CSYM023 Dissertation and module guide
# Table of Contents

## Module Introduction

**Module Guide**
- Introduction
- Draft Scheme of Work
- Assessment & Deliverable
- The Process
- M-level Dissertation
- Roles
- General

**Introduction**
- Introduction
- Selecting an area of research
- Focusing
- Research Proposal
- You and your supervisor
- Students Responsibilities
- Supervisors’ role
- Case Study
- External Activities

**Aims and Objectives**
- Introduction
- SMART
- Self Test

**Planning and sources**
- Introduction
- Planning tools
- Topic
- Use of Library
Sources 1
Use of the Internet
Electronic journals

Reviewing Literature
- Introduction
- What to do?
- Exercise 1
- What is this Literature Review?
- Finding information
- What needs to be recorded
- Bibliographic Software
- Quoting
- Exercise

Keeping Records
- Introduction
- Making Notes
- Keeping Notes
- Log book
- Record Activity

Approaches
- Introduction
- Quantitative v Qualitative Research
- Methods and Methodology
- Experimental/Empirical
- Surveys
- Action Research
- External Activities
- Selection Exercise

Collecting Data
- Introduction
- Choosing methods
- Methods of collecting data
Documentary Evidence
Experiemntal Data
Questionnaires
Interviews
Observation

Interviews
Introduction
When is it appropriate?
Question Types
What type of question
Interviews
Focus Groups
Self Test 1

Ethics
Introduction
Research Ethics
Ethics Committee

Data Interpreting and Presenting
Introduction
Interpreting and Presenting
Presenting Methods
Sample Analysis Methods
Computing Methods

Dissertation Structure
Introduction
Structure of Classic Dissertation
To be considered
Experimental-Type Dissertation
Style and voice
Appendices
Module Introduction

This module takes the form of a series of eight learning packages. The aim of the module is to provide you with the basic research skills that you require in order to successfully complete your research. You are also encouraged to read more extensively on research methods, and the books given in the reading list provide a more detailed discussion on research methods. Some of these books are available from the university libraries or purchased via the Internet, e.g., from Amazon.co.uk.

"Research is defined as seeking through methodical processes to add to one's own body of knowledge and, hopefully, to that of others, by the discovery of nontrivial facts and insights" [Sharp and Howard, 1996, p7].

Module Contents

Module Guide
Introduction
Aims and Objectives
Planning and sources
Reviewing Literature
Keeping Records
Approaches
Collecting Data
Interviews
Ethics
Data Interpreting and Presenting
Dissertation Structure
<table>
<thead>
<tr>
<th>Lesson Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Draft Scheme of Work</td>
</tr>
<tr>
<td>Assessment &amp; Deliverable</td>
</tr>
<tr>
<td>The Process</td>
</tr>
<tr>
<td>M-level Dissertation</td>
</tr>
<tr>
<td>Roles</td>
</tr>
<tr>
<td>General</td>
</tr>
</tbody>
</table>
IMPORTANT:
After the proposal has been submitted you are expected to work on the dissertation as if the proposal had been accepted.

DO NOT wait until you get the proposal back before starting work on the dissertation.
# Draft Scheme of Work

This scheme of work is indicative only. The taught sessions are designed to be flexible depending on need so there may be some movement of the sessions.

<table>
<thead>
<tr>
<th>Week</th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
</table>
| 1    | Taught: Introduction and asking the questions and aims/objectives  
Class-based Activity: Mini project – Semantic Web  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for mini project  | Class-based Activity: Mini Project  
Taught 2: External Speaker:  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for mini project  |
| 2    | Taught: Planning and sources  
Class-based Activity: Refine your proposal  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for final project  | Taught 2: Reviewing Literature  
Class-based Activity: Refining your proposal  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for final project  |
| 3    | Taught: Keeping Records  
Class-based Activity: Refine your proposal  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for final project  
- Refine proposal  | Taught: Methods and Approaches  
Class-based Activity: Refine your proposal  
External:  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for final project  
- Refine proposal  |
| 4    | Taught 1: Collecting Data and Approaches  
Independent student centred work  
- Meet potential supervisors  
- Refine your research question  
- Literature Search for final project  
- Refine proposal including a plan  | Class-based Activity:  
- Refine your proposal  
- Data Exercise  
Taught 2: Data Interpretation  
Class-based Activity: presenting data  
External:  
- Meet potential supervisors  
- Refine your research question  |
<table>
<thead>
<tr>
<th></th>
<th>Dissertation structure and own voice</th>
<th>Independent student centred work</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Class activity</td>
<td>Meet potential supervisors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refine your research question</td>
</tr>
<tr>
<td></td>
<td></td>
<td>literature Search for final project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refine proposal including a plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider the data needs of the dissertation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider the social, ethical issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider all the resource needs.</td>
</tr>
<tr>
<td>6</td>
<td>Hand in your proposal</td>
<td>presentations</td>
</tr>
<tr>
<td></td>
<td>Prepare your presentation</td>
<td></td>
</tr>
</tbody>
</table>
The module begins with a series of tutorials which help you to understand the difference between a Masters level and undergraduate level dissertation.

· As early as possible you must select a topic. Each computing tutor will outline suitable topics; you may choose one of those. Alternatively, you may choose your own topic. In either case, you must also approach a tutor requesting them to be your dissertation supervisor.

· You should discuss your chosen topic with your supervisor in order to ascertain exactly the nature of your dissertation. You should both sign a "Dissertation subject/supervisor form" and hand it in to the Module Leader.

· After a few weeks you must hand in a written proposal for your dissertation. Details of how to write your proposal will be given in the early lectures/tutorials.

· Your proposal should include a week by week plan for your dissertation; for example, in the form of a Gantt chart (there's an example on Nile).

· You should approach the librarian for help regarding the literature review aspect of your proposal and later on the dissertation. You should request an Athens username/password for accessing bibliographies and Journal papers if working outside the university campus. (One of the session you will have is with the librarian)

· You are also required to make an informal presentation of your proposal.

· Your proposal will be marked by the module leader and moderated.

· You will need to discuss with your dissertation supervisor how to contact them over the summer break. It is vital that you progress with the work week by week. It is your responsibility to manage your work including any meetings with your supervisor. You should keep a log of your progress and meetings.

· You may opt to present your work in September or in the following January. Should you wish to submit your work in January you must notify the Course Leader in writing before the end of August.

· At the end of the Module you must submit for marking the following items:
  (a) two paper copies of your dissertation,
  (b) one electronic copy of your dissertation,
  (c) one electronic copy of any software developed as part of your dissertation. The paper copies should be bound as described in the early tutorial and notes.

· Finally you must attend a “viva voce” examination. This will last around 45 minutes and usually consists of three parts: where you explain your work, demonstrate anything you have developed e.g. software, and answer a few questions on your work. The audience will consist of your supervisor, a second designated marker, and any other tutors interested in your work.

· The dissertation is independently marked by your supervisor and the second designated marker. They then meet to agree a grade.
Your dissertation topic should be chosen very carefully. It should be relevant to the subjects you have studied or pertinent to the wider topic of Internet computing. It must have an element of research.

Your dissertation may involve you: (a) attempting to prove some hypothesis or (b) attempting to solve a problem. It may not be merely a study of what others have done. It needs to have an element of your new work.

Because of the nature of your Masters degree, you will usually develop some end products (e.g. software) as integral parts of your dissertation.

You need to:
5. The role of your supervisor

Your supervisor’s responsibility is to:

· advise you on the topic of your dissertation and on available resources,
· advise you on risk assessment if appropriate,
· discuss with you the progress of your work,
· offer guidance on the structure and presentation of your dissertation,
· offer you feedback on various sections of your dissertation,
· advise you on research methodology,
· advise you on the design, implementation, testing and evaluation of any "end product",
· advise you on referencing and plagiarism,
· ensure that any external communication you wish to make concerning your dissertation is appropriate and carried out professionally,
· assist you in identifying problems,
· maintain regular supervisory contact with you,
· advise you on ethical practice within your work where appropriate,

Your supervisor will not:

· micro-manage your work;
· feedback on a full draft of your dissertation before you submit it;
· contact you if you fail to attend supervisory sessions;
· provide advice on information sources

Your responsibility as a dissertation student is to:

· agree a schedule of meetings, ensuring that the agreed schedule is adhered to and that deadlines are met;
· use this supervisory time allocated effectively;
· keep any appointments made;
· maintain a record of the supervisory meetings;
· manage the interaction with your supervisor;
· agree to act responsibly and professionally.

You should recognise that feedback will be specific to your work and relevant to the stage at which you are. Supportive comments do not necessarily indicate high performance nor is constructive criticism necessarily indicative of low performance.
The proposal structure

You will need to discuss exactly what your proposal will contain with your supervisor and module leader.

Please note that material included in your proposal may be re-used within your dissertation. However, it is important to note that your proposal has details of "what you propose to do", and of course, "why you propose to do it in a particular way". While your written dissertation has details of what you did.

Style of writing

This will be discussed during the Introductory lectures

Citing sources

You must use the Harvard standard when referencing others' work. Please see the document Harvard.doc on Nile or use the following link: http://library.northampton.ac.uk/files/guides/harvard.doc.

You might also find it useful to try the online Referencing tutorial:

http://library.northampton.ac.uk/liberation/ref/
# Introduction

## Lesson Contents

- Introduction
- Selecting an area of research
- Focusing
- Research Proposal
- You and your supervisor
- Students Responsibilities
- Supervisors' role
- Case Study
- External Activities
The purpose of this learning package is to:
- provide guidance on the selection of a research question and a working title
- provide guidance on the initial planning of your research project

This package is concerned with initial planning of a research project. The aim to provide the skills that let you and your supervisor be reasonable confidence that the area of research is viable in the time available and is appropriate to the level of study (MSc, MPhil or PhD).
You may not a choice in the particular area to research, the money for your research is for a particular area. Within this there is often some flexibility on how and what you actually look at within the area of research.

The other form is your own idea. This is often a difficult part of your research and has to begin with a carefully considered initial idea.

For either route, you **should choose to do something you are actually interested in**, this work is going to take up a lot of your time.

The idea then needs to be turned into your research question, i.e. what is it you want to find the answer to? Further questions then follow naturally from this such as:

- Can the question be answered in the period of time available?
- How and where can I obtain the information I need?
- What method should I use to gather the data?

The topic you select to research should have some originality. This does not mean it needs to be entirely original, for example. Originality can result from using already known material but with a new interpretation, or from taking a topic from the course and carrying out an extended study. The level of originality though depends on the level of the study, a PhD has to have more originality than an MSc.

If you are still unsure of the research topic, follow the steps given below:

- Initially consider a number of topics.
- Decide on the topic you wish to research. This should ideally be an area that interests you, sponsored students may have a topic imposed on them by their employer.
- Do some initial reading sufficient to give an indication that there is enough available information to allow you to continue.
- Decide on the initial research question.
- Talk to your supervisor.
- Think about your question and then give it precise focus. Carry out further reading if required.
- Arrive at a working title.
Let us assume you are interested in finding out if using the internet leads to more efficient industries. The initial research question may then be: Does using the internet lead to more efficient industries?

From which a working title can be formed, such as: “Improvements in industry by the use of the internet”

At first sight this appears to be an interesting area of study, but now consider the title against the following questions:

1. What industry are to be considered? Does this apply to all industries?
2. How is the data on efficiency to be obtained? From published data? By surveying companies?
3. How long will it take to gather the data and complete the research?

Other questions can also be posed, but consideration of those above is adequate to show that the selected topic is a very broad area of research that will require a considerable amount of time and effort to complete. We can conclude therefore that in its present form it is not a suitable MSc research topic.

Some focus could be given by considering only one industry and the effects on using the internet. Even then, it may be difficult to determine any conclusive link between the introduction of the internet and efficiencies that have occurred.

Further focusing may be required in order to be reasonably sure that the dissertation can be successfully completed to the required standard and in the time available.

It is apparent that focusing makes you consider not only the research question, but also the method(s) you will use to gather data and the time required for completing the dissertation.
The next logical step is to draw up your initial plan for the research. It should include:

☐ A working title based on the research question.

☐ A brief discussion of the main problem you wish to solve. This will include the aim and objectives of the study and address the secondary questions that follow from the selected research question.

☐ A brief description of the method, or methods, you intend using to gather the data you require to answer the research question.

☐ An action plan in the form of a Gantt chart.

☐ Your thoughts on the main problems that you anticipate encountering during your research and how these might be overcome.

☐ Initial references.

Using the procedures in this package select an initial research question and then give it focus to arrive at the final question and hence a working title.

If you have already decided on a research question then check it for focus and decide on a working title.

Having decided on a research question and working title do you think that you could complete the dissertation in the period June to September?
Once you have a supervisor they are the first portal of call. If you are unsure of anything to do with the dissertation they are who you ask first.

Do I have to agree with what the supervisor says? No, they can only advise it is your dissertation. BUT (and it is a very big but) you need a very good reason to go against advice. The ideal is the supervisor and the dissertation student can talk about the dissertation work and agree after a discussion on the way forward. An MSc student should be able to discuss the dissertation, be an independent researcher and therefore appropriately argue their case for the direction of the work.

Do I have to meet my supervisor regularly?

Yes. Past experience (and your supervisors are experienced) suggest those that meet regularly with the supervisors are likely to have greater success. Your supervisors can not help if you don’t keep in contact and meet.

My supervisors did not tell me what I had to do and when!

They are not meant to. You are in charge of managing the work not the supervisor.
Taken from the University's Dissertation Policy

To:

• agree a schedule of meetings,
• ensuring that the agreed schedule is adhered to and deadlines met,
• use supervisory time allocated effectively, manage tutorial time effectively by preparing for the tutorial in advance,
• keep appointments which have been arranged,
• maintain a record of supervisory meetings,
• agree to act responsibly and professionally when on fieldwork,
• understand the regulations with regard to plagiarism,
• take advantage of University support mechanisms (see appendixA.4),
• make use of NUPAD guidance and documentation to plan and monitor progress of the dissertation,
• to maximise the benefit of tutorial support, and to implement agreed action for development,
• recognise their ethical responsibilities.” (UoN 2007 pp 4)
Taken from the University's Dissertation Policy
To advise on:
- the topic of the dissertation and on resources
- risk assessment, where appropriate
- methodologies
- referencing / plagiarism
- ethical practice, as appropriate
- information sources, including NUPAD material, to support planning, monitoring and progress of the dissertation
- structure and presentation of the dissertation

To discuss progress on the dissertation
To offer feedback on partial versions of the dissertation
To assist the student in identifying problems/issues and suggest/agree specific action to address these
To maintain regular supervisory contact
To contact any student who fails to attend supervisory sessions
To advise the student on dissertations which are considered exemplars of good practice.” (UoN, 2007 pp.5)
Case Study - Semantic Web

You need to answer these two tasks

<table>
<thead>
<tr>
<th>Activity</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is the Semantic Web?</td>
</tr>
<tr>
<td>2</td>
<td>Create a plan for a project that uses the semantic web.</td>
</tr>
</tbody>
</table>
For each question, indicate the correct answer by placing a mark in the column to the left.

**Question 1**

**Have you meet your potential supervisors**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Question 2**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Question 3**

**Have you completed the literature review for the case study?**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Note: Answers appear on the next page.
### Answer 1

**Have you meet your potential supervisors**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
<td>Yes</td>
</tr>
<tr>
<td>✗</td>
<td>No</td>
</tr>
</tbody>
</table>

**Correct Answer Feedback:** Good.

### Answer 2

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
<td>Yes</td>
</tr>
<tr>
<td>✗</td>
<td>No</td>
</tr>
</tbody>
</table>

**Correct Answer Feedback:** Good, but keep at it.

### Answer 3

**Have you completed the literature review for the case study?**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
<td>Yes</td>
</tr>
<tr>
<td>✗</td>
<td>No</td>
</tr>
</tbody>
</table>

**Correct Answer Feedback:** What did you learn about doing this? What tools did you use?
## Aims and Objectives

### Lesson Contents

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SMART</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Self Test</strong></td>
<td></td>
</tr>
</tbody>
</table>
Your dissertation and proposal both must have an aim and a set of objectives.

<table>
<thead>
<tr>
<th>Element</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim</td>
<td>A single general statement outlining the dissertation.</td>
</tr>
<tr>
<td>Objectives</td>
<td>All objectives must be SMART</td>
</tr>
</tbody>
</table>
## Topic: SMART

All objectives must be SMART

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
<th>Questions to ask yourself</th>
</tr>
</thead>
</table>
| Specific  | Need to be precise about what you are going to achieve. Use verbs such as build, conduct, develop, design, etc. | • What exactly are we going to do?  
• Who are going to involve?  
• What strategies will be used?  
• Is the objective well understood?  
• Is their a clear outcome?  
• Will this objective lead to results wanted? |
| Measurable| How are you going to measure the objective? If you can't measure it how do you know you have achieved it? | • Can the objective be measured?  
• Does the measurement have relevance to the outcome? |
| Achievable| Can it be done? If the objective is not achievable or is too big, you will find it difficult (or impossible) to achieve. An objective should provide motivation. | • Can we get it done in time available?  
• What are the limits?  
• Can we do this with the resources available?  
• Is this possible? |
| Realistic | Can it be done in the time you have and the resources available to you. This does NOT mean easy! | • Do you have the resources available to achieve?  
• Can this objective be achieved? |
| Timely    | When the objective be achieved, be specific. Set realistic deadlines when will this objective be completed? Is the deadline stated? | |

Each objective should match the criteria for all of these.
As an example objectives modified from a real project
To have delivered a minimum of six sessions of a particular funded project, to 120 students by March 2011?
The project is to deliver to at least six sessions (Specific) to 120 students (this with the six sessions is measurable). You make the judgement about how realistic and achievable it is. It also has a specified time limit (Timely).

Can you refine this?
Now please do the following
(i) Set a single aim for your research.
(ii) Set three objectives for your research.
(iii) When parts (i) and (ii) 'swap' your aim and objectives with another member of the group for their comment.
(iv) Things for the consider as the reviewer:
Are the objectives SMART
Does the aim give a general overview of the research to be done?
From the aim and the objective can you see
• How the projects will be achieved?
• When will the objectives be met?
• Is the project realistic and achievable?
• Can you see how the success of the objectives will be measured?
• Is that measure appropriate?
(v) When task (iv) is completed give your feedback and suggestions to the person who set the aim and objective for their consideration.
(vi) Make any changes to your objectives and aim you feel are appropriate and swap them with a different person in the group and repeat (iii) and (iv).

Answer for this question can be written in the space provided below.
# Planning and sources

## Lesson Contents

<table>
<thead>
<tr>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Planning tools</td>
</tr>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>Use of Library</td>
</tr>
<tr>
<td>Sources 1</td>
</tr>
<tr>
<td>Use of the Internet</td>
</tr>
<tr>
<td>Electronic journals</td>
</tr>
</tbody>
</table>
Here is a summary of things that you should consider when carrying out a literature search.

1. **Select a topic**: This is a relatively obvious starting point. You may, however, have several options in mind for a research topic, and select the most appropriate one dependent on preliminary reading.

2. **Define the terminology**: Think clearly about what you mean to achieve from your research topic. Set yourself targets, and think about the context in which your research is set.

3. **Define parameters**: Set yourself parameters in the area of your research. E.g. what is the time period of the study (1990 to the present day) or what sector (internet applications in the leisure industry).

4. **List possibly related sources**: Think about possible alternatives to finding information on your chosen topic. For example, you may find information on lift fire damage under building fire damage, or fire brigade reports etc.

5. **Select sources**: Use a subject-based approach with the terms selected above. Make a note of library classifications and indexes, as you may well find related information in this subject area. One source of reference will invariably result in a ‘cascade’ to produce further useful sources.
We are going to look at some software tools that can be used to help structure and plan your work.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mind maps</td>
<td>Mind map software allow you organize thoughts, brainstorming ideas or list making into a desirable mind map diagram. As Mind mapping diagram is useful because it represent words, ideas, tasks, or other items linked to and arranged around a central key word or idea. Plus more, Mind maps are used to generate, visualize, structure, and classify ideas, and as an aid in study. Examples can be found at: <a href="http://bubbl.us">http://bubbl.us</a> <a href="https://bubbl.us/beta/">https://bubbl.us/beta/</a> <a href="http://www.mapul.com/#">http://www.mapul.com/#</a> <a href="http://www.techmixer.com/free-online-mind-mapping-to-draw-mind-map-diagram/">http://www.techmixer.com/free-online-mind-mapping-to-draw-mind-map-diagram/</a></td>
</tr>
</tbody>
</table>
You can use activity diagrams/networks to help with planning when activities need to be done. A useful free download is QSEE lite (http://www.leedsmet.ac.uk/qsee/complete.htm) which was several different tools.
start and finish dates of the task.
A downloadable free piece of software can be found at: http://www.ganttproject.biz/
This software was used to produce the chart above.
Spreadsheet packages can be used to do this as well.
Some of the pitfalls of just going to the library and see what happens are highlighted on the website([http://www.allenandunwin.com/estudy/research.asp#research](http://www.allenandunwin.com/estudy/research.asp#research)) though it was written for undergraduate students, some of the pitfalls and advice is the same. The main bits of advice being:

- If in doubt ask the library staff for help;
- Get to know the layout of the library, for example where the books and journals likely to use and where the photocopiers are.

Carrying large numbers of books from two floors up several times can get a bit tiring;

- Set the goal of why you are going into the library. Know why you are going into the library on this day. It is easy to get distracted,

if you find something that might be an interesting later in the research, make a note of it for another time.

- Set realistic time limits for how longer you are going to stay in there.
- Accept your probably never going to 100%, no question, full knowledge of everything that has been published. This can lead to 'Well, I not sure I have enough to start'. Start the literature review, and change if necessary, later.
These aHaving selected a topic, defined the terminology and parameters, and selected appropriate search terms, you are in a position to begin looking for materials. Here is a brief summary of possible sources of information:

1 Books
A useful tool is the British National Bibliography (BNB) or National equivalent for those outside the U.K., which should be available in most public libraries. It lists all books available, as well as some government publications. The index may give you some idea of other related terms you have not thought of. Most libraries also have a computerised catalogue that you can use when searching.

2 Journals and Articles
Should be your main source of information. For more specific and recent material, you should consult appropriate journals. The library may have some electronic means of searching for a particular journal or article, or you may have to consult the index.

Most journals publish a complete index for the year. An ever increasing amount of journals are available on the Internet.

3 Databases
Many specific databases relating to journals and abstracts can be found on the Internet. Some of these are free and others you must pay to gain access. Many are subscribed to by UoN learning resources, e.g. the 'Web of Science' and you should contact the Faculty of Applied Sciences librarian, or the help desk for more information of what is available and how to gain access. They will also be able to assist you with finding information for your research topic, and with the loan of books and journals from other libraries (inter-library loans). Go to their web site at http://www.northampton.ac.uk/lrs/index.html for more details.

4 Theses and dissertations
Theses are a useful tool to see what work has been done, or is currently being done in your subject. An index and abstract is generally available in academic libraries (either electronic or printed). Some theses are available for inter-library loan, and some may not be released. This depends on the confidentiality of information contained in the thesis.

The above list of reference sources is far from exhaustive, and you may well find other useful information in places such as manufacturers’ catalogues, internal company data sheets, externally produced reports and papers etc.

The key really is to try and locate as much relevant material as you can within the time allowed, but not to be too ambitious. You will always want to obtain more information, but must resist the temptation at the expense of depriving other areas of your dissertation work.
Like the libraries because of the vast amount of information that is available on-line the use of the internet has it is positive and negative aspects.

For an internet computing it had see how you got here without using search engines, so we will not discuss how to use them. The problem with these is the amount of information produced and the reliability of the information. Anyone can produce a webpage and the information is not always reviewed by anybody (more so than journals and books) so is not necessarily correct. The sheer amount of information can be a problem.

As an experiment, try this URL for internet computing research

http://www.google.co.uk/search?hl=en&q=internet+computing+research&meta=

At the time of writing this had about 15 500 000 results, so many to work through.

So suggestions of how to use them:

- Starting with the more obvious change the search to be more specific. For example instead of just internet computing research, make it more specific by looking for exact phrases "internet computing research"

(http://www.google.co.uk/search?hl=en&q=%22internet+computing+research%22&meta=) which reduced it down to 178 results.

- Aim to mainly use sites for identifiable sources.
- Aim to sites specific you believe to be respectable.
A lot of electronic journals are now available. Libraries often have electronic sources (http://library.northampton.ac.uk/databases/index.php?view=az) for searching through them. Sometimes these need a specific username to get access, so you would need to talk to the library staff.
# Reviewing Literature

## Lesson Contents

<table>
<thead>
<tr>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>What to do?</td>
</tr>
<tr>
<td>Exercise 1</td>
</tr>
<tr>
<td>What is this Literature Review?</td>
</tr>
<tr>
<td>Finding information</td>
</tr>
<tr>
<td>What needs to be recorded</td>
</tr>
<tr>
<td>Bibliographic Software</td>
</tr>
<tr>
<td>Quoting</td>
</tr>
<tr>
<td>Exercise</td>
</tr>
</tbody>
</table>
Any piece of research, irrespective of its method or scale, will involve reading about what other people have already written or discovered about this area. This information will be used to support or refute your own findings and thoughts on the subject. Whilst, for small-scale research, you will not be required to produce a definitive account of all of the material and research for your chosen topic, you will need to demonstrate that you have a grasp of the current state of knowledge.

Ideally, the majority of your reading and literature searching should be in the early stages of your period of research. In practice, however, a number of activities are usually 'on the go' at any one time, and your literature searching and reviewing may spill over into other areas of your research proposal outline. You need to take care that reading does not take up more time than you have allowed. It is rarely possible to obtain all the sources of material you require, at the time when you want them, so you will inevitably have to re-organise your plans while you are waiting.
Reading as much material as time allows about your research topic may give you plenty of ideas on how best to approach your research. It may also give you ideas about how you could classify and present the information you gather. You may even decide to gather some data of your own for analysis.

It is not sufficient for your research to merely present and describe information and facts that you find. You must organise information into a coherent pattern, and provide a rational discussion of your own thoughts given your findings.

As you read:

- you must begin to get into the habit of critically analysing what other people have presented on your research topic.
- You will also begin to see relationships to other issues.

This will give you some ideas on how to organise your own research and are essential skills for an MSc Dissertation / Research Student.
Ok, let's work through some material on referencing.
We are going to look:
  • Why we reference?
  • How we reference?
  • How to be construct a reference?
  • How do we use references with in the text?

http://www.glomaker.org/samples/GLOMaker_Ref_books/GLO_Player.html
For the dissertation, you are required to undertake a literature review. The purpose of this review is for you to investigate what information already exists on your particular chosen topic. It is should be more than merely a ‘list’ or ‘account’ of the sources of information that you have consulted. It should demonstrate that you have studied existing works in your field of interest, and have appraised them with some critical insight.

**Writing a good literature review can be a demanding process!** It should provide the reader, albeit in a succinct form, with the context in which the research is being undertaken – why are you doing this and what has already been done.

It should include:
- the current state of knowledge
- major questions in the field of interest;
- some of your own thoughts and ideas, backed-up by the sources referred to.

It is a common error to just put down a list of this person said this, etc. It should be a lot more giving the reader a sense of what you think and how it relates to your work.

There are many good sources of guidance into critically reviewing literature, and discussion of the ‘literature review’ process invariably occurs in all books on research methods and techniques. Take a look at some of the recommended books on the book list for this module, and you will be able to find some examples.
We will come back to this topic later in the module. Just to start with, here are some key points.

In order to proceed with your literature review, it follows that you must begin by locating information regarding your chosen subject. If you are given a topic to investigate, then you may also be given a preliminary list of reference sources. If you have chosen your own topic, you will need to find out for yourself what has been published in your field, even if time only permits you to read a selection of books and articles.

Whatever your topic, it is important that you consider the following key points:

1. Try to find the most relevant published materials as quickly as you can. Remember, the bulk of your reading should come at the beginning of your dissertation studies.
2. Avoid getting too bogged down. The literature review only forms a part of your dissertation. It will not be possible in the time period for you to read everything written on your chosen topic. Try to be selective.
3. Get into the habit of recording and categorising information found during your reading, so that it may be more easily used at a later date. (We will discuss this later)
### What needs to be recorded

Whichever referencing system you choose (more on this later), you will always need to record the following details of sources:

**Books**
- Author’s surname, forename or initials
- Date of publication
- Title (underlined)
- Place of publication
- Name of publisher
- Your Comments and Notes

**Journals:**
- Author(s)
- Title of journal
- Volume number
- Date of issue
- Page numbers
- Publisher
- ISSN Number
- Your Comments

For articles in collections (i.e. in a book):
- Author/editor
- Date
- Title of book
- Place of publication
- Name of publisher
- Page numbers
- Your Comments
There are software alternatives (and some feel more appropriate) to the card index that does the same thing.

The first and simplest is to set up your own database or spreadsheet to store them. Alternatively there are specialist software that do this but will also link the reference into a Word document (e.g. your dissertation). EndNote is a widely used commercial package. There are alternative opensource (i.e free) package such as Bibus available. Have a look at the following URL it contains a comparison of various types

You may wish to use direct quotations in your dissertation in order to illustrate a point, or to add an extra dimension to an argument. It is important that you make an accurate and full copy of any potential quotation you wish to use, including full details of the source from which it came. Quoted material should be presented as in the 'referencing guide' included, and any words that have been left out must be made clear to the reader. The source of the quote must be suitably acknowledged.
With your dissertation idea in mind. Now have a go at the following tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Find three references that relate to your dissertation idea.</td>
</tr>
<tr>
<td>2</td>
<td>Using the references found during task 1, write a 250-500 word summary (not including the reference list) Add the reference list (using Harvard Referencing) as well at the end.</td>
</tr>
<tr>
<td>3</td>
<td>Now post your summary on your University web area.</td>
</tr>
</tbody>
</table>
# Keeping Records

## Lesson Contents

<table>
<thead>
<tr>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Making Notes</td>
</tr>
<tr>
<td>Keeping Notes</td>
</tr>
<tr>
<td>Log book</td>
</tr>
<tr>
<td>Record Activity</td>
</tr>
</tbody>
</table>
An essential part of the research process is keeping accurate records and notes of your findings. Throughout your research you will inevitably make reference to many sources of information, and may also gather data for analysis. It is important that all through this research you keep an accurate and workable record of all of this information in order to be able to carry out later analysis or refer to, and produce the final dissertation write-up.

Here are two simple examples of why keeping accurate records is so important:

1. You may discard information, which you wish to use later. This could be information, which, at the time, may seem unimportant to you may later prove just what you need. Without clear and consistent record keeping, you may never find your way back to this source.

2. You may be unable to use a source of information on which you have made incomplete or unclear notes. This could have been a useful source, but you cannot be used in the dissertation if you have not recorded the author and publication details. You may then have to spend many hours trying to locate the original source.

There a few ‘golden rules’ to help you keep track of this valuable information – all of which are relatively common sense!
The amount of note making you do, and the form it takes will depend on your research topic. An analytical topic may require that you record vast amounts of data using a computer, whereas a literature-based topic may require no ‘data’ but reference to many books and journals.

Whatever your topic, you should aim to keep your notes as brief as possible without losing the detail of what you are trying to record.

Ending up with vast reams of notes may prove of little value when you come to organise them for your write-up. If you have a relatively clear idea of your research topic before starting, then you may be able to take fewer notes.

If you judge that you may need a particular source at a later date, but not at present, then you need only record a bare outline of its details.
The first decision that you must make is whether to keep notes in hard-copy or in electronic format. You may decide to keep them in both formats. There are merits with both methods, which you must carefully assess, however, a good format is in a loose-leaf file. In this way, you can begin to organise information into sections, and form cross-references between related items. Whatever approach you adopt, it is a good idea to develop your own system and to remain consistent. Here are a few ideas for good practice:

- Use headings to group facts and ideas in a meaningful way.
- Use a numbering or indexing system.
- Use underlining or highlighters to emphasise key points.
- Use abbreviations (but remember what they mean).
- Use spacers and dividers to categorise information.
- **Always record the source of information.**

You may also wish to keep and index photocopies or electronic copies of information (pages from books, journals etc). Remember to observe any copyright legislation, and to keep an accurate note of the information source.
Keeping a log book is good practice. In the logbook you should record all activities relating to your research project – and the dates on which these were carried out e.g. dates of visits and interviews, basic findings of reading, questions and ideas, random thoughts if you wish etc. Such a document provides a useful chronological record of the progress of your research.

This can enable both you and your research supervisor to monitor your research progress, and also forms part of the assessment process. Mostly it is for you to keep track of your project though.

The format of the logbook may be:

- A loose-leaf folder;
- A notebook;
- A page-per-day diary;
- A box-file with everything in it;
- Some people do it all electronically.

The important point is you must record what you do. You can bet that the piece of information you did not record is the one you need.
Open following URLs
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.61.1053&rep=rep1&type=pdf
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.61.1053&rep=rep1&type=pdf
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.83.430&rep=rep1&type=pdf

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>For each using the Harvard Referencing system. Write a reference for each of these. After each of these write a short summary of each one (each should be no more that 250 words)</td>
</tr>
<tr>
<td>2</td>
<td>Taking of these write a note on how some part of this could be implemented.</td>
</tr>
</tbody>
</table>
# Approaches

## Lesson Contents

<table>
<thead>
<tr>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative v Qualitative Research</td>
</tr>
<tr>
<td>Methods and Methodology</td>
</tr>
<tr>
<td>Experimental/Empirical</td>
</tr>
<tr>
<td>Surveys</td>
</tr>
<tr>
<td>Action Research</td>
</tr>
<tr>
<td>External Activities</td>
</tr>
<tr>
<td>Selection Exercise</td>
</tr>
</tbody>
</table>
This learning package aims to make you aware of the various research methods available to researchers and hence to enable you to select a method or methods suitable for your area of research. Finding any textbooks that deal specifically with research methods in technology based subjects is difficult. However, this is of no great concern since the methodology of research is well established and documented in other disciplines such as the social sciences and education. Although a great deal of philosophical debate takes place regarding the exact meanings to be attached the various research methods, all is intended in this learning package is to create an awareness of the general methods that are appropriate to the discipline of technology-based subjects and present them in a straightforward manner.
These are the two broad research categories with which you should become familiar. As indicated above, there is much philosophical debate regarding the exact nature of qualitative and quantitative research. Whilst beyond the scope in great detail here, it is a debate which you should explore out of personal interest.

Quantitative research is objective and concerned with gathering factual data, usually in numeric form, and its analysis.

Qualitative research, on the other hand, is subjective in nature and concerned with gathering data in the form of opinions, perceptions and experiences. The data is generally non-numeric. The distinctions can be illustrated by considering the performance of a website.

- Data could be collected over a period of time and analysed in terms of number of people visiting the website. As long as the performance is determined in a factual manner the research is clearly quantitative. This should be clearly stated in the aims and objectives should be clearly stated at the outset. - However, if you form opinions on the performance based on what people think then this is subjective analysis, which is associated with qualitative research. - An alternative method would be to survey the visitors over the same period of time seeking their opinions on the performance of the site. The data and its analysis are subjective, even if you attach numbers to the data for the purpose of grouping and categorising passenger responses. This is clearly qualitative research.

Ok, now it gets complicated. In computing research you often have to do a bit of both. You might have to usability of a product (subjective therefore, qualitative) but in the same dissertation you might have been collecting factual information as well.
The examples above indicate some methods that can be used to gather data in technology-based areas.

To solve the problem a method or methods of gathering data is required. For the purpose of this course the term methodology may be taken to mean the system of methods used. You should however be aware that methodology does have a broader philosophical meaning.

The research methods appropriate to computing or computer engineering and their main characteristics are outlined below.
Experiments are tests or investigations designed to provide evidence for or against a hypothesis. They may be carried out in a laboratory or as fieldwork. With laboratory experiments the hypothesis is often expressed as an objective and the report includes method, results, analysis and conclusion. The experiment may be concerned with establishing how one physical quantity \( y \) varies as another physical quantity \( x \) is independently varied. Hence, \( y \) is referred to a dependent variable and \( x \) as an independent variable. The basic experiment to determine how current changes with changes in resistance illustrates these points. If the voltage applied to a variable resistor is maintained constant then current \( I \) can only change if the value of resistance \( R \) is changed and so \( I \) is a dependent variable and \( R \) an independent variable. This basic example also reveals something further regarding the experimental conditions, because resistance is also dependent on temperature and so the temperature must be accounted for during the experiment. It follows that for experimental design great care is needed in identifying all the conditions imposed on the system and controlling/measuring them so as to eliminate erroneous or misleading results.

In the social sciences experiments are usually concerned with a comparison between two groups of people where independent variables are manipulated. Again, care is required in establishing and controlling the experimental conditions particularly with regard to the selection of sample groups.
Surveys are concerned with the collection of information. The information may be obtained in a number of ways:

- From a group of people.
- Observation of events, e.g. from observing the number of persons using a website in a given period of time, what features the use and don’t use.
- From literature or documents.

The first two types involve some fieldwork whereas the third type is essentially deskwork.

Surveys have the specific advantages that they can be carried out both relatively quickly and at relatively low cost. Furthermore the data obtained can be easily expressed in numeric form and hence can be analysed statistically.
Action research is applied research and is well suited to those who wish to carry out research at their place of work. It is problem-focused research in a particular context that aims to bring about improvements in working practice. The key point about action research is the person doing the research is not an outside expert conducting experiments on subjects, but are co-workers doing research with and for the people considered. The researcher is part of the research. It is an iterative process the results from each cycle feed into the next cycle. As an example if you were looking at how web design implement designs, the first cycle would involve looking how designs and implementing and thinking about problems raised. The next cycles would involve take the problems raised in the last cycle and then implemented changes, and then observe the how designs are implemented. The goal being to improve the practice of designing web pages.
For each question, indicate the correct answer by placing a mark in the column to the left.

**Question 1**

<table>
<thead>
<tr>
<th>Have you meet potential supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select the correct answer.</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Note: Answers appear on the next page.
### Answer 1

**Have you met potential supervisors**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Now it is time to practice making informed choices. If you have a dissertation idea use this, if you do not have yet the dissertation idea is "Using the semantic web as to a tool for improving a website's page ranking"
You can change your mind later. Please discuss and share ideas on these activities in groups.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name four approaches. With the dissertation idea in mind, produce a table stating the advantages and disadvantages of each for the dissertation idea.</td>
</tr>
<tr>
<td>2</td>
<td>Based on the table produce above make a justified argument for the approach to be used.</td>
</tr>
</tbody>
</table>
## Lesson Contents

<table>
<thead>
<tr>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choosing methods</td>
</tr>
<tr>
<td>Methods of collecting data</td>
</tr>
<tr>
<td>Documentary Evidence</td>
</tr>
<tr>
<td>Experimental Data</td>
</tr>
<tr>
<td>Questionnaires</td>
</tr>
<tr>
<td>Interviews</td>
</tr>
<tr>
<td>Observation</td>
</tr>
</tbody>
</table>
Whatever topic you choose for your research, this will inevitably involve the collection and analysis of data of some form or another. For example, your research may be involved with the collection and critical appraisal of literary information, or with the gathering and analysis of raw data. In this learning package we shall consider a variety of different sources of data, and some key points to their collection. We shall not, at this stage, look at how to analyse, interpret or present data – which will be covered in the next learning package.
The method or methods by which you select to perform your research will largely determine the method by which data collection and analysis will be undertaken. The essence of effective research is asking the right questions. The questions that you intend to answer through your research will influence your selection of methodology, and hence your methods of data collection and analysis. Here is a brief recap of some of ‘questioning’ and ‘research’ approaches you may decide to take.

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive or Theory Testing</td>
<td>This is often the first stage in the research process, and is sometimes called ‘exploratory research’. The questions asked here are generally broad or vague – such as “What is going on with the lifts in this building?” An entire project might be based on descriptive or exploratory research, and end with a plan for further research.</td>
</tr>
<tr>
<td>Pure and Applied Research</td>
<td>Some kind of research projects will involve finding things out (pure research) Others will involve the application of what is found out, or the making of recommendations for action (applied research). Look at your project and decide which category it falls into.</td>
</tr>
<tr>
<td>Testing a Hypothesis</td>
<td>For some research, rather than asking questions, we may wish to make statements that can be tested. These statements are commonly referred to as ‘hypotheses’. This type of research process is referred to as ‘hypothesis testing’, and researchers often set about proving or disproving a hypothesis by testing it. E.g. If the accident rate on lifts has fallen then this must be due to improved safety standards.</td>
</tr>
</tbody>
</table>

Before we proceed to a discussion of some actual techniques for collection of data, you should recap on the broad research methodologies which they fall under. You will be able to find a more detailed explanation of each of these in Learning Package LP2, and in the research books on the recommended reading list for this module.
The methods by which you decide to gather data for your research project and dissertation may be many and varied, but will generally fall into one or more of the following categories:

- Documentary evidence or data
- Experimental data
- Questionnaires
- Interviews
- Observation

Let us look briefly at each of these categories. You will be able to find much greater detail of these in the research books on the recommended reading list, which you should study.
For your research project you will be expected to show some analysis of documentary evidence. This may be the core of your research, or may be used to supplement information that you gain from other sources. It is a particularly useful technique where access to the subject of your research is difficult. But what is meant by documentary evidence? In addition to locating and analysing the usual books and journal articles etc., other sources such as films, videos and electronic sources such as the Internet can be classified as ‘documentary evidence’. Documents can be divided into two main groups – primary and secondary.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Description and Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>These are sources which came a hand’ such as the minutes of a meeting, or data, questionnaire.</td>
</tr>
<tr>
<td>Secondary</td>
<td>These are accounts or interpretations of primary sources e.g. an analysis of the minutes of the meetings, or an analysis of questionnaire data.</td>
</tr>
<tr>
<td>Tertiary</td>
<td>‘Third hand’, and essentially an account of previous accounts.</td>
</tr>
</tbody>
</table>

Try to identify the type of source from which you are researching.

Documentary evidence may also contain numbers as well as words, and so its analysis may be qualitative or quantitative. Whatever the sources of information used, you must remember that it is important to obtain a good representation of information from as many writers on the subject as you can. Analysis and presentation of information from documentary sources must also be more than a simple account, and so must be done critically. You must also acknowledge all sources of material used in your research.
You may decide that you wish to carry out some experimental work, and the gathering and analysing of the data which you obtain. You may also find that the raw data that you require is already available, and only requires analysis. Remember that any experimental work must be backed-up by suitable and sufficient reading and research of the research topic.

One technique of experimental research is to take an active set and a control set and to form a comparison between these. Another is to simply gather raw data from an experiment or exercise. Whatever techniques you choose for gathering and analysing data, remember not to get too bogged-down. The amount of data you obtain, and the complexity of its analysis must be chosen to suit both the requirements and time constraints of your research project.
Questionnaires are another way in which you may decide to gather data and information. You will first need to decide the purpose of the questionnaire, the kind of questions you wish to ask, and how you intend to analyse the results. A great deal of care must be taken with their design and administration, and you will be able to find suitable guidance in most research methods books. A range of different techniques exists for the type and style of questions that you can set. Be careful with wording, and don’t make the questionnaire unnecessarily long or complicated. You should also be aware of ethical issues when designing questionnaires, and the nature of your intended audience.

The questionnaire should always be piloted before final issue. The data which you gather may be analysed using both quantitative and qualitative techniques, depending on the types of question you set. We shall take a more detailed look at analysis and presentation of results in a later learning package. In general, the response (return rate) to questionnaires may be somewhat poor and disappointing, and you must plan a contingency into your research project should this occur. An alternative to actually setting and administering questionnaires is to analyse data already obtained by someone else through a questionnaire. Vast amounts of data sets are now freely available, or available at a suitable cost from various research council data archives and other sources. You will, of course, not be able to set your own questions – but have to use the ones already set. This is worth investigation!
Another means by which you may decide to gain information is through interviews. Again, you need to decide what information you wish to find out, what questions to ask, and how you will analyse and present findings and results. There are a few key guidelines which you should follow when carrying out interviews, all of which are discussed in detail in research methods books.

Interviews may be structured, where you prepare and ask a set of questions (rather like a questionnaire), or unstructured where the interviewee may speak more openly. You should decide which approach to take, in light of how you will later analyse your findings. It is always a good idea to pilot your interview questions before 'going live'. Make sure that you clear all the necessary channels, book an appointment for the interview, arrive on time, and keep within a specified time limit. The interview may be recorded by taking appropriate notes (structured in the form of a grid, or unstructured), or by using a tape recorder, with appropriate permission of the interviewee. You should, if appropriate, check the accuracy of the facts that you have recorded with the interviewee before publication, and also respect their right for anonymity if requested.

Remember that interviews are time consuming. They have to be setup and then undertaken and the results have to be carefully recorded and analysed. Gaining access, and arranging a mutually agreeable time with a busy interviewee may prove to be a problem. If the interview was taped, then you may require this transcribing for analysis, adding more time and expense. They may, however, provide a clearer response than a questionnaire, as a particular issue can be clarified and developed as required.

See Next Learning Package for further detail
Another way in which information may be gathered is by observing and recording what is actually going on. This technique will most likely not be applicable to your research project, and is quite difficult to undertake. Planning is again the key. Decide what information you wish to find out, how you propose to undertake this, and if this is really the most appropriate method.

A suitable method has to be devised (possibly the use of a grid or the like) for recording the activity being observed e.g. the actions of passengers when waiting for lift service at a landing, or discussions at a project team meeting. A pilot study and any revision is always a good idea before the actual event. After the data has been collected, it has to be collated and analysed. There are again ethical issues to consider when observing and reporting people’s behaviour. The presence of an observer may influence the actions of those being observed in some way, and so the results may not be entirely natural.
## Course: CSYM023

### Lesson Contents

- Introduction
- When is it appropriate?
- Question Types
- What type of question
- Interviews
- Focus Groups
- Self Test 1
Interviews vary in style based on how structured the interview is. 
Taking the definitions from Robson C (2002):
□ Fully Structured Interviews: Questions worked out beforehand very fixed in a very fixed order in the main.
□ Semi-Structured Interviews: Questions are worked out beforehand but the order of the them, or whether to include particular questions is altered by the interviewer based on what happens with a particular interviewee. The actual wording is sometimes changed depending what happens with a particular interviewee.
□ Unstructured Interviews: The interview has a general area but lets the conversation develop. It can be formal or informally done.
When is it appropriate?

If a study focuses on finding what a particular item means to a particular person, group or organization.
When you need to find out how things have been done before, finding out how particular changes events will effect the participants.
After new system has been in place and you want to find out how it is working out. When you want to measure effects of the new system, clarify problems or validate that the measures or working.
<table>
<thead>
<tr>
<th>Question Type</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>Closed questions force an interviewee to choose from a list of fixed alternatives.</td>
</tr>
<tr>
<td>Open</td>
<td>Open questions are those provide very loose restrictions on the content of the reply. The only real restriction is the reply has be about the subject the interview focuses on. These are common used in interviews. These have the advantage of being flexible; can lead more depth understandings; can encourage better co-operation; get unexpected answers. Some people argue you can get a more ‘accurate’ response. The disadvantages are mainly they can more difficult to analyse or the interviewer loses control.</td>
</tr>
<tr>
<td>Scale</td>
<td>These are those questions that measure degrees of agreements. The design can vary some people use a five-point scale, which means there is a middle value. There is a belief that people prefer to select the middle value if given a choice. Some researchers use a four scale to force people to agree or disagree.</td>
</tr>
</tbody>
</table>
For each question, indicate the correct answer by placing a mark in the column to the left.

<table>
<thead>
<tr>
<th>Question 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of questions are multiple choice questions in general?</td>
</tr>
</tbody>
</table>

Select the correct answer.

- Closed
- Open
- Scale

<table>
<thead>
<tr>
<th>Question 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of Questions is “Describe what you think of the internet?”</td>
</tr>
</tbody>
</table>

Select the correct answer.

- Closed
- Open
- Scale

<table>
<thead>
<tr>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of question is the following: “What did you think of the session circle the appropraite number Poor 1 2 3 4 5 Excellent”</td>
</tr>
</tbody>
</table>

Select the correct answer.

- Closed
- Open
- Scale
Note: Answers appear on the next page.
### Answer 1

**What type of questions are multiple choice questions in general?**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Closed</td>
</tr>
<tr>
<td>✗</td>
<td>Open</td>
</tr>
<tr>
<td>✗</td>
<td>Scale</td>
</tr>
</tbody>
</table>

**Correct Answer Feedback:** Correct

### Answer 2

**What type of Questions is “Describe what you think of the internet?”**

Select the correct answer.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>Closed</td>
</tr>
<tr>
<td>✓</td>
<td>Open</td>
</tr>
<tr>
<td>✗</td>
<td>Scale</td>
</tr>
</tbody>
</table>

**Correct Answer Feedback:** Correct, it is open to the respondent to reply with as little or as much information as they want.

### Answer 3

**What type of question is the following:**

“What did you think of the session circle the appropriate number

Poor 1  2  3  4  5 Excellent”

Select the correct answer.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
</tr>
<tr>
<td>Open</td>
</tr>
</tbody>
</table>
Scale
### Interview Types

<table>
<thead>
<tr>
<th>Interview Types</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured</td>
<td>These are similar to questionnaires and surveys. These are the easiest to analyse of the interview types. The interviewer has control do to the inflexibility of the type.</td>
</tr>
<tr>
<td>Semi-structured</td>
<td>This type has a certain amount of flexibility. The interviewer still has their question list and the topics that need to be covered. The flexibility is the interview has flexibility to alter the order of the questions and wording used. It is a bit like an actor improvising they may a list but it is up to them how it is used and all that matters is getting the information. It is usual though to have some structured elements. A lot of interviews will use structured questioning when they are after some types of information and more open questions for other types. As an example a market researcher might have basic set of structured questions, depending on the answer go to more open questions to pull out the answers.</td>
</tr>
<tr>
<td>Unstructured</td>
<td>These can be open-ended and in-depth. In this type of interview there is a lot of flexibility, but the role of the interviewer is a little different they have guide the interviewee. Telephone interviews can often be of these types.</td>
</tr>
</tbody>
</table>
Here is the confusing bit, they do not be in a group, they can be one-to-one (but one-to-one of several individuals in a group). In terms of structure these can be any of the above. Focus groups are meant to get a group to ‘focus’ on specific topic. Usually these are open-ended discussions and usually not quick to collect the responses. The interviewer role is to guide the discussion. These are efficient methods as the amount of data collected from several people simultaneously increases the quantity of the data. Group dynamic can help to focus the topic, and enable shared views to be seen. Not an expensive method and participants can be stimulated by the comments of others.

There are disadvantages though. Number of questions has be very limited and to be effective the researcher needs to be skilled. Bias is a potential problem, as those with strong ‘personalities’ can dominate.

Confidentiality is limited by the group nature.
Now you have work through the material now consider question types, interview and focus groups. (You don't have to use the space provided below to answer the following questions)

1. For each of these think of an example of how they could be used successfully in your dissertation work.
2. Now consider the three you are most likely to use and state advantages and disadvantages.

Answer for this question can be written in the space provided below.
# Ethics

## Lesson Contents

<table>
<thead>
<tr>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Research Ethics</td>
</tr>
<tr>
<td>Ethics Committee</td>
</tr>
</tbody>
</table>
The following dictionary definitions provide a useful stating point when considering the meaning of ethics:

“1. (usu. treated as sing.) The science of morals in human conduct; moral philosophy. 2 a (treated as pl) moral principles; rules of conduct 
b (often treated as pl.) a set of these (medical ethics)” [The concise Oxford Dictionary]

From these definitions it is clear that ethics is about moral values and codes of behaviour. All professional bodies have their own code of professional conduct, which determines the expected moral values and codes of behaviour within the profession. The engineering institutions, in addition to their code of professional conduct, also issue a series of guides that provide information on the recommended procedure to be adopted in areas of work related to the profession. If you are a member of a professional body obtain a copy of their code of professional conduct.
Whether you carry out qualitative research or quantitative research you will be concerned with gathering data, which will then be analysed and presented in the final report.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
<th>Help to avoid problems/ issues to consider.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plagarism</td>
<td>the direct copying of work by others and presenting it as your own whether intentionally or not, and the need to acknowledge and correctly reference all direct quotations used in your reports.</td>
<td>Correct referencing (using the harvard system). The University has an NILE module called UNPAC aim to help. From the Library Lieration (<a href="http://library.northampton.ac.uk/liberation/">http://library.northampton.ac.uk/liberation/</a>)</td>
</tr>
<tr>
<td>Confidentiality</td>
<td>If you intend to gather data from companies or from individuals you must seek their permission and explain the purpose for which it is to be used.</td>
<td>Any agreement reached on the use of the materials must be observed and the provider of the data may require evidence of this. If you use data that is already published make sure that it is correctly identified and referenced in your report. There is a further problem here with the sponsors of the project are the organisation your using as a case study. What do you do if your research results raise points that would potentially be detrimental to the organisation. They are sponsoring you, but your results that have to be seen by people outside the organisation. There is a conflict of interest. What do you do?</td>
</tr>
<tr>
<td>Anonymity</td>
<td>This follows from confidentiality, e.g. if a company or individual supplying data wishes to remain anonymous.</td>
<td>How do you present the data so that they cannot be identified?</td>
</tr>
<tr>
<td>Informed Consent</td>
<td>In research that involves others participating in your research. The participants must be fully informed about the research project before they agree to take part. Defining what informed consent means is difficult, but from a practical point of view we</td>
<td>Your research might include uncovering peoples person view on how the internet is used within their organizations. So a potential participant might have questions that need to be answered before taking part such as: - Will my organization find out what I said? - How will the data produced be used? - Will the information be published? - Can I pull out of the research at anytime? If so</td>
</tr>
</tbody>
</table>

Course: CSYM023
have design the consent to include any information the participant is likely to need to decided whether to take part or not.

<table>
<thead>
<tr>
<th>Professionalism</th>
<th>The means working according to laid down code of professional conduct and presenting your report in a manner that adheres to the generally agreed standards for the engineering profession. Following directly from this point, the way the research is carried out and data is gathered and presented in your report needs to be honest and free from ambiguity.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hence any form of fraud is unacceptable. Plagiarism has already been mentioned and to this can be added, amongst others, forging of data and obfuscation, which is to make something obscure. Obscurity can result from a long-winded approach and the inclusion of unnecessary material such as lengthy mathematics where a simple solution would be more appropriate. A specific contribution by others to your dissertation must also be clearly identified and acknowledged. One final and important point is that you must write your dissertation</td>
</tr>
</tbody>
</table>

At all stages ethical issues may arise and so your research should follow a generally acceptable code of research behaviour. You must also be aware of the ethical issues during the planning stages of your research.
Most institutions (including University of Northampton) have established ethical policies on how research is conducted and what needs to be considered for the research to be ethical. This includes any type of research carried. Part of this is a formal committee to monitor ethical issues in research activity.

Though their role is in part to disseminate good practice and establish ethical policy, a lot of their work is reviewing research proposals to ensure ethical issues are considered and addressed. As an example, if your research was concerned with finding how school children use web-pages to aid learning, this research has several ethical issues such as:

- How can a child give informed consent?
- Can a specific child be identified from the data?
- Can a child be harmed by the research?
- Does the researcher need to have a CRB check?

Generally, if you have any doubts that there is an ethical problem that you want advice, you should ask advice from the ethics committee.

Ethical committees usually have the power to veto a research proposal, but usually they make recommendations to improve the research design. If you are involved in research with the National Health Service involving patients, it might have to be referred to the local NHS ethics panel for approval as well.
Data Interpreting and Presenting

Lesson Contents

Introduction
Interpreting and Presenting
Presenting Methods
Sample Analysis Methods
Computing Methods
Data collection, by whatever methods you choose, means very little until it is analysed, evaluated and presented in a suitable format. Gathering vast amounts of information in the hope that some useful information will emerge is certainly not recommended for the type and timescale of study which you are undertaking. This will also make the analysis more complex and time consuming. You must, therefore, decide what the restrictions are for your research topic, and gather both the quality and quantity of information and data that can be readily analysed, interpreted and presented.

In most ‘short timescale’ projects it will be sufficient to only analyse data in a relatively simple way. If your methods of data collection are well devised and you have adopted a system, then the task of analysis and interpretation will be all the more simpler.

One important point to note is that of generalisation. With a relatively small-scale project, care must be taken not to claim more than the information you have gathered warrants. Equal care must also be taken not to attempt generalisations based on an insufficient amount of data e.g. based on the results of 10 interviews, it is claimed that lift maintenance is unnecessary.
The methods by which you choose to analyse, interpret and present the information that you gather during your research will largely depend on the topic you have chosen, and the methods you select for collection. The key, as always, is not to be too ambitious. This also relates to the amount (and possibly quality) of information you gather. Too little information will not be sufficient to support your argument, and you are in danger of generalising based on ‘insufficient information’. Too much information, and the task of analysis will become too much, or too complex to achieve. It is important to remember that simply evaluating and presenting the information (e.g. collating responses to a questionnaire, and presenting as graphs) is not sufficient – there must also be some (critical) interpretation of your findings.

You will be able to find ample reference and examples of different techniques for analysing and presenting information in the research methods books on the reading list for this module. Depending on your research topic and chosen framework (e.g. literature searches, experimental research, questionnaires, interviews etc), some of these references will be more appropriate than others. Try to, at least, have some idea of how you are going to analyse and present (not forgetting interpret) your information before you start collecting it. Your ideas may well change, but at least this will give you some guidance as to what you should be collecting.
## Presenting Methods

<table>
<thead>
<tr>
<th>Methods</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lists</td>
<td>Lists are a simple way of collating and presenting information. They may also be used for simple analysis (e.g. most important first in list, then descending order). Numbers may be placed against each item in the list – and a graph produced if appropriate.</td>
</tr>
<tr>
<td>Categorisation</td>
<td>Another way of grouping and analysing data is to put it into categories (e.g. age ranges or number of a particular type of lift breakdown etc.). Results may be presented in a table, or as a graph.</td>
</tr>
<tr>
<td>Grids/Tables</td>
<td>Grids and Tables may be used to show ‘one-dimensional’ data or perform some simple correlation between data (e.g. types of lift breakdown against lift usage). Again, results may be presented in tabular or graphical form.</td>
</tr>
<tr>
<td>Scales</td>
<td>Scales are generally used to give some discrete measure of a particular item (e.g. in a questionnaire – rate lift performance from 1 (good) to 6 (poor)). There are many different types of scale that can be used, so consult the research methods books. Findings can again be presented in tabular or graphical form.</td>
</tr>
<tr>
<td>Graphs</td>
<td>Graphs are a good way of analysing and presenting data. Be careful, however, not to include them just for the sake of it, and make sure that they are clear to understand.</td>
</tr>
</tbody>
</table>
## Sample Analysis Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>Correlation techniques may be used to look for links between concepts (e.g. how lift accidents have reduced through new standards). Generally, you will chose to prove or disprove a hypothesis, and to investigate the measure of correlation. There are various mathematical methods and other techniques that can be used for this type of analysis, and these can be found in the research books.</td>
</tr>
<tr>
<td>Inference</td>
<td>Inference techniques may be used to make some prediction of something with a certain degree of confidence based on a limited amount of information (e.g. the overall occurrence of lock faults on all UK lifts based on a sample of 100).</td>
</tr>
</tbody>
</table>

These are only a few of the techniques that are available.

If your topic demands experimental work, then you may well choose to use far more complex mathematical techniques. The key is not to attempt complex techniques if you do not have the expertise to cope! If your research is entirely literature based, you may still use appropriate techniques to categorise and present your findings. Within your final dissertation, a summary of your findings is quite sufficient – you should, if appropriate, include examples of the ways in which gathered your data (experimental method and results, sample questionnaires etc.). Finally, remember that you must also critically interpret the information you collect. It is not sufficient, for example, to simply gather data and plot a graph. You must critically interpret the meaning of this graph in light of other information that you have obtained.

7.3 Use of Software Packages
The analysis and presentation of data lends itself to the use of a computer and software packages. You should be able to carry out all of the analysis and presentation of your data using a spreadsheet, such as Excel. With all spreadsheet software you can tabulate data and very easily produce graphs for inclusion into your dissertation. It is possible with most packages to perform quite a complex level of analysis.

Should you wish to analyse more complex, or a larger amount of data, then specialist statistical software packages (such as SPSS) are available. For mathematical analysis of experimental work you may also choose packages such as MatLab or MathCAD. Remember, however, that the time available for your whole research project is limited, and that getting to grips with a new and unfamiliar piece of software is often time consuming.
Dissertation Structure

Lesson Contents

- Introduction
- Structure of Classic Dissertation
- To be considered
- Experimental-Type Dissertation
- Style and voice
- Appendices
Introduction
This is the final learning package and deals with the structure, format, presentation and writing of the dissertation. You will recall that at the weekend schools and throughout the course we have encouraged you to adopt a particular style of writing and presenting your assignment work. This package reinforces those procedures already covered in detail and offers further ideas for drafting and writing the dissertation.
As discussed before there is a classical dissertation structure, and we have encouraged you to follow this as closely as possible for your key assignments. This structure is shown below.

- Title page
- List of contents
- Abstract
- Introduction (approx. 10%)
- Literature review (approx. 20%)
- Methodology (approx. 15%)
- Presentation and analysis of data (approx. 25%)
- Comments and critique of outcomes or findings (approx. 20%)
- Conclusions (10%)
- References

To comply with university regulations the dissertation will be approximately 12 000 words. The word count includes all words in the dissertation. The structure shown is not set in stone so that variations are acceptable. However, the elements contained in the classical structure must be present in whatever structure you decide to adopt and you must adhere to the word limit.
The dissertation must be word-processed and all pages, diagrams, tables and figures prepared using suitable software and appropriately numbered. Take care to set the page layout, margins, font, etc on your computer before you start processing. Select a font that is easy to read, those with serifs are generally easier to read than those without - Times New Roman, as used in this document, has serifs whereas the Helvetica font does not. The following are requirements:

- 25 mm margins
- double spaced lines
- single sided printing
- 12 point font size

Remember that consistency of layout and format is paramount. If abbreviations and acronyms are to be extensively used throughout the report then the first time the name is introduced it must be abbreviated and thereafter the abbreviation used, e.g University of Northampton (UoN) when introduced and UCN thereafter. If there are numerous abbreviations and acronyms then a list should be included after the contents page(s).

### Title

The layout of the title page is as follows:

<table>
<thead>
<tr>
<th>Element</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Quality Assurance in Internet Engineering by M. Mouse BSc Submission date: 15 August 2010 A dissertation submitted in partial fulfilment of the requirements of the degree of Master of Science in Computing at University of Northampton</td>
</tr>
</tbody>
</table>

### Abstract

"The function of the abstract or executive summary is to summarize briefly the nature of your research project, its context, how it was carried out, and what its major findings are." (Blaxter, L. et al 1996, p238) UoN requires the length of the abstract to be approximately 200 words. Abstracts have the following uses: 
- provide potential readers with a quick overview of the dissertation 
- help the writer to focus and structure or restructure the report 
In the latter case it may be useful to start draft the abstract before the dissertation is completed.

### Drafting

Drafting and writing begins as soon as you start to collect data. It follows therefore that there will be a number drafts and revisions before you arrive at the final document. Although approaches to writing depend very much on the individuals concerned, it is a good idea to write up as you gather information. Editing will then take place as more information is gathered and to take account of the word limit and to link the sections of the dissertation together. The following points should also be considered. 
- If you encounter difficulty in starting to write then try writing the introduction to the dissertation. Although you will have to redraft this a number of times it should help you to focus your thoughts with regard to the collecting of data and other relevant information. 
- Writing blocks may occur at any time. If this happens process any information you have gathered just to try and remove the
Sometimes when writing the ideas just flow. Unfortunately the problem you may then encounter is that of lack of time to complete the section you are writing. When this happens leave clear pointers to the next topic you wish to introduce, perhaps by writing the start of the next sentence or by a series of bullet points so it is relatively easy to recommence writing.

### Non-discriminatory language
You must use non-discriminatory language throughout your dissertation. The basic principle involved is writing in such a way that is does not denigrate or excluded particular groups of people on the basis of what may be fairly arbitrary characteristics, such as sex, age, race, religion, physical and mental abilities or sexual orientation. (Blaxter et al 1996, p. 224)

### Heading and sub-headings
The classical dissertation style suggests a limited number of main headings. Care is needed with sub-headings and the numbering of headings and sub-headings should be avoided. You are writing an academic dissertation where clause and sub clauses are important for reference purposes. If you use sub-headings it must make the text more accessible, not turn it into a directory of short paragraphs with no coherent flow of ideas. If your essay is coherent, with one part relating to another, building to a conclusion, then you will not need many sub-headings. (Barnes 1995, p. 84)

### Referencing and Quoting
References appear in the text as a signal that evidence in the form of books or papers exists and can be found elsewhere if the reader wishes to pursue this avenue. Quotations are verbatim, that is, given in the exact words of the writer and included in the text so that the readers do not have to hunt for them. (Barnes 1995, p. 74)

The Referencing Guide to the Harvard System of referencing is available on the University's website ([http://library.northampton.ac.uk/files/guides/harvard.doc](http://library.northampton.ac.uk/files/guides/harvard.doc)) and should be rigorously adhered to.
There can be modification to this classic dissertation structure. An example of which is shown here for experimental dissertations. An example structure is shown below.

- Title page
- List of contents
- Abstract
- Introduction
- Literature review
- Experiment
  - Methodology
  - Presentation and analysis of data
  - Comments and critique of outcomes or findings, ideally that lead to the next set of experiments
- Conclusions
- References

The Experiment section may be repeated several times.

To comply with university regulations the dissertation will be approximately 12,000 words.

The word count includes all words in the dissertation. The structure shown is not set in stone so that variations are acceptable. However, the elements contained in the classical structure must be present in whatever structure you decide to adopt and you must adhere to the word limit.

You must discuss the structure of dissertation with your supervisor.
As we have already indicated you should not wait until you have gathered all the information and data you think you require before you commence writing the dissertation. However, you must remember that the final dissertation will be an account of what you have done why you did it and what you found out. It is usual to use the third person and passive voice.

Does it have to be an interesting read? As far as possible it should be whilst keeping the language formal – this should be a piece of professional quality work.
Appendices are used for material that is not vital enough to be included in the main part of the dissertation. So let us look at some example cases.

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>You would include all the code you produced in an appendix (as well as on CD/DVD) and use extracts with the main dissertation. Talk to your supervisor if you are unsure.</td>
</tr>
<tr>
<td>Extra Theory</td>
<td>If you have some theory or background information that you would be useful to the reader but not vital you might consider this as an appendix. Talk to your supervisor if you are unsure.</td>
</tr>
<tr>
<td>Example Questionnaires and Results</td>
<td>A further use is you can create and appendix contain all or a sample questionnaires or results. You should illustrative examples in the main text. Talk to your supervisor if you are unsure.</td>
</tr>
</tbody>
</table>