Keep your Gantt chart up to date

Your Gantt chart should be updated as the project progresses so you know the demands on your time and other resources for the remainder of the project. Make a practice of taking your chart to all meetings with your Supervisor(s) and Mentor as it can be a great help when assessing possible courses of action.

Making It Easy

You can construct and revise your Gantt Chart manually, using software such as Microsoft Excel. Alternatively, Microsoft *Project* is a good software package that provides flexibility in the development of the Gantt chart. If you do not have the software, check with your school and Mentor to see if it is available from them.



8. Communication

- Effective communication will greatly improve your success.
- Put things in writing. In the long term, memories are unreliable.
- Keep everyone informed at all times.
- Regular written reports develop people's confidence in you.

Importance of Communication

The success of your project hinges on people and your ability to ensure that proper input is obtained from all parties. You are effectively the coordinator of your project (even though you are under supervision) so the final responsibility rests with *you*.

Communication is the key to full participation and input into your project. Without proper communication, the best plans and ideas in the world are close to useless. It is vital that you recognise this and take active steps to ensure proper communication takes place.

Communication may take many forms, depending on the nature of the message to be conveyed. From formal, such as writing a letter, through to email, face-to-face, phone call, as appropriate for given situation and/or material.

Your CEED project involves four parties, yourself, your Supervisor, your Mentor, and the CEED Office. It is important that all be kept adequately informed.

Misunderstanding is one of the greatest causes of problems between people

More effective communication

There are steps you can take to minimise the risk of misunderstanding:

1. Keep in regular contact with all parties.

This does not mean that *all* parties need to attend *every* meeting. At times, some people can just be kept up to date with progress and decisions. At other times they may need to be closely involved. You should decide what level is appropriate, and when. Do not neglect this and just hope for the best. Make conscious decisions in consultation with your Supervisor(s) and Mentor. If in doubt, ask the person how closely they want to be involved.

2. Put all agreements in writing.

When an agreement is made, the parties are in accord (or think they are) and you may be tempted to treat the verbal agreement as sufficient. Do not fall into this trap!



Firstly, putting decisions in writing makes all parties check much more carefully that they understand what is agreed. Many misunderstandings are avoided as a result.

Secondly, memories fade with time and become confused. Perceptions, pressures and priorities change. Even with goodwill on all sides, disagreements can arise. Deliberately or unconsciously, people's recollections adjust to accommodate their current perceptions. A written document (even just a scribbled note) allows the facts to be established later. If goodwill has been stretched a bit thin, written documents become even more important.

3. Keep all parties informed

If in doubt whether or not a person needs some information, err on the safe side by sending it. The risk in sending too much information is that the recipients may not read it. Help them by indicating what you require of them. For example, state whether it is "for information only", or "requires action".

Monthly written progress reports

Communication in the corporate and public sectors is vital, and each organisation will have its own mechanisms. Regular reports are an important part of this. You may be seen as slack or incompetent if you do not meet expectations in reporting. As part of your project obligations, you are required to present a brief report every month (throughout all phases of the project, **including** the site work period) to your Supervisor, Mentor and the CEED Office. Reports can be very brief, simply outlining progress, problems, delays, and expectations for the next month. A sheet you could use is shown at the end of this chapter and an electronic form is on the CEED website (www.ceed.uwa.edu.au/forms).

The CEED Client may want you to write a longer report at the end of your site work period. Check with your Mentor about this. If you submit one, provide your Supervisor(s) with a copy for information, preferably in time to allow feed-back before submission.

Communication with the CEED Office

The CEED Office is responsible for arranging your project, and monitors progress to ensure all needs are being met. The CEED Office will also be initiating some activities exclusively for CEED students, so communication channels need to be kept open.

From time to time, group meetings of all CEED students will be held. Regular mail can lead to delays, so communications (e.g. discussions on the Seminar/Dinner) will generally be by email. Please check your email regularly, and ensure that the CEED office always has your current contact information.

In case of problems

Should problems of communication or any other sort arise during your project (including vacations), discuss them immediately with your Supervisor(s) or the CEED Office. Make sure to document these problems in your monthly progress reports. Suggested improvements to how the CEED program is managed are also welcome at any time.





THE UNIVERSITY OF
WESTERN AUSTRALIA

CEED Office
M050
35 Stirling Highway
Crawley WA 6009
Phone: +61 8 6488 3130
Fax: +61 8 6488 7235
Email: CEED@uwa.edu.au



CEED Student Monthly Report

Report by: _____ Project Ref: _____

Covering the month of: _____

Project Title: _____

Company: _____

Progress since previous report:

Problems and delays encountered:

Expected progress in next month:

Expected Problems and Sources of Delays:

Signed.....
Copy to: (4 total) Academic Supervisor(s)/ Mentor / CEED Office / Self

Date.....

9. Work Your Network

- You cannot succeed alone, you need help from others.
- You already have a network of people keen to help you succeed.
- Networks are about mutual success, always be ready to help others.
- Making better use of your network is good for you and for others.
- Don't be too proud to let your network know what can be of help to you.

Build your Success Network

The project you are undertaking is yours, but you cannot accomplish it alone. You have reached your current level of success with the help of a mutually supportive network of family, friends, business associates (e.g. lecturers), and other contacts. Overall, you contribute to others just as much as you receive (or more), but contributions will not be balanced for each person. This is normal, so don't be afraid to ask other people for help.

Your network is important to you, so learn how to use it. Much of the material that follows has been gleaned from an excellent book entitled "Successful Networking" by Donna Fisher and Sandy Vilas, published by Thorsons of London in 1996. Nobody is suggesting you become a parasite! Networking works both ways. In fact, your focus is best placed on seeking to help others. Networking has been described as: "Creating relationships whereby you can help others achieve their goals, which in turn will help you achieve yours." (Ralph Hayes, President, Data Voice Technologies, cited by "Successful Networking", p28)

As you work on your project, you will need to *extend* and to *make use of* your supportive network. You have probably been doing this unconsciously in the past, but you will be *much more effective* if you do it deliberately.

Extending your network

In all your activities, you are continually meeting new people. They are potentially new members of your network, as you are of theirs. Use the opportunity to discover where they could fit in. Avoid at all times the attitude of looking only to receive. You may be able to help them. "Networking is the genuine expression of interest in others and the willingness to contribute and support them when possible." ("Successful Networking", p20) Be ready to let people know where you might be of help to them, either through your own knowledge or by putting them in contact with people you know.

When you meet new people at work, or even socially, be prepared to write down their names and how you can contact them again. Equally, be willing to supply information for them to contact you. This need not infringe your privacy or theirs. If you or they have



concerns, simply ask for (or give) a means of contacting at work (you could give your university school's address). Most people are happy to *exchange* this information.

Making better use of your network

How can you make better use of your network? Most people are glad to help others if they can. It gives them satisfaction. "When people ask us for support we typically feel pleased, acknowledged, and honoured that they thought of us and thought enough *of us* to feel that we could be of assistance. Isn't that true for you, too? By polling the people in our workshops, we have found that this is consistently true. Yet isn't it interesting that so few people ask for what they want or need?" ("Successful Networking", pp18)

The key to benefiting from your network is letting people know you are seeking help on a particular matter. This approach removes fear of rejection: "Networking consists of gathering, collecting, and distributing information. When you contact someone to let them know that you are looking for a referral, prospect, or service provider, you are giving that person information. Your focus is to distribute this information to a sufficient number of people to make the connections that will best serve you in reaching your goal and getting the support or contact that you want. Rejection is an issue only if your focus is on having someone respond in a particular way. If you are relaying information primarily as a way to mutually share resources, then any response you get will support the flow of the process." ("Successful Networking" pp16-17)

In the past, some CEED students have been reluctant to ask questions for fear of appearing ignorant, especially once their project has been under way for a while. Don't be afraid to let your needs be known. "It is important to realize that asking for support is not a sign of weakness but really an indication of:

- Strong self-esteem.
- A commitment to the goal rather than the ego.
- A willingness and ability to learn from others."

("Successful Networking" p18)

Develop your personal network. You will discover that: "In those relationships you will find the people who *want* to support you." ("Successful Networking", p20).



10. Workload

- Work will be divided between campus and site depending upon project needs. Flexibility is important.
- Higher degree projects have no special schedule, provided the required period is spent at the CEED Client's premises.
- At Honours level, the workload differs from non-CEED projects.

Location of work

Your work will usually be distributed between the CEED Client site and the university. For projects at higher degree level, there is no special schedule. You need to discuss with your Supervisor(s) and Mentor how best to schedule your time on site. At Final Year or Honours level, the schedule is quite tightly defined, and is shown below.

Special requirements for Final-Year/Honours workload

At Final-Year/Honours level, the CEED project work load is not uniform over the three semesters. While it is flexible, some indication of what is expected is given below.

First project semester

If you are appointed early in the pre-summer semester, you should spend no more than 4 hours/week on your project. Your main task at this time should be to develop your Project Brief.

Summer vacation

While at the CEED Client's site for eight weeks during the summer vacation, you will be expected to spend at least their normal working week on your project work.

Final/Honours year

In your Final or Honours year, your project workload will be the same as for a regular Final Year/Honours project in your school. You should expect to spend at least a day to a day and a half each week on your project. Expectations with a CEED project will be greater because of the longer time-scale. You will be judged on how well you make use of the opportunities given, including the longer project period. *Do not expect to slacken off in the during your Final or Honours year.* Maintain your momentum if you want to obtain a good grade for your thesis.



11. Talks and Seminars

- Two presentations of project work are required including a formal seminar with senior CEED Client personnel
- Organisation of the seminar and dinner has major student input.
- A paper from each CEED student is published in the seminar proceedings.

Presentations

You will normally need to give two presentations on your work over the project period. For students at Final Year/Honours level, the first is an informal seminar with your CEED colleagues early in the semester after summer site work. The second is a formal seminar and dinner, with published proceedings, arranged for invited CEED Client personnel during second semester each year (normally during mid semester break). Both presentations provide you with an opportunity to develop your communication skills; an area of great importance for both your career and personal life.

Industry seminar and dinner

Around mid-semester break in Semester 2 each year, a special CEED seminar is arranged with guests from existing and potential CEED Clients invited to hear CEED students give a short presentation on their work. This is followed by a formal dinner. Proceedings, incorporating papers by all CEED students, are produced and issued to all delegates. Attendance is by invitation only, and there is no charge.

The seminar and dinner have several aims. It provides an opportunity for:

- a. you and the other CEED students to show your work to potential employers;
- b. you to meet and mingle with senior people from industry and government bodies;
- c. CEED students to give an oral presentation on their work;
- d. us all to show what can be achieved through CEED projects;
- e. encouraging CEED Clients to offer further CEED projects;
- f. raising the profile of the university and its graduates in the wider community.

All CEED students finishing their CEED project that year take a part in its organisation, in conjunction with the CEED Office. The event is a co-operative effort, but largely organised by CEED students. The seminar and dinner has proven to be a very beneficial and enjoyable event over many years.

Activities are coordinated by two committees, with students forming a majority on each, an Editorial Committee (say 3 students and 1 staff) and an Organising Committee (say 4 students and 1 staff). These are responsible to the CEED Director for all organisation.



They receive assistance from the CEED Office, and all costs are met by CEED. The main activities are outlined below:

1. **All students** attend a meeting early in second semester to select committee members and discuss dates and deadlines for the seminar;
2. **All students** finishing that semester prepare a short paper (maximum 6 pages) on their project by the selected date, and submit them in the set format to the CEED Office for compilation into Proceedings;
3. The **Editorial Committee** groups papers for presentation at the seminar;
4. The **Organising Committee** arranges the setting up, registration, ushering, etc. for the seminar and dinner, assisted by *all* CEED students and the CEED Office, to maximize interaction between students and external delegates;
5. **All students** attend a “rehearsal” seminar, held a few days before the actual seminar, where students presenting papers get feed-back from the group, and final arrangements are made for seminar duties;
6. Invitations to Mentors, senior personnel from current and potential CEED Clients, academic Supervisors, and senior university people, will be sent out by the CEED Office. The formal “host” is usually a very senior person within the university, such as the Vice-Chancellor;
7. Two students act as **Master of Ceremonies** and one student gives a **speech of thanks** at the dinner.

Seminar papers

All papers are published in the seminar proceedings and distributed to all delegates at registration. When preparing your paper, you need to consider the following points:

1. A high standard of presentation and content is expected of the high calibre students undertaking CEED projects;
2. Written seminar papers should aim to inform intelligent people who already have some knowledge of your topic, and should typically be modeled on conference papers for your particular discipline. Expect your paper to be widely distributed to your CEED Client’s personnel. High quality diagrams enhance your presentation, but be aware of the space they take;
3. A standard format is used for all papers. Details are shown at the end of this section, and you can download a template file with the necessary formats (see item [6] below) from the CEED web site. Please use this for your paper;



4. Your paper should be 5-6 pages long, and should not exceed 6 (including appendices). The cost of printing pages in excess of 6 may be charged to you;
5. Get your Supervisor(s) to review your paper before submitting it to your Mentor. Your Mentor must check your paper, and approve it (in case it contains commercially sensitive material) before you submit it to the CEED Office. This precaution is vital, and can avoid considerable embarrassment (not to mention legal issues);
6. Submit one "hard" copy of your paper (with signed approval from your Mentor), and one electronic copy in a version which can be accessed) by Microsoft Word.
7. Difficulty is occasionally experienced with diagrams in the electronic copy. If you have diagrams created by exotic software, check *in advance* that they can be transferred successfully. As an extra precaution, save your presentation in pdf form.

Seminar presentations

Details of talk duration, question time, etc. will be finalized as the seminar approaches. However, the following may be helpful to you as a guide:

1. Talks are likely to be about 15 minutes duration, with 5 minutes afterwards for questions (which may also involve your Mentor);
2. The purpose of your talk is to inform others generally about your project work, and to demonstrate to them how it is valuable (this is an essential part of "real life" practice);
3. Your talk should be aimed at *intelligent people with no knowledge of your discipline or topic*. This means you need to spend a substantial part of the time on the background to your project, and limit the technical depth of your talk. This should ensure you do not "lose" your audience;
4. Make your talk an interesting and enjoyable experience for your audience. If you do this, it will have much greater impact - and convey more information - than one which is only significant technically;
5. Blinding people with your knowledge and brilliance (real or imagined!) simply persuades them you cannot communicate. This is a common pitfall and should be actively avoided. Communication skills are almost always regarded as more important than simple brilliance;
6. Your appearance and attitude inevitably influence delegates' perception of both you and the university. It is a good investment to make sure they receive a good impression - make sure you are smartly and professionally dressed. Treat the occasion as you would a rather important interview - it is!



A grading rubric is attached with has been developed for use in grading classroom presentations, and to help students develop their presentation skills. Always remember – first impressions are often critical, and can affect people’s subsequent perception of you and your work. Many of the points addressed in the rubric relate to these impressions.

Remember the following key points;

- Loudness – There’s no need to shout, but you must speak clearly and loudly enough for the entire room to hear you.
- Speaking rate – Nerves will often make inexperienced speakers talk too quickly. Similarly, a lack of confidence or preparation may slow a speaker down as they continually check their notes or slides. Practice your talk to establish a comfortable, confident speaking rate.
- Mannerisms/Interjections – Most people have mannerisms that they are unaware of. Ask your friends to watch you practice your talk, and they will be able to see any that you might have. Avoid repeatedly saying things like “um”, “er”, “you know” or “like”
- Eye contact – It is critical to engage your audience - avoid turning your back on the audience to read your presentation of your slides, and don’t just stare at your notes. Make sure you speak to your audience, not away from them.
- Gestures – Be animated – don’t just stand still with your hands in your pocket. Point out interesting features on your slides.
- Redundancy – don’t repeat the same thing over and over. It’s OK to reinforce important points, but don’t overdo it.
- Confidence – The key to confidence is preparation. If you take care in preparing your slides, prepare your speaking notes well, and practice your talk, you will be confident when the time comes.
- Professionalism – Don’t be overly familiar with the audience, and use professional language. Avoid slang, and, as a general rule, never swear. Remember to go by the standards of your audience, not your peers; they will tend to be older and more conservative.
- Dress – Dress as if for an interview.
- Time limits – It is extremely inconsiderate to exceed time limits. Your audience are busy people, and, if there are parallel seminar sessions, may wish switch sessions between talks.
- Font and image sizes – Always remember that the back of the room is a long way away, and size text and images accordingly. Test your presentation if you have any doubts.
- Colors and backgrounds – Many color combinations that look pretty on your screen don’t project well. In general, avoid complicated backgrounds, and test your slides to ensure that everything is clearly visible from the back of the room (examples – always have dark text on a light background, or light on dark; make lines thicker, as thin lines don’t project well; red lines or text on a white background looks good on screen but projects poorly). Remember; it may be dull, but plain white backgrounds and black text generally work well.
- Spelling/Grammar – Spelling and grammatical mistakes make you look lazy and careless, and can detract from people’s impression of the quality of your work. If



people think you can't spell, they're not likely to think of you as smart, and, by extension, will doubt your work.

- **Graphs and Images** – Must always be labeled. Never leave the audience in any doubt as to what they are seeing – try to make each slide self-explanatory. In many instances, presentations will be circulated around a company, without you being there to explain it. The axes on a graph must be labeled with titles and units – otherwise the graph is meaningless.
- **Language** – In addition to being professional, language must be appropriate for the audience. Avoid esoteric argon, while still respecting the intelligence of the audience.
- **Shared knowledge** – Tailor any presentation to the audience, being mindful of the expertise of the audience in your subject area.
- **Key terms** – If it's important, it should be on the slide. Again, remember that a presentation may be circulated via e-mail to people who didn't get to hear your talk.
- **Stressing Points** – If it's really important, it'll be on the slide AND you will talk about it. After all, that's the point of doing the presentation.
- **Distractions** – This can be a matter of personal taste, but in using the "effects" in powerpoint be mindful that they not slow down your talk or provide unnecessary distractions. It may look cool, but your audience will eventually get fed up with waiting for the next bit of text to fly in from the side, especially if it slows the talk down.
- **Technical content** – the points in the rubric relate to a specific class, but you should always remember one golden rule – **MAKE SURE EVERYTHING YOU PUT ON THE SLIDE IS TECHNICALLY ACCURATE** (at least to the best of your knowledge). A presentation is a time to demonstrate your expertise, not to show people that you are sloppy or uninformed.



ChE 3232 - Spring 2008 : ORAL PRESENTATION RATING SHEET

Name _____

Date _____

Individual Delivery Rating Scale: 0 = rarely or never 1 = sometimes 2 = consistently, appropriately

Spoke using appropriate loudness level	0 1 2
Used an adequate speaking rate	0 1 2
Avoided distracting mannerisms or interjections (e.g., "um" or "ah")	0 1 2
Established eye contact with audience, Presented material without reading from text	0 1 2
Used gestures and engaged the audience	0 1 2
Avoided redundancy (repeating information in the same way over and over)	0 1 2
Demonstrated confidence (adequate level of comfort) when presenting	0 1 2
Addressed audience in a professional manner	0 1 2
Dressed in an appropriate professional manner	0 1 2
Met requirements for time limits	0 1 2

Individual Slide Content Rating Scale: 0 = rarely or never 1 = sometimes 2 = consistently, appropriately

Used appropriate font and image sizes in slides	0 1 2
Used appropriate colours and backgrounds in slides	0 1 2
Slides free of spelling and grammatical errors	0 1 2
Graphs and images appropriately labelled (title, axes, units, legends)	0 1 2
Explained subject matter in appropriate language	0 1 2
Assumed appropriate level of shared knowledge with audience	0 1 2
Provided key terms on transparency or whiteboard	0 1 2
Stressed the most important points graphically and verbally	0 1 2
Avoided distracting graphics/animation/slide timing	0 1 2

Technical Content Rating Scale: 0 = did not 1 = partially 2 = fully

Covered the assigned experiment in sufficient detail	0 1 2
Clearly and correctly identified the experimental objectives	0 1 2
Presented graphs and data that were technically accurate	0 1 2
Demonstrated accurate understanding in the discussion of results	0 1 2
Presented conclusions accurately summarizing the experiment	0 1 2
Answered questions thoroughly, demonstrating understanding	0 1 2

Additional Comments:

Total Points Possible: 50

Total Points Earned: _____

12. Project Agreement

- CEED projects involve formal agreements
- You sign a formal undertaking for your CEED project
- UWA has a formal agreement with the CEED Client
- Confidentiality agreements may also be required

CEED student agreement

When you accept your CEED project, you enter part of an agreement between the university, the CEED Client and yourself to perform a particular bit of work. You are not engaged as a consultant with particular expertise, but as a student with the project, as a co-operative research venture, incorporated in your regular program of study.

For the project, you are not employed by the university, nor by the CEED Client, even though both are committing time and resources to your project.

You will have signed a formal application and acceptance for your CEED project. You will also have signed a "CEED Student Undertaking", which becomes part of the formal agreement between UWA and the CEED Client. Some CEED Clients may also require students to enter into another agreement before starting work. If so, it is likely to be their standard document – but may, in some way, duplicate or contradict your Project Acceptance or Student Undertaking. Do not sign any such document without first showing it to and discussing it with your Supervisor(s) and the CEED Office.

Confidentiality

Some CEED Clients may be concerned about confidentiality relating to the project. The CEED Student Undertaking includes standard provisions for confidentiality, so you will already have confirmed that you will comply with confidentiality requirements.

Some CEED Clients may require all parties involved in a project (including you) to sign their own standard confidentiality agreement. This is common in industry, particularly where competition for new information is a major factor. If you are asked to do this, before signing show it to and discuss it with your academic Supervisor(s) and the CEED Office.

Intellectual Property

While ownership of Intellectual Property produced by joint research (such as CEED projects) is generally shared between the university and CEED Clients, CEED offers an option whereby Clients may pay a fee surcharge to obtain full ownership of IP produced during the project. In such cases, the normal CEED payments to students are increased to compensate for the concession. Ownership of "Background IP" is unaffected by the surcharge. If you have any concerns about IP, contact the CEED Office immediately.



13. Project Expenses

- CEED Clients fund CEED projects and you will need to accommodate their accounting procedures
- You are responsible for ensuring CEED Client accounting needs are met
- You can make choices to minimise extra accounting work
- Prior written approval is required before any project expenditure.
- You can claim for a refund on certain minor expenses

Agreement on funding

The CEED Client has agreed to share with the university the cost of your project and, in addition to providing your Studentship and funding the expenses of your project, pays fees towards the cost of operating the CEED program. The CEED Client's undertaking to fund project expenses is conditional on their approval being obtained *before* incurring any expenditure.

Responsibility

You are required to take responsibility for the financial management of your project, under the oversight (and guidance) of your Supervisor(s) and Mentor. Whenever possible, consult your Supervisor(s) before proposing any new expenditure to your Mentor. Always keep both persons informed of progress.

Processing of paperwork for expenditure on your project is your responsibility. This includes obtaining written approval from the CEED Client prior to any expenditure, and keeping proper records of expenditure for accounting purposes. You can reduce the administrative work if you choose carefully how you get certain things done; this is discussed further below.

Minor personal expenses

You have access to a limited sum of money (\$200 excl GST in the first instance) to cover specific expenses incurred during your project. These are basically limited to the production of your thesis and CEED report, along with any reports for your CEED Client. Claims for this must be approved by your Supervisor(s) before you submit them to the CEED Office.

Approval for such expenditure up to this limit has already been obtained. If expenses are likely to exceed this sum, you must obtain written approval from the CEED Client before claiming greater amounts.

Details of how this sum (and any increase on it) is spent must be provided for accounting purposes. **It is important to obtain and keep receipts.**



Travel expenses

Under the standard project agreement, CEED Clients agree to reimburse students only for travel outside the Perth metropolitan area, provided it has been agreed to in writing. If your site work is more than 30km away from UWA, ask your Mentor how travel expenses are handled in the CEED Client's organisation. Record this in your Project Brief.

If your Mentor wants your transport claims to be handled through the CEED Office, arrangements **must** be confirmed **in writing** prior to any expenses being incurred. Forward a copy of the authorisation to the CEED Office and make sure you keep accurate records and receipts of travel costs. Without prior written authorisation and accurate records, the CEED Office will not reimburse you.

Should your Mentor decide to reimburse you for travel *within* the metropolitan area, this will need to be confirmed in writing and included in the Project Brief.

Project expenditure through the university

The following is a general principle when handling expenditure if the university is spending money on your project on behalf of the CEED Client:

1. Prior written authorisation from the CEED Client is essential;
2. Your school arranges for the expenditure and makes payments from its own accounts as the job progresses;
3. When the job is complete, you (or with their agreement, your school) supply the CEED Office with information so they can invoice the CEED Client and arrange for your school to be reimbursed.

Specific procedures for expenditure

If your project incurs any expense, you can arrange for it to be handled in one of three ways. These are discussed below. While approach 1 requires the least administrative effort for you, approaches 2 and 3 may be preferred by the university. This is because these approaches allow the University accounting system to record the expenditure on research undertaken through the University. This information is then included in submissions used to secure funding for the University from the government.

1. Incur expenditure through the CEED Client

This approach requires the least work by you and your school, and may also be preferred by the CEED Client. Ask your Mentor (in writing) to obtain the needed goods and services through the CEED Client's organisation. They may be provided by the CEED Client or by sub-contractors, but will be arranged and supervised by the Mentor.

You might be asked to keep records of such expenditure, or to process applications for payment within the CEED Client's organisation. Ask your Mentor what is required, and what records you need to keep.



2. Work by the university or others on "fixed price"

You can obtain a "fixed price" quotation from your school's personnel (or an outside contractor) for goods and services and then obtain approval from the CEED Client for this expenditure. Make sure that quotations from suppliers are in writing, and send a copy of the quotation to your Mentor, including any "small print" conditions on the back!

Your school (or other party) then functions as a sub-contractor to provide goods and services for that price. In this case, you need not maintain detailed records of the work for submission to the CEED Client because they have agreed to a set price. The school (or other party) will keep the records necessary for their own purposes, and you need not be involved in these.

At the end of the project (or for progress payments with large sums), make sure that a request for payment is submitted to the CEED Office (by you or your school). The CEED Office will then invoice the CEED Client, and have your school reimbursed.

3. Work by the university on "time and materials" basis

This is a flexible, but administratively tedious way to obtain goods and services. You may obtain approval from the CEED Client for expenditure on a "time and materials" basis up to an agreed price limit. You then make arrangements with the appropriate personnel in your school to buy the necessary items and have technician time logged for charging to the project.

It remains your responsibility under your Supervisor(s) to ensure the agreed limit is not exceeded. If it looks as though the limit may be exceeded, request a revised limit from your Mentor as early as possible. *Never allow expenditure to exceed the current limit.* It can result in considerable embarrassment.

Make sure that all expenditure (including stock items of more than trivial cost) is recorded appropriately against your project. Your Supervisor(s) has a sample sheet for this and will discuss procedures with you. A sample of the sheet is shown on the following page. Details of expenditure will need to be passed to your school accounts clerk as work proceeds.

When a project is complete, inform your accounts clerk, and arrange for details of expenditure (together with a copy of the CEED Client's authorisation) to be sent to the CEED Office. The CEED Office will invoice the CEED Client and arrange for your school to be reimbursed.

Note: Invoices will not be sent to the CEED Client on your behalf unless you supply a copy of their written authorisation for the expenditure.





THE UNIVERSITY OF
WESTERN AUSTRALIA

CEED Office

M050
35 Stirling Highway
Crawley WA 6009
Phone: +61 8 6488 3130
Fax: +61 8 6488 7235
Email: CEED@uwa.edu.au



RECOVERABLE PROJECT EXPENSES

CEED Proj Ref: _____ School: _____

CEED Client: _____ Supervisor: _____

Mentor letter ref/date _____ approves the expenditure below

Approved by Supervisor/School: _____ Date: _____

Qty	Description	GST excl.	GST	GST incl.
TOTAL		\$	\$	\$

Students: Please give your school accounts officer a completed copy of this sheet with other documentation when requesting project expenditure to be recovered from the CEED Client.

School accounts officer: Please *do not process the above expenditure without confirmation of written approval by the CEED Client*. When the above expenses have been incurred by your school, please forward a signed copy of this sheet to the CEED office. We will invoice the Research Client and reimburse you. If you have any queries, please call us on 6488 3130.

I confirm the above expenses have been incurred by this school on the nominated CEED project.
Please reimburse account number _____

Signed: _____ Date: _____
School Accounts Officer

14. Insurance and Safety

- The university indemnifies the CEED Client against accidental damage you may cause on site
- Different conditions may apply for any period when you take employment
- You need to consider taking out personal insurance
- You are responsible for ensuring you comply with the CEED Client's safety procedures

Insurance

The university indemnifies the CEED Client against accidental damage caused by CEED students' negligence on site while working on their projects, including periods when visiting and carrying out project work on site. This also provides some cover for you for any accident against yourself, but does not cover damage caused as a result of foolish or criminal acts. You are advised to check the university policy at www.safety.uwa.edu.au/insurance, and consider whether you wish to take out additional insurance for personal accident and other risks.

Insurance while employed by the CEED Client

If you make any arrangement with the CEED Client for any period of work *earning extra payment*, you effectively become an employee of the CEED Client for that period. This is an important technicality because employees fall into a different insurance category; for example, the CEED Client is obliged to provide workers' compensation insurance for any period of employment.

If the CEED Client is *not* employing you for any period, your normal CEED student conditions apply.

Make sure the *dates* of any period of employment are clearly agreed in advance, *in writing*, so that liability for insurance is absolutely unambiguous. This is your responsibility. Any disagreement between insurance companies tends to be extremely inconvenient for those caught up in it.

Safety on site

Your safety is of paramount importance. Treat it that way. Your CEED Client may have a work safety program requiring you to attend training on safety matters. Check with your Mentor, who can then make any necessary arrangements. Industrial sites often contain unforeseen dangers so, if in any doubt, ask. Never be ashamed to ask.



15. Studentship

- You get a studentship unless you have another arrangement with the CEED Client
- CEED studentships are conditionally tax exempt

Arrangement for Studentship

CEED students who have no other special relationship with the CEED Client have a uniform arrangement for their Studentship and site work. In some cases, CEED Clients may pay more than the standard Studentship amount, particularly if they want the student to gain more experience than the normal site period (e.g. 8 weeks during the summer vacation for Honours level students). In such cases, the amended sum will be paid in the same manner as outlined below. CEED students with scholarships or cadetships from the CEED Client usually have separate financial arrangements.

Provided you have no other special arrangement with the CEED Client, you will receive a Studentship for the duration of the project. This Studentship is tax free, subject to the conditions listed in the section below. Payment times for postgraduate students vary, but for Final year/Honours level students, they are generally made through the CEED Office in three installments as follows:

1. Once you have handed in your SIGNED Project Brief to the CEED office, the first installment will be made;
2. Once you confirm to the CEED Office your commencement of final year and provided you are up-to-date with all reports, the second payment will be made at the end of the first semester of your Final or Honours year;
3. When the Client confirms that all deliverables have been received, and your thesis has been submitted to the school and the Client, then if you are up-to-date with all reports the third payment is made.

Your CEED Studentship is conditional upon satisfactory performance on your project and on the understanding that you continue the project to its conclusion. Failure to fulfill your obligations could lead to loss of, or even require repayment of, your Studentship.

Cheques for the first two installments of your Studentship will be collected from the CEED office. You will be informed via email when cheques are ready. *It is your responsibility to check your email.* If you want your final cheque mailed to you, you will need to send an email to the CEED Office stating your preference and confirming your address. If you have any queries regarding your Studentship, please contact the CEED Office.



Students with another scholarship or cadetship

Students with a scholarship or cadetship from the CEED Client typically have in place an arrangement giving even more generous financial support than the CEED Studentship. As a general rule, whichever mechanism provides the greater support will be used, *but not both*.

It is your responsibility to ensure that both the CEED Client and CEED Office are informed if you have financial support from the CEED Client or other parties under which you have specific obligations. If you have financial support from a different organisation which still allows you to fulfill your CEED obligations, that support should not affect your eligibility for the CEED Studentship. Under such circumstances, establishing your liability for tax would be your responsibility.

CEED Studentships and Austudy

Your CEED Studentship is classified as income for the purposes of establishing your Austudy entitlement. Normally, you will only receive two thirds of your total CEED Studentship during any one year (financial or calendar).

If your total "other" income (including your tax free CEED Studentship) for any year exceeds limits allowed by Austudy, your Austudy allowance may be reduced. Despite this, you will still be better off with the CEED Studentship. The above is for your information only, and it remains your responsibility to ensure you comply with all requirements for your Austudy and taxation liabilities. Visit the Austudy web site at: <http://www.centrelink.gov.au/internet/internet.nsf/payments/austudy.htm>

Conditions of Tax-Exempt CEED Studentships

CEED Studentships are available to students who qualify to be full-time candidates for a university course. The Studentships are funded from monies paid to the CEED Office by CEED Clients and shall be governed by the following conditions:

- 1.1 Eligibility for a Studentship is confined to students who have satisfactorily completed one semester of the CEED Program.
- 1.2 In order to be considered for a Studentship, students must have satisfactorily completed a minimum of five semesters of undergraduate study and be accepted into the CEED Program by a formal offer of a CEED project.
- 1.3 Projects and Studentships will be awarded to those eligible students who bid for and are deemed to be best suited to the demands of individual CEED projects, as assessed by the respective academic Supervisors.
- 2.1 Applications for CEED projects with Studentships may be called annually, and a closing date for lodgement shall be set by the CEED Office.



- 2.2 Notwithstanding 2.1 above, the CEED Office shall have the discretion to call for applications based on special grounds at any time of the year.
- 2.3 Each individual project with a Studentship shall be advertised.
- 2.4 Applications for projects with Studentships shall be submitted by the due date and be addressed to the CEED Office.
- 3.1 The CEED Office shall from time to time determine the amount of the studentship.
- 3.2 The stipend shall be paid in equal installments at intervals determined by the CEED Office.
- 3.3 The Studentship shall not be affected by payments made to Studentship holders for expenses related directly to the CEED Project they are undertaking.
- 4.1 A student awarded a CEED project may engage in appropriate employment, whether within the University or outside, up to a maximum of 180 hours in a calendar year but shall not, without written permission from the CEED Office, engage in employment for more than 10 hours in any one week.
- 5.1 The maximum period of tenure of a Final year/Honours level CEED Studentship is fourteen months.
- 6.1 CEED Studentships are financed by CEED Clients that propose project topics and provide a Mentor to assist the Studentship holders together with nominated academic Supervisors.
- 6.2 Former Studentship holders are neither obligated to seek full-time employment with their client company, nor is the client company obligated to offer employment to a former CEED Studentship holder.



16. Arrangements for Site Work

- You need to make arrangements for dates of working on site
- Make good use of the site period to develop your networking skills

Opportunity with site work

The CEED Client has undertaken to enable you to work on your project at their premises for a period of time during the course of your project. At Final year/Honours level, this is eight weeks, typically during the summer vacation. This period provides an excellent opportunity to gain experience operating as a significant contributor in a normal working environment. Make the best of this opportunity. Interact with the other people and look for opportunities to develop and use your "networking" skills for their benefit and yours.

Your academic performance on your CEED project will be assessed on the basis that you used the site work period effectively, so do not allow your efforts to be diverted from your project.

Site work dates and status

You negotiate with the CEED Client the dates to start and finish on site. Out of courtesy, inform their personnel department of your arrangements even though you are not employed by the CEED Client and are not a conventional "vacation student".

Make sure your status as a CEED student working on a specified project is properly understood. CEED Clients which regularly employ vacation students may need this clarified, otherwise they may expect you to undertake their regular vacation training program. If difficulties arise, contact the CEED Office.

Extending or changing the site period

Most CEED Clients will not object if you wish to work on site for longer than the minimum required period. CEED Clients are under no obligation to allow a longer period, or to pay extra if you do work longer. If you would like the CEED Client to pay you for the extra time on site, discuss the matter with them as early as possible, preferably before you start on site.

If you are unable to work the full length of time during the normal period (e.g. summer vacation for Final Year/Honours students), negotiate alternative arrangements with your Supervisor(s) and Mentor to accumulate an equivalent period. For engineering students, this can be critical, as CEED project site work counts towards your professional practicum.



Expectations during site work

Expect to spend the majority of your time on site on your project. The CEED Client may offer you an opportunity to gain experience on other interesting matters which are of little relevance to your project. Provided it does not excessively interrupt your project work, you are welcome to take the opportunity because broadening your experience is a major aim of CEED. If you receive such offers, it would be wise to discuss them with your Supervisor(s) before accepting.

If your project gives you little opportunity to interact with others on site and see how things are done, it may be a good idea to ask your Mentor to arrange some specific "extra" activity to broaden your site experience. Ultimately, the benefits you receive from working on site are up to you. Make the best of the opportunity.

Course Requirements for Professional Practicum

If your course has a requirement for a Professional Practicum, your CEED project will probably give you credit for a large portion, if not the whole (e.g. for engineering and computer science students at Honours level, a CEED project is deemed to cover the full time requirement if the normal site work quota is met). In most cases (e.g. engineering), **you will still be required to submit practicum reports in the normal manner.** If your school requires written confirmation of any practicum, make sure it clearly states that you are doing a CEED project.



17. Research and Assessment

- Assessment of your work will take account of any longer period of work with your CEED project
- Your thesis is the major item assessed
- Attitude and initiative also affect your mark
- Conferring of degree dependent upon CEED Client confirming receipt of project deliverables and CEED Office receiving soft copy of thesis.

Academic assessment

Your attitude and performance over the course of your project may be assessed by your academic Supervisor(s). However, by far the greatest part of your academic assessment will be based upon your thesis.

Performance expectations of you will assume you have made good use of any extended time afforded by your CEED project, *including* the period on site. Make sure you plan appropriately and use it to good effect. In some schools, you may be able to negotiate in advance with your academic Supervisor(s) the work to be undertaken during any given project period, and then be assessed on the basis of the previously agreed level of difficulty of the undertaking, and how well you achieved it. Your Supervisor(s) may let you submit an appraisal of your own performance and “invoice” for marks each semester but, if this is the case, beware, as the validity of your request may contribute to your score!

Please note that as the execution of your CEED project is a serious undertaking, the conferring of your degree is conditional upon:

- CEED Client receiving the deliverables specified in your Project Brief;
- CEED Office receiving a soft copy of your thesis.

Features of a Good Research Project and Thesis

In most UWA schools, project work is assessed almost entirely on the thesis document. It is therefore essential that your thesis work be planned, handled, structured, and presented in the best possible way, both physically and intellectually.

Requirements for theses at different levels vary, and you should check what is required for your level. At Final year/Honours level, your thesis typically needs to demonstrate the full extent of your academic skills, particularly your ability to:

- a. Find, review and assess critically relevant past work by others in your discipline;
- b. Design and conduct experimental or other creative work to test or develop some hypothesis;

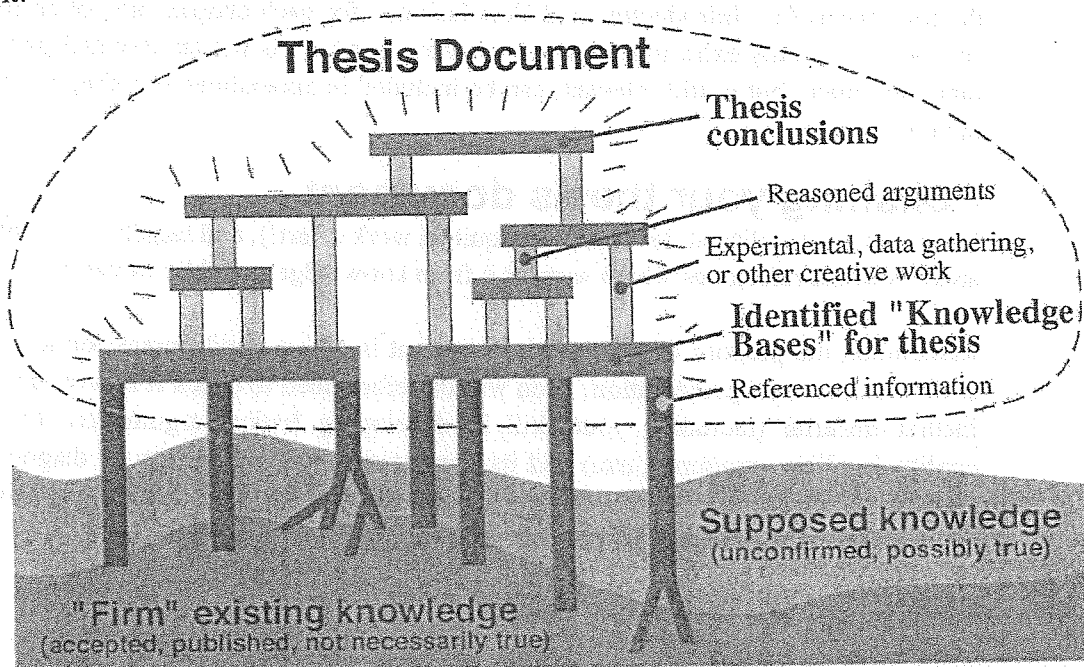


- c. Analyse critically the results, draw careful conclusions, identify and recommend further work;
- d. Write and present a coherent and comprehensive report on the work.

Essentially, your thesis is to prove your ability to find and handle knowledge reliably, accurately, and intelligibly. This is sometimes called “academic rigour”, and implies that you can support every statement and conclusion from the accepted knowledge base of your main and relevant allied disciplines. The diagram on the next page may help you understand what is entailed.

Identifying the knowledge bases for your work

Identifying the current knowledge bases for your thesis is the objective of the literature review. You need to link all your work back to published literature (rather than to “supposed fact” which may just be hearsay). Published material may still be wrong or out of context, so you must review literature “critically”, showing yourself watchful for flaws (eg. loose reasoning, or information used out of context). Knowledge which is unconfirmed (if you *must* mention it at all) should be supported as far as possible from firm knowledge. If any uncertainty remains, be sure to say so to show you are aware of it.



A thesis is a polished and self-contained document that stands apart from its links to accepted knowledge – but any research project is only as solid as its foundation. Make sure you provide a broad base of knowledge to ensure a solid foundation.

Building on the knowledge base

Once you have outlined the knowledge base or bases supporting your work, your aim is to develop that knowledge further in some way. This will generally require creative work to gain extra data, and some careful reasoning. From these, you can develop the next "levels of conclusion". Your thesis may contain one or several levels of conclusion, but each must be reasoned from previous knowledge, with or without new data.

Structuring your thesis

The structure of your thesis document is a vital part of your work. Breaking down the segments of your work appropriately has an immense effect on how you can develop your arguments, and deserves considerable attention before you start writing. Poor structure will lead to "fuzzy" boundaries when discussing points, and is frustrating to writer and reader alike. If you ever find it difficult to write a particular section, make sure it is not due to a poor thesis structure. It is a very common cause of de-motivation when trying to write!

As you write your thesis, aim to lead your reader through the document. It is often helpful to show the context or relevance of each section as you enter it, and indicate what should logically be discussed next as you finish a section. This principle holds true for the total thesis (ie. Introduction and Conclusions), for each chapter, and often for major sub-sections. Any extra information or reasoning which is not an essential part of your main argument, but is still relevant, can be included in appendices and simply referred to in your main text.

Polishing your thesis document

Your thesis is a polished document (not quite a work of art!), and largely self-contained apart from the references which support it from knowledge in public literature.

Remember, the purpose of your thesis document is give a good impression to the reader in both content and presentation. You will therefore need to check it several times for its factual material (including your skill in developing logical arguments), its editorial quality (spelling, grammar, etc.) and its presentation (layout, quality of diagrams, etc.). Getting somebody else to read through it can also be very helpful. High quality takes time; always allow plenty of time to achieve it.

Identifying further work

There is always more work to be done, whether to develop ideas further, or to confirm tentative conclusions reached in your thesis. In identifying these, you demonstrate that you can see your work in the context of developing the knowledge further. For a CEED project, it will also help the CEED Client identify ways to develop from and extend your work.



Approach to referencing

References tie your work into existing knowledge. They also provide leads for later researchers to explore the subject further. It is therefore important that references be linked appropriately and carefully into your text. There are many approaches to handling references, some more suitable than others, so choose carefully. Check with your Supervisor(s) to find out if your school has a preferred system.

Some helpful notes ("Notes on References in Technical Writing") issued by the UWA Maths and Physical Sciences Library discuss various options. Check these or some other authoritative source to help you choose a suitable method and implement it properly.

Although popular among journals (where space is at a premium), the numbering system is not always best for a thesis because it gives no immediate indication of the chronology and author of works to which you refer. One popular alternative is the Harvard (or "name-year") system which takes up more space in the text, but gives the reader useful extra information. It can be handled in several ways, offering some variety in your text. For example: "An early study (Smith and Bloggs, 1987, p. 96) showed that references in theses were useful. In two later surveys of students, Jones (1994a, p. 3; 1994b, pp. 426-28) found that nearly half preferred to omit references since it avoided recording so many names." You may then list the references alphabetically in the reference section of your thesis.

Harness the experience of others

There is a large pool of experience available to you. Your Supervisor(s) can help you make decisions on the structure of your thesis document. Discuss your ideas and concerns as soon as they arise.

Take advice also on timing to make sure you are leaving sufficient time to complete the necessary tasks. They usually take longer than you think!

Your supervisor(s) has considerable experience with theses. Harness it. As early as possible, give your supervisor(s) a fully edited "final draft" of one or two thesis chapters so that you can easily implement any resulting suggestions in the remainder of your thesis.

It is sometimes helpful to look at examples of theses from past years, but remember two important points: (a) they are not perfect, and (b) there is more than one way to present a good thesis. Do not feel bound to imitate previous theses. They may have been regarded as good despite some faults, such as being too long.

Mentor approval of thesis

Your thesis might contain information of a sensitive nature with respect to your CEED Client. Discuss this matter with your Mentor, and submit your draft thesis to your Mentor in good time. Your Mentor will need to confirm that no special arrangements are necessary for marking or processing your thesis. If necessary, you may need to get your



school to arrange for your thesis markers to sign a confidentiality Agreement. The CEED Office has a standard document available.

If you have any concerns at all about these matters, discuss them with your Supervisor(s) or the CEED Office. Do not leave it to the last minute. They can become extremely disruptive at a time when you do not need any extra distractions!



18. Planning Techniques

- Large projects can easily become intellectually unmanageable
- Breaking down the project into intellectually manageable sections is vital

Introduction

With a project lasting 16 months or longer, it is essential to make plans which are:

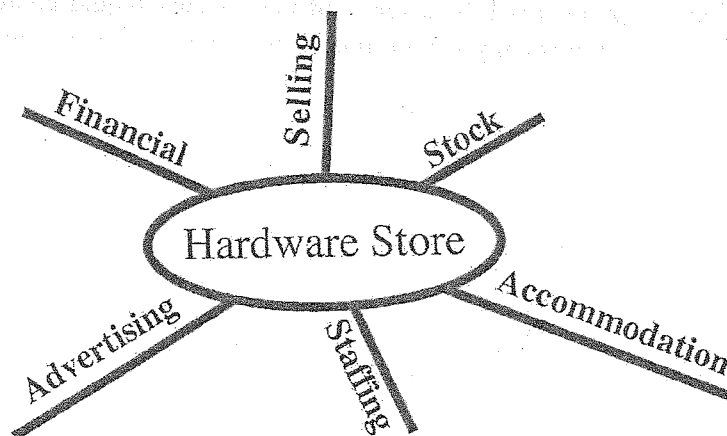
1. comprehensive (covering all areas of the project);
2. flexible (to allow for changes of emphasis, or even direction);
3. expandable (to allow parts to grow).

Before you can make any sort of detailed plans, you need to identify the areas where work will be needed. This requires a breaking down of the major topic into smaller topics.

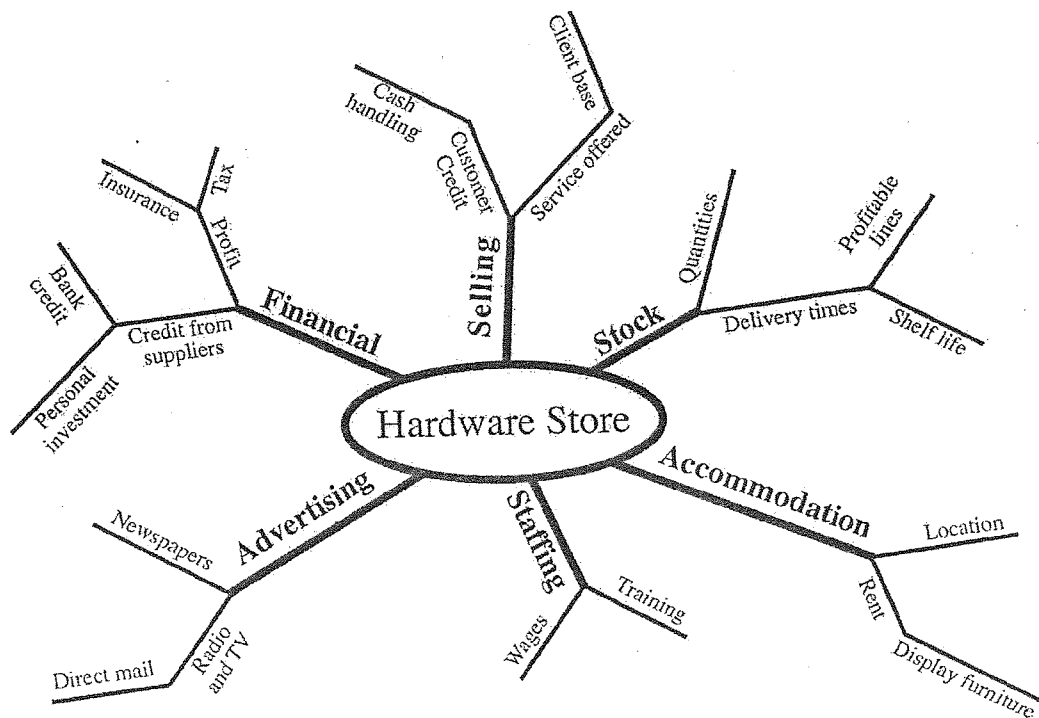
A variety of techniques is available to do this. Some people favour one method because it particularly suits their mental processes, while others find another more effective. As long as it enables you to break the problem down into sub-problems without missing anything important, it does not really matter what technique you use.

Mind mapping

One method which is often recommended is called "Mind Mapping". It is designed to take advantage of the fact that our thought processes are not in linear sequences, but much more complex. To illustrate the process, we will use an example of Operating a Hardware Store. In using the technique, first write a heading at the centre of a clean page to describe the project (in our case, a hardware store), and then identify some "key" items relating to the project (see Diagram below). Then join these to the project heading by lines indicating the areas of major concern.



Next, add items of lesser importance, where possible attaching these to an appropriate line of major concern. If necessary, further "key" items can be added. The lesser items are essentially adding detail to the major items (see diagram below).



This process can be done in rough form in the first instance as it is more important to write down your thoughts than to get everything in its best location on the diagram. When the flow of ideas has stopped, a systematic examination of the items can be done, adding new items and relocating old ones as necessary.

The end product will be a series of ideas which should greatly assist you when you start to look systematically at your project to determine what is involved.

19. Collating Information

- Information can be collated many ways, but some provide greater flexibility and long term potential
- Care should be exercised in choosing an information storage methodology

Introduction

The information needed for a project remains the same no matter what method of collating is used. The main purpose in collating is to provide a framework for storage and retrieval of information for personal use, and to make it readily available for presentation to others.

In the context of your CEED project, you have two main possibilities for structuring your information. You can either structure your system under the headings of your *activities* on the project (ie. making the project process the focus, e.g. *setting up* a hardware store), or with the *project object* as the focus (eg. the *hardware store itself*). The latter may require a bit more effort to set up, but offers advantages, especially in the longer term.

Importance of structure for creativity

Many people fear that structuring their environment (or information) will inhibit their creativity. If anything, the opposite is true, although balance is essential as in all things.

You will find it hard to think creatively if at the same time you are trying to keep in mind a whole lot of extraneous thoughts and ideas. Like computers, human brains can be slowed down or rendered much less effective if there is a multitude of loose ends around. You will be able to concentrate your creative and analytical thinking better if you are confident that other important thoughts will not be overlooked or lost. You therefore need an information system which is both accessible and reliable.

Information to collate

No matter what your project is dealing with, you will generally find you have information in the following categories (among others) for each part of the project object:

1. Literature review material, examining previous work by others (eg. for the hardware store example: previous work on stock, advertising, etc.);
2. Theoretical information on the project object, analysing what is occurring, and developing ideas to be pursued during the project (eg. choice of advertising mechanisms);
3. Design of experimental work to test your hypotheses (eg. testing effectiveness of advertising approach);



4. Historical, or diary, information outlining the options you have considered during your project, and the reasons you chose to follow one particular line of enquiry rather than others (eg. why you chose a particular advertising method);
5. Actual experimental work carried out, including any construction of test equipment (eg. how you tested advertising effects);
6. Analysis of the results of your test work (eg. what you could, and could not, conclude from your tests on advertising).

Information group	Item 1	Item 2	Item 3	Item 4
Literature review	X	X	X	X
Theoretical information	X	X	X	X
Design of Experiment	X	X	X	X
Historical records	X	X	X	X
Experimental work	X	X	X	X
Analysis of results	X	X	X	X

Project information to be collated and stored

In effect, you are listing the projects you have to do for your project, and then listing as subheadings the items upon which you will have to do the particular project. This makes your information system very dependent on the activities you expect to carry out on your project, which can lead to problems when linking with other people's work or future work. Blocks of information of the kind described above would be relevant to many different items within the project "object", and can be represented in the form of a table (see diagram above). How you lay out the table with the above information will affect the structure of your information storage and retrieval system, and its overall usefulness in the long term.

Option 1: Collating by project "activity"

When planning your project and considering the activities you will have to perform, it is tempting to categorise the project simply in terms of the work you will do. For a start, it is easy. In doing this, you may use each information category shown above as a "main heading" for grouping information, and then list each relevant item within each section as a sub-group. This would result in a structure like that shown in the diagram below.



Lit Review	Theory	Des of Exp	Experiment	Analysis
Item 1	Item 1	Item 1	Item 1	Item 1
Item 2	Item 2	Item 2	Item 2	Item 2
Item 3	Item 3	Item 3	Item 3	Item 3
Item 4	Item 4	Item 4	Item 4	Item 4

Collating by project activity

In effect, you are listing the projects you have to do for your project, and then listing as sub-headings the items upon which you will have to do the particular project. This makes your information system very dependent on the activities you expect to carry out on your project, which can lead to problems when linking with other people's work or future work.

Option 2: Collating by project "object"

The major alternative to categorizing information by your activity is to categorise by the project item, using the activities you may perform as sub-groups. This results in a structure as shown in the second diagram below.

Item 1	Item 2	Item 3	Item 4
Literature Review	Literature Review	Literature Review	Literature Review
Theory	Theory	Theory	Theory
Design of Exp.	Design of Exp.	Design of Exp.	Design of Exp.
Experiment	Experiment	Experiment	Experiment
Analysis	Analysis	Analysis	Analysis

Advantages of collating by "object"

Either of the above methods could be used, but only the second remains useful in the long term. An information system structured simply around your project activities remains operational (and useful) only for the duration of your project. If the CEED Client wishes to continue the research further after completion of your project (possibly employing you to do it), then a system committed only to the processes needed for your Honours project will no longer be useful. This is a serious limitation, especially as most "real" research continues after completion of the initial study.



No doubt you hope that your work will continue to be useful to the CEED Client after you have finished your project. Creating an information system structured around the project object can improve the likelihood of this. Several advantages emerge:

1. Being independent of your specific project activities, the information system can include later work simply by adding further sub-groups;
2. Using parts of the project object as main categories, your information system can be enlarged painlessly to include other items, studied after your project work, or even concurrently;
3. An information system grouped by objects which continue to be relevant to the CEED Client has meaning and validity long after the activities of your specific project are forgotten;
4. Your use of a comprehensive and effective information system will create a good impression of your work with the CEED Client.

The work you do for your project will be useful to the CEED Client, but if you wish to ensure its long term relevance, make sure the information you finally present to the CEED Client is in a form **they can continue to use.**



20. Grouping information with an Open Mind

- Devise information groupings without closing off options prematurely
- Finding classifications which allow you to keep an open mind takes extra effort, but produces a better result
- Careful identification of the various functions of your project object will yield enormous benefits

Introduction

Most people agree that you need to keep an open mind when seeking a solution to any sort of problem. Otherwise you may miss one or more good solutions.

In the previous section, the usefulness of an information system categorised by items of the project object was discussed. The difficulty is that your information storage and retrieval system needs to be operational very early in the project, before you have had much opportunity to decide which solutions will be best. Your information system therefore must *leave all solution options open*.

How can this be done? You need a way to categorise each aspect of the project object **without excluding any solution** - whether you have thought of it yet or not (e.g. for advertising our hardware business, we need to ensure our "category" can accommodate print, TV, direct mail, catalogue, word-of-mouth, or any other form of promotion). If you describe a part of your project object solely in terms of what it *achieves*, you can minimize the risk of channeling your thinking prematurely towards a particular solution.

Breaking down by "function"

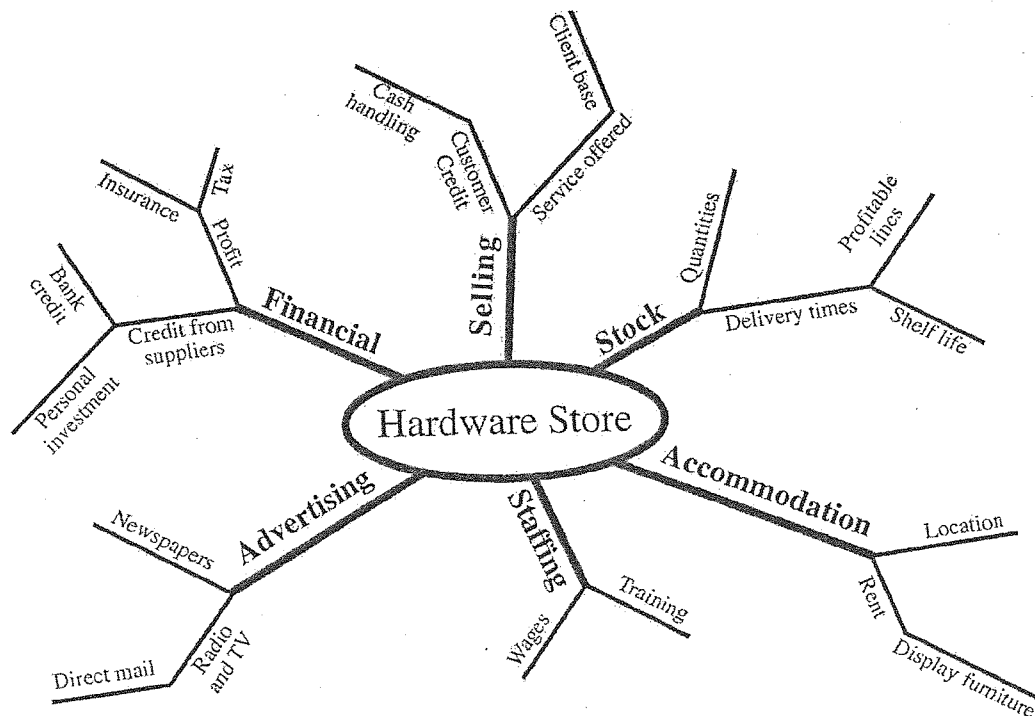
One effective way to identify groupings without accidentally specifying a particular solution is to look at the "functions" of each part of the project object (e.g. instead of making a category: "advertisements" which tends to suggest print or electronic media, we can use "inform public" which describes the function rather than any particular method we might choose).

Breaking down the project object by function demands effort, but provides a better framework for you to perform your project with proper academic rigour. It increases your ability to think "laterally" and identify solutions that other people might have missed.



Having drawn your "mind map" or similar summary of relevant points, you will need to establish which of the points already describe "functions" of the project object, and which require further analysis to identify the underlying function.

We will continue to use the example of a hardware store. Taking the "Stock" portion of the diagram as an example: we could identify the major function as "Handling stock", with sub-functions of "Scheduling orders" (to cover "Quantities" and "Delivery times"), and "Store products" (to include "Shelf life"), with "Assess potential products" (to cover "Profitable lines"). Analysis of this kind may reveal previously unidentified functions, such as "Unpacking product" which might become a sub-function of "Store product".



The above illustration should be sufficient to show how your mind map items can be translated into functions. You now have a list of functions of your project object. It probably is not yet comprehensive, but reveals much of what is involved.

Your next step is to establish proper groups of functions, and for this you will need to take an overview.

Structuring groups of functions

So far, you have used your mind map to identify functions of relevance to your project object. Now you need to structure groups of functions and sub-functions to give clear lines of demarcation, otherwise you may later have difficulty deciding where particular information needs to be stored.

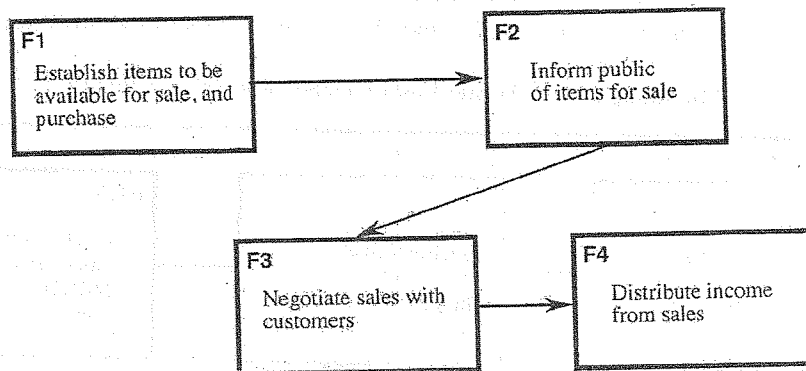
This is best done by putting aside your mind map material for a moment, and looking at the overall functions of your project object. As you take an overview, select several (say four or five) major "global" functions which together describe the function of the whole object. In the case of the hardware store, you might choose:

1. Establish which items to be available for sale;
2. Inform potential customers of items available;
3. Negotiate sales with customers;
4. Distribute income from sales.

These global or "Master Level" functions (because they embrace *all* of the objects function) will not usually match directly the functions identified from your "mind map". That is not a problem because the twin approaches will tend to bring to mind extra functions, and one of your goals at this stage is to make sure as few as possible functions are omitted.

Your Master Level functions may appear to be stating the obvious. Do not be put off by this, because you are merely looking for general groupings, much like chapter headings for a thesis. Subsequent steps will soon reveal the intricacies of the problem.

It should be reasonably clear that your choice of Master Level functions can be a bit arbitrary. Bearing in mind that the group of functions describes the whole of the project object, the precise demarcation lines drawn are of only minor importance. You can therefore choose whatever seems convenient.

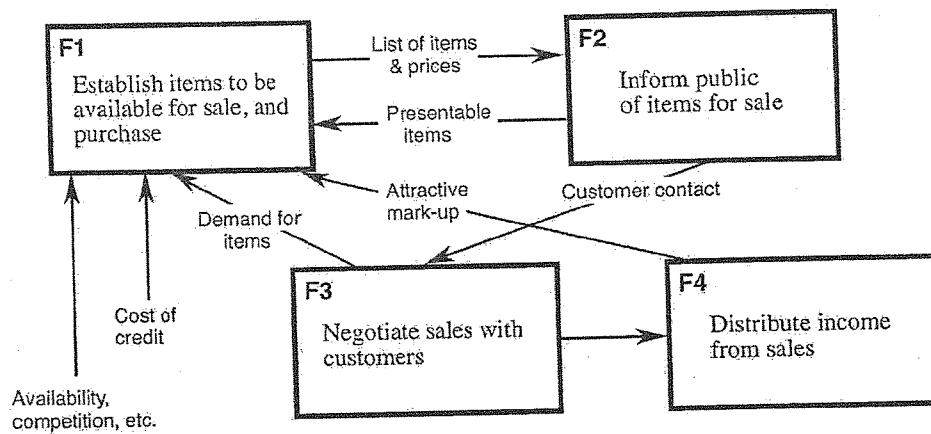


Your Master Level functions can be represented as in the block diagram above. This style of diagram can help you establish clearly your demarcation lines, and has other useful features which will be described later. The actual *orientation* of the blocks is not significant, although a "flow" of functions will probably emerge and this is often shown flowing from left to right.

Identifying interfaces and links

Master Level functions can be treated separately in their own right, however, they interact with external factors and with each other. These interactions, or links, need to be identified and recorded so they can be taken into consideration as "boundary conditions". Typically, output from one function will become input for the next, but there will usually be external influences or feed-back from later functions as well.

It is helpful to add links to your block diagram, as shown below, as it gives an increasingly clear picture of what is influenced by what, and summarises the interactions quite well.



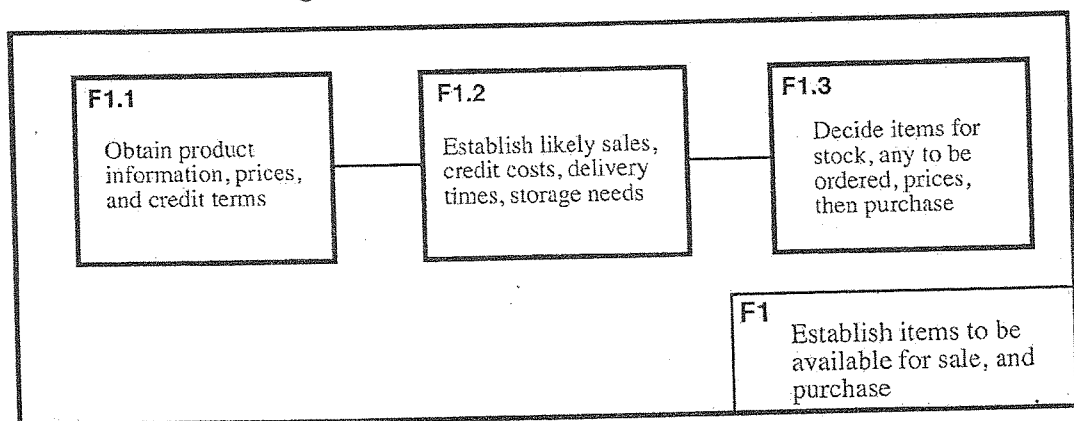
Some links affecting Master Level Functions

When identifying these interactions, *err on the side of showing excessive links*. The problems from leaving out an interaction can be great, but if you end up deciding to neglect one you listed, nothing is lost

Breaking down functions into sub-functions

The next step is to break down each of your Master Level functions into smaller sub-functions. During this stage you may find it useful to refer to your mind map functions to ensure they are all eventually included somewhere in your functional structure.

Breaking down a Master Level Function into Sub-functions



As you break down your Master Level functions, you will probably find that some mind map functions (eg. those under "Staffing") will need to be split to include parts within several functions (e.g. "Finding and training staff" may appear in all Master Level functions). This is not necessarily inefficient because it is recognising that staffing for different parts of the business may be handled differently. You are simply sub-dividing the functions under different major groups to those used in your mind map. Ultimately, your structure will contain the same information as it would with any other.

As you break down functions, links should be shown at each level of break down. It may be helpful to imagine you are briefing teams of staff, each to work on one function or sub-function. They need to know where their work affects others, and vice-versa, so they can communicate on those aspects. Omit one interface and you could have strife when the whole project is put together at the end!

As you progressively break down the functions, it is helpful to ask two questions:

1. Can every single activity of the object or function be placed logically into one of the functions identified?
2. Do the sub-functions provide sufficient flexibility to allow any "solution"?

For your CEED project, you are unlikely to be able to break down your sub-functions beyond the second or third level without prescribing a particular solution. Until you have gained the information to make informed choices on these, it may be better to halt your break-down process.

Summary of processes to break down functions

Processes to reach an appropriate break-down of your project object by function may seem unnecessarily complex and tedious, but they seek to do several things.

1. Provide you with an information structure which will remain effective throughout the project period and beyond, while you still know little about what will eventuate;
2. Allow you to take a fresh look at the project object and seek solutions to the problem you are addressing.

The basic processes suggested so far are:

1. Use a technique like "mind mapping" to gather as many ideas as you can about the project "object" without making judgments as to whether or not they are relevant. Convert as necessary your mind map items into "functions";
2. Take an independent overview of the project object to classify its overall functions into a very few categories;
3. Identify links between each function and other functions or outside constraints which affect its processes;
4. Break down each major (Master Level) function into smaller ones, using your mind map material as a checking mechanism to ensure completeness;
5. Add links to each level of break down, noting which relate to which sub-function.

The overall result is a series of block diagrams going into progressively more detail, but all of which show what external factors need to be considered when dealing with each sub-function.



21. Project Close Out

- It is important that you close out projects with your clients in a professional manner
- Deliverables must be submitted to the client within 4 weeks of the submission of your thesis
- It is good practice to arrange a final close out meeting with your mentor and supervisor. It would be logical to transfer deliverables to the client at this meeting

Introduction

In professional life, it is critical to maintain your relationships with clients and colleagues by closing out projects in a professional manner. Failing to do so can leave a poor impression, which will adversely affect your chances of working with an organization or colleague in the future. Closing out a project professionally will leave a good impression, enhancing your standing with clients and colleagues. The effect can be profound, particularly since the way you close a project will be the last impression that you leave with people.

The process of closing out a CEED project should be straightforward, merely requiring students to display the discipline to take the final steps. These steps should normally include;

- Transferring all deliverables to the client, and completing all associated activities, within 4 weeks of the submission of your final thesis.
- Arranging a close out meeting with (at least) your Mentor and Supervisor.

CEED project close out strongly influences the prospects of Clients sponsoring future projects, and directly affects the reputation of the University of Western Australia within our Clients. For these reasons, as well as your own reputation, it is critical that you close out your CEED project in a professional manner.

Deliverables

Your deliverables will have been defined in the project brief (and any subsequent amendments to the brief). All deliverables set out in the project brief (and amendments) **MUST** be transferred to the client within 4 weeks of the date that you submit your final thesis. You must also provide a copy of the deliverables to the CEED Office.

If the deliverables are satisfactory, your mentor client will sign a form stating that the deliverables have been received. When this acknowledgement is received in the CEED office, you will be able to receive your final check.



When preparing your deliverables, be sure to take the same care that you would in preparing your thesis. The deliverables represent your lasting legacy at the client organisation, and readers or users will form their impression of you based on what they see. A client may also decline to accept a document that is presented unprofessionally. Remember that each project has \$200 allocated for printing costs; this should be used to ensure that any documents provided to the client are professionally prepared.

It is essential that you adhere to the deadline for submitting your deliverables. The CEED office cannot invoice the client for the second half of the project fee until you have provided satisfactory deliverables. The CEED office will check on the status of deliverables as the deadline approaches. **If your deliverables have not been submitted by this deadline, the CEED Office will make arrangements with the relevant faculty to have your grades withheld.** This will obviously affect your graduation or future enrolment in the University.

Close Out Meeting

When completing a project, it is good practice to convene the project team for a final project meeting. This provides an opportunity for members of the team to discuss the results of the project, identify areas where the execution of the project might have been improved, and propose directions for future work.

In a CEED project, such a meeting could provide an opportunity to present your findings to a broader audience at the client organisation. It provides an ideal opportunity to present your deliverables to the client, and potentially even have them sign off on their acceptability. It provides an opportunity for your Client Mentor and Supervisor to develop their relationship, which may prove to be important for UWA and the CEED program. Perhaps most importantly, it provides an opportunity for you to thank you Client and Supervisor, and let them know where you'll be headed in the future (you never know when they may have a reason to call you to offer opportunities down the track!).

As with deliverables, it would make sense to complete this meeting within four weeks of submitting your thesis. As this meeting drifts further, its impact can be diminished, and the difficulty of arranging the meeting increases (you may have to travel for work, as may Client staff, and Christmas or school holidays can become a problem).

While close out meetings are not compulsory at this time, they are STRONGLY recommended.

Drop by the CEED Office!

As a last step, make sure you drop by the CEED office as you wrap up your project. In addition to wrapping up administrative details (like your check!), we would like to get your future contact details so that we can invite you, as CEED alumni, to attend functions such as the CEED seminar.



22. Advice from Past Students

- Those who have "been there and done that" have suggestions to pass on to you
- Their skills, experience and personalities differ from yours, so apply any suggestions with a good measure of wisdom

Introduction

The suggestions below come from past CEED students as advice they would like to have had themselves. They are grouped under various categories for convenience, and are slightly edited to avoid comments which could be confusing or counter-productive. You are welcome to view the unabridged versions held in the CEED Office.

Advice from Past Students

Communication

Make sure you talk to your mentor (a lot) to find out exactly what they want.

Deanne Renting (2001/2002)

Keep Supervisors abreast of the changes in the brief.

Anthony di Felice (98/99)

Keep your spirits up and COMMUNICATE, COMMUNICATE, COMMUNICATE!
Choose to appear "slow" rather than get into bigger problems with Mentor or Supervisor.

Katia Defendi (1996/97)

Consult your Supervisor(s) as often as possible - they can provide a wealth of knowledge

Suresh Vadnagra (1996/97)

Initiative and Perseverance

25% of your time may be spent "chasing up" things. It's your project, your responsibility.

Ryan Heng (2001/2002)

You really get stuck into a project that's yours (even if they sound boring to start with), so enjoy it! Explore!

Kenny Daubermann (2001/2002)

Nothing beats hard work!

Nicholas Yau (2001/2002)

PERSERVERE - the satisfaction and reward is worth it!.

Jason Page (2000/2001)



Learn to love your project and in that process, you will love to learn more than just your project.

Shan Goh (98/99)

The final outcome of the CEED Project normally turns out much better than you expected. Therefore, don't give in easily and get a lot of support from Supervisors, mentors and people working around you.

Kin Keong Chor (1997/98)

Put in your best effort as there is nothing more rewarding and satisfactory than succeeding.

Suresh Vadnagra (1996/97)

Make maximum use of company resources.

Craig Stannard (92/93)

Don't rely on Supervisors to help you, if you want anything you have to do it yourself. You get out of it what you put in.

Peter Phan (91/92)

Ultimately it is your project, you will have to make decisions and push people around, etc. You know more about your project than anyone else. Therefore if something is bothering you even slightly, talk to both of your Supervisors.

Tim Greville (91/92)

Guidance and Networking

Your supervisor, mentor, fellow colleagues and CEED students are doors to an infinite amount of useful information.

Kaye Lim (2001/2002)

Ask LOTS of questions if you do not FULLY understand!

Ryan Heng (2001/2002)

Get to know at least a couple of other CEED students in your area of study. Keep in contact with them during vacation work so you can support each other. This is often the hardest period.

Sarah Prout (2001/2002)

Keep in close contact with your mentor, from as early as possible.

Ze Kwan Ng (2000/2001)

Talk to your Supervisors - they are always there to help.

Julia Clapsis (98/99)



Network with other professionals in the office since your mentor may not always be available.

Anthony di Felice (98/99)

Talk to people at the company; be interested in what they do and they'll be interested in what you are doing. That's very valuable.

Philip de Vos (98/99)

Students should use the Mentor and others as much as possible. A good engineer (*CEED student*) should ask MANY questions - try to pick the brains and knowledge of others more.

Shalini Cooray (96/97)

Try to find out early on who your project is likely to help so you can get lots of advice.

Craig Stannard (92/93)

Ask questions and make contacts.

Peter Cawley (91/92)

Should anyone suggest a particular way to tackle a problem, don't just blindly follow their suggestion. Make sure you understand fully what is going on before proceeding.

Cameron Parrotte (92/93)

Get more Supervisor(s) guidance, especially at the beginning.

Rowena Cole (91/92)

If you don't feel things are going as they should, tell your academic Supervisor(s) about it! Discuss how things are going.

Dorothy Hatch (91/92)

You know more about your project than anyone else. Therefore if something is bothering you even slightly, talk to both of your Supervisors.

Tim Greville (91/92)

Planning

Start writing early as it really clarifies the project and you WILL find holes that you need to fill!

Sara Haase (2001/2002)

Be prepared for the worse and you can take everything in your stride.

Teck Hua Goh (2001/2002)

Be organised

Yvette Manolas (2001/2002)



Get organised and everything will be easy.

Brett Mannors (1997/98)

Find out who knows what in the organisation - fast. Plan in advance any financing requirements and set realistic project boundaries with your client Mentor and Academic Supervisor.

Shaun Campbell (96/97)

It's a good idea to use the DDS style of planning.

Simon Pritchard (92/93)

Make maximum use of company resources.

Craig Stannard (1992/93)

Try to identify dead ends. Arrange to get information and equipment, that may (otherwise) involve waiting, before vacation employment.

Michael Dufty (1991/92)

Project Brief

Before finalising the Project Brief, some initial research into the topic is essential to assess whether the desired outcomes are realistic.

Jason Page (2000/2001)

Clearly establish your Project Brief and revise it continually as you progress.

Anthony di Felice (98/99)

Find out what is expected from both the company and the school (faculty). Their expectations and requirements are often not the same.

Sarah Lee (98/99)

Look very closely at the project before proceeding. Even if it is a top company, top Supervisor, etc. If the proposed work is not good for a research project you will suffer later, as will other aspects of your course and self esteem - by which time it will be too late.

Johanna Kieboom (91/92)

Discuss expected result and relationship with (yourself as the) student, etc.

Rowena Cole (1991/2)

Documenting

Put everything in writing

Yvette Manolas (2001/2002)

Submit all information to Mentor in writing

Steven Richardson (2001/2002)



Document and date details of all meetings and random ideas
Always back up work (hard/soft copy)
Shawn Fernando (2001/2002)

Record details of meetings and where data/info is sourced from.
Andrew Macky (2000/2001)

Keep a good log book.
Ozan Perincek (98/99)

Document everything.
Andrew Nilsson (1997/98)

Keep an organised file
Suresh Vādnāgra (1996/97)

No matter what you do, no matter how trivial it appears at the time, **WRITE DOWN** what you have done. Explain everything and do it clearly. Having to come back in 12 months and try to remember what you have done is virtually impossible unless you have explained it or do it again.
Cameron Parrotte (1992/93)

It's a good idea to use the DDS style of planning.
Simon Pritchard (1992/93)

Scheduling & Time Management

Keep working on it through out the year.
Joshua Hii (2001/2002)

You may think you are starting your honours project early and therefore have an advantage over other honours students. But do not be deceived, you have twice the time to work on a project three times the size of other honours students' projects.
Nigel Lengkeek (2001/2002)

Work hard early.
Anthony Lamb (00/01)

Focus on completing set tasks before progressing to avoid having to re do previous work.
Aaron James (00/01)

Work hard from day one! Stress early, cruise later!!
Philip de Vos (98/99)

Work hard/panic/stress early in the project - there is always much more involved than you first think.
David Zacher (98/99)



Tasks always take longer than you think.

Julia Clapsis (98/99)

Start on the project early. I mean REALLY EARLY!!! Never let the project down for other work and come back for it. Consistent work is a MUST for CEED.

Poh Hing Foong (98/99)

Make good use of the summer vacation. You don't realise at the time what a luxury it is to be able to concentrate on your project without a million other things - assignments, lab reports etc, - to do as well.

Kathleen Shaw (98/99)

Try to finish the practical side of the project during the summer break.

Ozan Perincek(98/99)

Start your project early and try to do as much as possible during vacation work.

Alison Foo (1996/97)

Do everything you can during the Vacation. Set aside one whole day per week throughout the project.

Michael Willson (1996/97)

Start early

Suresh Vadnagra (1996/97)

Start early and include at least two months of stuffing around, in which you'll achieve nothing except getting your equipment.

Fiona Wilson (1996/97)

START EARLY!!!! It really does save headaches in the last weekend.

Jack Barnett (1996/97)

Do as much research and familiarisation as you can in the first four months as this is vital to the rest of the project. Make as many contacts as you can as they will be invaluable later on.

Irene Yung (1996/97)

Start ASAP - if it is to be, it is up to me.

Mark Azzopardi(1995/96)

Start very early

Start getting into the technical aspects (getting your hands dirty) as soon as possible, to get an idea of the project.

Paul Nolan (1991/92)



Work like a dog during the summer vacation to get a lot of it done.

Peter Phan (1991/92)

Don't get slack in 1st semester of 4th year.

Craig Stannard (1992/93)

Do not wait until 4th year to get right into it.

Clint Walker (1991/92)

Arrange to get information and equipment, that may (otherwise) involve waiting, before vacation employment.

Michael Dufty (1991/2)

Thesis

Start writing as early as possible – you feel like you never know enough to start writing during the year, but this never changes, because the more you know, the more you realise the less you know.

Sabina Fahrner (2001/2002)

Start writing your thesis early, even if you haven't got all your results, you can write up background information

Fiona Fong (2000/2001)

Write up the sections of your thesis as you complete them during the year.

Jason Page (2000/2001)

No matter how much work you're doing, make sure you have enough material to write a thesis.

Reto Meier (98/99)

Reference everything you do very well so you can find it again.

Peter Cawley (1991/92)

Extra Suggestions Resulting from CEED Student Feedback

Becoming Known on Site: It is very useful to become generally known on site. This makes life more stimulating, and can bring in some extra allies. On arriving at site (and with your Mentor's permission), try sending out a general circulation email (or similar general message) outlining very briefly who you are and what you are doing on site. You could invite anybody interested to contact you with suggestions or other matters of interest (Note: get your Mentor to check your message doesn't contain anything confidential or controversial!).

Dress on Site: Recognise that differences in "dress" can generate barriers between you and others. If you are dressed very much more formally than the other persons, you could be "classified" (rightly or wrongly) with people who may have lost their respect (or are even resented). However, if you are dressed significantly "lower" than them, you may find it hard to gain their respect.



Terminology and "Crossed Wires": Be aware that people use jargon and other terms in differing ways, and they may describe an identical thing using apparently different terms. It is wise to make sure you are talking on the same wavelength. One student had an apparent disagreement with a Mentor over several weeks before finding out that they were in fact describing much the same thing, but using different terms!

Effects of Company Morale and Politics: Do not imagine you will be unaffected by the morale and office politics of other people on site. Be prepared to bolster your own morale and motivation to offset any negative attitudes on site. If necessary, contact your Academic Supervisor(s) or the CEED Office for encouragement and advice.

Persistence: Past students have remarked that persistence, even in the face of much discouragement, paid off. They decided to remain focused on their objectives (often with much struggling) and eventually "broke through" the barriers.

Keep Your Progress in Perspective: It's common for students (and others) to underestimate what they've already achieved with their project. Don't do that! Try writing down early in your project a list of things which you believe will constitute good progress, if achieved. Then seal the list in an envelope (give it to your Supervisor(s) if you like) and open it after (say) six to eight months. You may be surprised how much you've achieved! Remember, getting experimental work set up always takes a lot longer than you'd think - that's normal!

Be Willing to Ask for Help on Site: You will not be flooded with offers of help with tedious or repetitive tasks on site! If there are simple, tedious projects to be done (be sure they do not require more knowledge or skill than you expect), ask your Mentor if anybody could help you get it done.



23. Project Completion

- CEED projects are completed when the client receives the deliverables
- It is good practice to convene a "project wrap-up" meeting with the client to hand over the deliverables, complete final discussions, and thank the client
- The client must receive the deliverables in an acceptable state within 4 weeks of the date that your academic thesis is due.

Introduction

Project completion is critical – Project is completed when the client receives your deliverables in good order, and has signed a document confirming that.

Final project payment is dependent on receipt of the form signed by the client stating that you have submitted the deliverables in good order.

Final impressions are critical – your reputation with the client and the CEED office, the reputation of the CEED Office

Easy to forget in the excitement of finishing your course – but critical.

It is good practice to convene a project wrap-up meeting with your supervisor and the client to hand-over the deliverables, complete final discussions, and thank the client staff that have assisted you. This meeting can also provide an opportunity to expedite the process of the client completing the form stating that you have provided the deliverables in good order.

CEED office will work with the faculty office to withhold your grades until such time as the client receives your deliverables – this could interfere with your graduation.

Deliverables submission

Your Academic Supervisor provides the main supervision. Input and guidance from the CEED Client is provided via a "Mentor". Your client Mentor in particular should appoint deputies to assist you when their many commitments require their absence.

Final Project Meeting

The first and most vital part of your project is the initial literature review, discussions, negotiation and planning. Results of this are encapsulated in the "Project Brief" which defines project benefit to the Client and your activities. This must be done early so you can confidently begin work on your project.

Final Project Payment and Release of Grades



Please note that we would only expect to have to arrange for the withholding of grades in the rarest of circumstances. It is a measure that we have to have available, however, in order to protect the interests of the client, the CEED program and the University. The client has provided funding to support that project, and is entitled to receive the deliverables. The reputation of the CEED program, and by extension the University, can be severely damaged if a student fails to complete their obligations in a timely manner - obviously this will adversely affect our ability to secure projects with the disappointed client in future.



Expenses This Month	
Urgent Issues	

CEED Project Monthly Report		Insert Month
Project No & Title:	16/0XX	
Client	Insert Text	
Student	Insert name	

Project progress this month
Enter Text

Issues affecting progress
Enter Text

Expected progress next month
Enter Text

Issues that may affect progress next month
Enter Text

Expenses incurred this month
\$

Total expenses incurred during the project to date
\$

Itemised list of expenses incurred this month
<p>In this box, provide an itemized list of all project expenses incurred during the month, stating the amount of each item and the reason for the expense.</p> <p>If expenses have been occurred</p> <ul style="list-style-type: none"> • attach copies of all receipts • attach a copy of the written authorization from the client covering the expenditure. <p>If no expenses have been incurred this month, simply enter "No expenses incurred this month" in this box.</p>

Signed	Date

Recipient List

- Academic Supervisor
- Client Mentor
- CEED Office (ceed@uwa.edu.au)
- Self



<Project Title>

Project Number 16/XXX

CEED Client Name

Project Summary

The project summary provides a clear, concise summary of the project. It should briefly identify the reasons for undertaking the project (with emphasis on relating those reasons to the needs of the client enterprise), the objectives of the project, and the business value realized by the client enterprise in achieving those objectives. It should then proceed to identify the methods by which the objectives will be achieved, and the total costs that may be expected (excluding the original project fee). The key deliverables must also be identified.

The length of the summary must be limited to ensure that the summary, the headings above, and the names below appear together on the cover page.

<CEED Student>

<School>, University of Western Australia

<CEED Client Mentor(s)>

<Facility>, <CEED Client Organisation>

<Academic Supervisor(s)>

<School>, University of Western Australia

<Date>

1. Project Background

1.1 Problem Statement

The problem statement describes the specific issue (or issues) to be addressed by the project. The nature of this statement will obviously vary according to the nature of the issues. For technical problems, it may be appropriate to incorporate diagrams, graphs or tables illustrating the nature of the problem. For business and financial investigations, it may be useful to present relevant financial data.

This section should also discuss the implications of the issue for the client organisation. For operational problems in a plant, this may include environmental, health and safety issues, potential production loss, or maintenance requirements. For a design problem, the project may investigate improvements that allow the Client to compete more effectively or enter a new market. For projects dealing with organisational practices, the problem may affect the efficiency or effectiveness of operations or the delivery of services. In other cases, the project may simply help the Client develop a thorough understanding of an issue, which will help guide future policy formulation or planning.

1.2 Background Information

This section should consider existing knowledge related to the issue that will affect the progress of the project. If not already covered adequately in the problem statement, this section should start by summarising the current situation of the Client.

- How is the issue presently being handled?
- What is the current understanding of the issue?

You should then proceed to discuss the history of the issue in the Client organisation or other affected stakeholders (internal and external organisations, communities).

- How has the past history influenced the current situation at the Client?
- How did the issue develop?
- Have previous attempts been made to address the issue, and, if so, how successful have those attempts been?

Tracking down and discussing this history is critical if your project is to avoid “reinventing the wheel”

You should then go on to discuss any relevant information that you have gathered through the early stages of your literature review. If there alternate technologies that are to be considered, they should be described here. If similar studies have been reported in the literature, their findings should be summarised (briefly) here.

1.3 Current and Future Client Environment

In planning a project, it is important to understand the ways in which the current environment at the Client organisation can affect the project, and can influence the motivations for undertaking the project.

- Does the client have access to a new piece of technology that can be applied to the project?
- Is there a particular group of staff available to support the project?
- Has new data become available that has not been previously been available for consideration?

- Have new motivations emerged for pursuing an issue? For example, a Client may have adopted a “carbon neutral” approach that dictates the retirement of old technology.
- Are any organisational changes expected to occur in the project time frame?

It is also critical to understand the environment in which the project’s findings and deliverables will operate, and to consider any expected changes in that environment.

- Is new equipment scheduled to come online?
- Will new data become available?
- Are plant upgrades likely?
- Could political change affect organisational policy?
- Are operations subject to fluctuations in the price of a commodity?
- Is an organisational restructure, or a change in ownership, likely to occur in the foreseeable future?
- Will client staff require additional training in order to effectively implement your recommendations?

Any expected changes should be taken into account in the formulation of the project deliverables and project brief.

As an example, in one current CEED project the objective is to provide a framework for deciding between two options. During the course of the project, it will be necessary to base that decision on assumed data (or data sourced from the literature). However, it is known that the Client organisation is establishing a new working group that will gather hard experimental data over the next several years. As a result, the decision framework should and will be designed in a way that will permit it to be re-used in conjunction with the “hard” data as it becomes available in future years.

2. Project Objectives and Benefits Analysis

2.1 Objectives

This section will describe in detail the specific objectives to be pursued by the current CEED project. The importance of each objective should be assessed in the context of the background material provided in Section 1.

Note the difference – Section 1 will define the full scope of the issue. Section 2.1 will discuss specifically what is to be addressed in this project.

2.2 Benefits Analysis

This is one of the most important elements of this (or indeed any) project brief. You must describe the business value that will be realized through the implementation of the project deliverables, taking into account the form in which those benefits will be realized by the Client.

In many cases, this will entail assessing the positive financial consequences of achieving the objectives (or, conversely, the negative consequences of failing to address the issue). In such cases, examples would include;

- Cost savings expected from an improvement in practice.
- The cost of production losses that may be incurred if the issue is not addressed

- A reduction in manufacturing costs per unit, and thus an improvement in the competitiveness of the manufactured goods.
- The impact on one or more of the client's Key Performance Measures.
- An increase in sales, market share and/or net profit.

The benefits sought will not always be exclusively financial in nature;

- An environmental, health or safety issue may need to be addressed, or an assessment may need to be made to determine whether there is an emerging EHS issue.
- By assessing current practice, a project may enable more efficient deployment of resources; as an example, for government organisations, there may not be a profit motive, but more efficient deployment of resources may help the organisation improve the delivery of services for a given budget (for example, road improvements may reduce accident rates; targeted police deployment may reduce the number of offences committed, etc).
- The provision of an accurate report may enable the formulation of equitable policies in future (for example, a review of regional aboriginal history may guide the assessment of native title claims and negotiations).

It should be noted that in many cases the benefits may be a combination of financial and non-financial benefits;

- In environmental issues, the direct benefit may be in reducing emissions to an acceptable level, but there will be ultimate financial benefit in that plant may be forced to shut due to excessive emissions.
- In safety issues, it may be essential to eliminate a safety hazard, but again there will be financial benefit in that accidents usually force plants to suspend operations at least temporarily.

In light of the current and future environment at the Client Enterprise, the project deliverables, and the associated benefits, will generally have a finite life. You should discuss the expected future life of the deliverables and benefits within the client organisation.

- Are there any specific conditions that will limit the useful life of the deliverables/ Are these conditions likely to emerge or change?
- How may the deliverables be adapted to extend their life as the client environment changes?
- Are there future changes that will enhance the benefits realized? Will the deliverables enable the client to take advantage of anticipated changes in circumstances?

3. Project Execution Plan

3.1 Methodology

This section describes the “process” by which the project objectives are to be achieved. The nature of this process will vary according to the type of project, but for all projects you should break down the project into specific tasks, and describe the approach that will be taken to accomplishing each task. It is important that you provide extensive and specific detail on the technical and logistical aspects of the planned process.

For experimental tasks, describe the experimental equipment and specific techniques that will be employed. For modelling tasks, identify the software packages and computing resources that will be used, or the platform for the development of any new software. For theoretical tasks, identify the approaches under consideration or that will be developed. For design tasks, identify the tools or

approaches to be used for each task. For literature review tasks, identify the databases/indexes and bodies of literature that will drive the review. Obviously, a single project will often include examples of each of these types of task.

For CEED projects, it is important to identify any constraints imposed on the methodology due to the needs of the Client. Examples of such constraints would include;

- The use of a specific type of test (due to the Client's need to comply with organisational or regulatory requirements)
- The use of specific modelling software (such as Finite Element or CFD packages)
- The use of specific standards (to comply with Client practice)
- The use of specific programming languages or tools (to comply with the tools available at the Client)

3.2 Project Timeline (Gantt Chart)

The project timeline describes the sequence of tasks, and the expected initiation and completion dates for each task. A graphical approach, in particular a Gantt chart, is usually the best way to describe the project timeline, and as such is required in the brief. It is important to identify the tasks that form the critical path for the project, and to take particular care in the scheduling and management of these tasks. In the text, you should provide in list or tabular form a summary of the key project milestones and dates.

You must also provide text discussing any key constraints on the proposed timeline;

- The availability of test equipment
- Lead times for expenditure approval and /or equipment delivery
- The availability of personnel to assist in data collection
- Times that a particular site can or cannot be accessed
- Absences of the Client Mentors or Academic Supervisors.
- Lead times for client approvals of publications (the conference paper and thesis).

3.3 Resources

It is important to identify the resources needed to accomplish the processes described in section 3.1. It is critical to provide a breakdown of who will be providing each resource (UWA or Client) – there's no point specifying a test that neither party is capable of doing or arranging. Be sure to discuss the plan with your mentor and supervisor, to make sure there are no misunderstandings as to the availability of equipment. You should also identify whether resources are currently in place, or whether they will be developed during the course of the project.

Provide a detailed breakdown of any costs to be incurred, including an estimate of the costs (as refined an estimate as can be made at the time of writing). Note that the client will have to agree in advance to any expenditure before it can be incurred. Also note any constraints imposed on the cost, such as any upper limit imposed on the total project budget by the client.

3.4 Risk Management

One of the most important elements of project management is to understand potential problems, or "risks", that may affect the project, and to identify "risk management" strategies to eliminate or mitigate these risks. Final year projects are subject to a variety of factors that can prevent a student

from successfully completing their project. Examples of risks that commonly affect final year projects include;

- Failure or unavailability of critical experimental equipment
- Unavailability of data or facilities at partner organisations
- Changes in the business situation of industrial partners
- Failure of a key technique to deliver the results needed to achieve the objectives.
- Extended absence of the supervisor or other key personnel.
- Delays in workshop fabrication
- Unavailability of funds to create experimental facilities
- Loss of data (through computer failure)

By recognising risks and developing risks management strategies at an early stage, students can overcome apparently catastrophic circumstances to deliver a successful thesis. Indeed, simply being aware of the risks may enable students to avoid finding themselves in the most catastrophic circumstances. Risk management approaches could include;

- Developing alternate plans or objectives in the event of equipment loss
- Identifying research paths that are not necessarily dependent on the continued cooperation of an industrial partner
- Identifying alternate techniques that may provide useful data in the event that the preferred approach does not work.
- Developing strategies to ensure security of data.

As an element of the project brief, students are required to identify and describe the risks affecting their proposed project, and to describe strategies for eliminating or mitigating these risks. For each risk, you must provide;

- A brief description of the risk
- The likelihood of the risk eventuating
- The consequences of the risk
- The management strategies to be adopted to mitigate the consequences of the risk.

In classifying the likelihood and consequences of the risk, the guide (Based on HB 436:2004 Risk Management Guidelines – companion to Australian Standard AS/NZ 4360:2004) listed in table 1 below should be followed.

Likelihood	Description
Probable	The event is expected to occur within the time frame of the project
Possible	The event is not expected to occur in the time frame of the project
Improbable	Conceivable but highly unlikely to occur during the project
Consequence	Description
Severe	Most objectives cannot be achieved
Major	Some important objectives cannot be achieved
Moderate	Some objectives affected
Minor	Minor effects that are easily remedied

Likelihood	Description
Negligible	Negligible impact on objectives

Table 1 Guidelines for classifying the likelihood and consequences of risk factors. (Based on HB 436:2004 Risk Management Guidelines – companion to Australian Standard AS/NZ 4360:2004)

3.5 Personnel and Communications

To ensure the smooth progress of the project, it is important to list in the project brief the names, positions and contact information of all personnel at the Client organisation who will be involved in supporting the project, along with the staff involved at UWA. This should be done in table form, as illustrated below.

The next step is to set out the planned schedule for meetings and reporting. You should list the frequency (eg fortnightly, monthly, quarterly) and location of any planned project meetings. If there are any requirements for periodic reporting (above and beyond the monthly reports that you are required to provide), this should be specified in this section.

Finally, you must list any specific reporting requirements for your project. Your client may require that approval be given for you to undertake certain portions of the project. For example, you may need to contact client staff, customers or stakeholders, and the client may wish to pre-approve the contact list and approve the form of the contact (such as the form of any questionnaires or surveys). The client may also need to be involved in approving the design of any experimental equipment or procedures. The project brief must list any such requirements, along with the communication protocols to be followed in each instance.

Name	Position	Phone	E-mail
Joe Bloggs	Operations Manager (Client Mentor)	(08) 9555 3555	Joe.bloggs@company.com.au
John Doe	Operator (Deputy Client Mentor)	(08) 9555 3555	jdoe@company.com.au
Dr. Jane Doe	Academic Supervisor	(08) 6488 5555	Jane.doe@uwa.edu.au
Gary Bettison or Margot Jupp	CEED Business Development Manager	(08) 6488 3130	First.Last@uwa.edu.au
Adrienne Hondros	CEED Admin Office	(08) 6488 3130	ceed@uwa.edu.au
Jeremy Leggoe	CEED Director	(08) 6488 7315	Jeremy.Leggoe@uwa.edu.au

Table 2 Key Project Personnel

3.6 Confidentiality

In many projects, the client's business interests will require that some or all of the information produced during the course of the project will need to be held confidential. It is also common for clients to require students to hold information provided by the client during the course of the project in confidence. In some CEED projects, specific contracts include clauses dictating confidentiality requirements; the standard CEED Project Agreement also includes some generic clauses related to confidentiality.

In the project brief you must define the specific confidentiality conditions and procedures for your project. This will require determining the manner in which you will meet your obligations to the Client while still meeting the requirements for assessment in your School. This section should accordingly include;

- The nature of any material to be held in confidence;
- The nature of the restrictions imposed on any publications and presentations;
- The procedures to be used for approving publications and presentations for release;
- The period over which material must be held confidential (note – some typical conditions are included in the CEED Standard Project Agreement; additional conditions may be imposed if there is a specific contract for your project).

Note that in addition to the CEED seminar, your project unit will usually require some form of public presentation – it is your responsibility to ensure that you are able to comply with the requirements of both the Client and your unit. In determining the confidentiality conditions for your project, you should inform the Client of the assessment procedures in your School; they should be aware of the materials you will be expected to submit for assessment, and the range of people that will be involved in the handling of these materials. This will help the client to plan any approval procedures.

Your unit coordinator will be able to assist if you need to arrange a confidential presentation - but you must give them enough lead time, and you must make them aware that a research agreement exists between the University and the Client (in the form of the CEED contract and the project brief) that sets out the University's obligations for handling confidential material.

If there are no confidentiality requirements, this section should still be included, and may simply state "There are no confidentiality requirements associated with the project at this time". If this situation changes during the course of the project, which is not unusual, an "Amendment to the Project Brief" can be formulated to set out any confidentiality conditions that emerge.

4. Deliverables

List the deliverables, specifying the format they are to be delivered in. The deliverables should be arranged as a bulleted list, as follows (with examples);

- Project Report – This may simply be your thesis. If so, it should be specified as such; if not, the way in which the report provided to the client differs from a conventional thesis should be described.
- Matlab Program for performing Model Calculations (to be provided on a CD-ROM)

- Manual for the Matlab Program – a text document containing comprehensive instructions for Client staff using the program.
- etc, as necessary.....

Endorsement

Student

.....

Print Name

.....

Date

.....

Client Mentor(s)

.....

Print Name(s)

.....

Date

.....

Academic Supervisor(s)

.....

Print Name(s)

.....

Date

.....

CEED Director

.....

Print Name

.....

Date

.....