1 Introduction

The importance of undertaking your research using the two skills of reading and writing cannot be overemphasised; the two go hand in hand.

It was pointed out in Preparing for Research, Section 3.5, that the reading process occupies the majority of your time in the initial stages.

Reading is important because it:

- develops your knowledge of the subject and your research in general terms
- ensures that you have an up-to-date picture of the current state of knowledge in the topic in which you are interested
- helps you to identify the gaps in knowledge that your research will address.

As a reminder, having practised and developed your information literacy skills (see the advice in the Course Guide, Section 6 of Part A and Section 1.3 of Part B in particular, and the course website), you should now be familiar with:

- how to locate literature sources
- the use of libraries
- the use of websites
- searching literature databases using keywords
- how to locate journals and reports
- the use of abstracts.

2 Literature reviews: their importance

As a colleague and fellow supervisor once stated: ‘I don’t really need you to tell me what Professor Porter thinks, since I can read that for myself, but I do want to know what you think about what Professor Porter thinks’.

Literature reviews should be more than a mere description of what has been written by other people in a particular field. They should serve the aims of identifying the practical problem or issue in its widest possible context, and of refining your research problem and research questions (or hypothesis if you use one).

Research is continuous, so a literature review can never be entirely finished, though in the context of T802 it is limited by the time you have available to complete your dissertation. The essence of a professional approach is continued learning. This means keeping up with current work in a particular subject area (how would you like to be treated by a dentist who had not bothered to keep up with the latest developments in dentistry?) and as this work continues unabated, you will contribute to it yourself.

The importance of a literature search cannot be overemphasised. Your research problem or issue is of course your primary research, but your secondary research – the literature review – should be carried out no less diligently. Even more importantly, it must be recognised that the literature review is an essential precursor to the primary investigation because the need for your primary research can only be properly established in the light of a review of existing knowledge. The gap in knowledge that your research will fill only emerges as a result of the literature review. Perhaps counter-intuitively based on the terminology, therefore, secondary research needs to come before primary research.
2.1 What’s the research problem or issue?

In T802, a great deal of emphasis is placed upon the importance of undertaking a literature search and providing a review of the relevant sources. In spite of this, examiners are frequently disappointed by the literature review section of the dissertation. This is not usually because the student has failed to find the relevant authorities, though this happens sometimes; it is more often that the review resembles a catalogue. By this, I mean that it is descriptive rather than analytical. There is little or no attempt to compare or contrast work in the topic nor to identify anomalies, problems and inconsistencies. Mere recitation is not a review. A thorough examination of the literature is not just important for its own sake. It is important because it allows you to identify the problem or issue in its current form, and because it enables you to put forward useful research questions the answers to which will fill gaps in existing knowledge. It may also allow you to see the problem in the context of other, similar work that may have been carried out in the past.

2.2 Three reasons why you need to examine previous research in your topic

The understanding of previous research goes to the heart of the nature of T802 research, which in turn relates to the nature of masters research. As the aim of the course states (Section 2 of the Course Guide, Part A), ‘you [will] carry out a significant piece of research … [of] professional relevance’. An important aspect of professional activity is keeping up to date with the latest developments in your chosen field. Literature reviewing in T802 contributes to achieving this aim.

A second reason for examining previous research is to contribute to knowledge. Even though, as a masters researcher, you might be considered as a spear carrier in the great army of those attempting to push forward the frontiers of knowledge, your contribution will count. Therefore, it is vital that you do not undertake research that has already been done, to which there is already an answer. The only way to ensure that your research is new is to find out what others have already done. That said, your subject and topic area might be the same as or similar to that of a previous T802 student, but you will be carrying out your investigation when things have moved on, or by looking at different contexts or applications.

The third reason is concerned not with the content or outcome of the research, but with its methods. Reading the literature will familiarise you with research methods appropriate to your chosen topic and how they might be applied.

2.3 Why it is important to adopt a critical approach

I mentioned above that in masters research, you will be a spear carrier in the great army of those attempting to extend the frontiers of knowledge, but also that your contribution will count. For it to do so, you will need to identify omissions, inaccuracies, inconsistencies, impracticalities or errors in the work that has already been undertaken in the topic. I use the generic term ‘gaps’ to signify all these failures. You will be building on the foundations laid by others in identifying the research questions that are significant, but simultaneously you will want, at least partially, to demolish what they have built.
3 Critical reading

It is easy to waste a lot of time aimlessly looking through material that might be of interest. You need to focus on what you want from your reading and if you can’t find it, move on quickly to something else. Critical reading is a process of searching, not of passive absorption. In particular it:

- goes beyond mere absorbing of information, by making a personal response or reflection about what has been written
- relates different writings to each other, indicating their differences and contradictions, and highlighting what they are lacking
- does not take what is written at face value
- strives to understand the values and theories that inform and colour reading and writing
- views research writing as a contested terrain, within which alternative views and positions may be taken up
- shows an awareness of the power relations involved in research, and of where writers are coming from
- recognises that authors use a particular type of language.

When presented with a complex narrative, it helps to follow these simple tips:

- Take a quick look ahead before reading a complex narrative in depth, to get an overview of the headings, key diagrams and tables.
- Use a highlighter pen or make notes in the margin to draw out memorable points.
- Keep some paper handy to draw diagrams or make notes to keep track of the storyline.
- Note down questions that occur to you, and the answers if they appear later in the text.
- Look out for signs of the author’s perspective. What does the author criticise, praise, find remarkable or unremarkable? Is there more detail about some aspects of the work than others? Why? What has been left out?
- Note down your overall impressions and any questions you still have at the end.

4 Initial steps in research: reading and recording

The first thing to suggest is that you establish a recording system at the outset. Whatever method you choose for recording what you have read, be it on index cards, direct onto a computer, in a loose-leaf folder or other means, bitter personal experience prompts most researchers to emphasise the need to maintain your records in an organised and complete manner. Do not be tempted to have more than one method; this can lead to confusion and unnecessary extra work. There are software tools available to you that can help you to both organise your references and incorporate them into your written work – see the information literacy resources summarised in the Course Guide (particularly Part A Section 6 and Part B Section 1.3) and the links on the course website.
Reading, within the context of a research activity, is something of a misnomer. As I have already emphasised, the purpose is not simply to read through once only, as one would when reading a novel. The objectives of using the work of others to develop your own thoughts and views, and as an aid to your own thinking process, mean that the reading process must be more active. The following three-step approach is a suggestion of how you might use the literature interactively.

(a) **Opening a record**

The process starts by recording the basic details of the work:
- author(s), including initials
- date of publication
- title of work or article.

Then, for books:
- publisher
- place of publication
- page numbers of relevant material.

For journal papers:
- journal name
- volume and issue number
- date of publication
- pages on which the paper appears.

Further details for referencing are given in Section 7.

(b) **Skim reading**

It is perfectly possible to skim read a book or a paper in ten minutes. To do this you need to make use of the various signposts that are available from the:
- title page
- publisher’s ‘blurb’
- abstract (if present)
- preface
- contents page
- introduction
- conclusions
- references/bibliography
- index.

Finally, skim through the opening page of each chapter. Figure 1 completes this phase with steps 8 and 9.
1. Record complete reference
2. Look at title page (if book)
3. Look at any publisher’s ‘blurb’
4. Look at abstract, preface, contents etc.
5. Look up item in index (if book)
6. Look at references, bibliography
7. Leaf through, skim read
8. Assess credibility, value of source
9. Decide whether to read in detail

**Figure 1** Recording and skim reading

(c) **Thorough reading and commenting**

If you have decided to study the work that you have skim read in more detail, you can use the well-known ‘SQ3R’ approach (that is, Skimming, Questioning, Reading, Recalling and Reviewing), adapted below from Blaxter et al. (1996, p. 114). This involves:

(i) **Skimming** – skim reading the chapter or part of the paper that relates to your topic, or otherwise interests you.

(ii) **Questioning** – developing a few questions that you consider the text might answer for you. For example, ‘What conclusions does the author reach about the management of innovative projects?’; ‘What is the view taken of Porter’s model of international competitiveness?’.

You can often use chapter or section titles to help you formulate relevant questions. For example, when studying a paper with the title ‘Technology and the learning organisation’ you might ask, ‘How is the learning organisation defined?’; ‘What are the main forms of technology that the author considers in the paper?’.

(iii) **Reading** – reading through the chapter, section or paper with your questions in mind. Do not make notes at this stage.

(iv) **Recalling** – making notes on what you have read. You should normally develop your own summary or answers to your questions. There will also be short passages that you may want to note fully, perhaps to use as a quotation in your text. Be sure to note carefully the page(s) on which the quotation appears.

(v) **Reviewing** – checking through the process, perhaps flicking through the chapter again. It is also worth emphasising that if you maintain your reference list as you go along, not only will you save yourself a lot of work in later stages of the research but you will also have all the necessary details to hand for writing up and will be less likely to make mistakes.
There is no doubt that this approach takes considerably more effort than sitting back and studying a text passively. The benefit from the extra work involved is the development of a critical approach, which you must adopt for your research.

5 The nature of the literature review

The need to establish the relationship between the practical problem/issue that you have observed and the wider context in which it has been investigated means that your literature review should:

- be analytical – not descriptive
- identify the relevant gap(s) in knowledge
- establish the importance of these gaps, by placing them within their technological field and business, industry and social contexts.

Your work on the relevant literature will enable you progressively to refine your research problem and research questions.

5.1 The five-stage model

Figure 2 illustrates how the process of literature search and review can be divided into five stages: planning, searching, gathering, analysing and comparing. These stages form a circle, since completing a literature review will almost invariably require more than one pass through the stages.

![Figure 2](image)

**Figure 2** A five-stage approach to literature search and analysis

Following the stages:

- provides a systematic approach to gathering and analysing literature in your chosen field of study
- ensures that the literature is approached critically
- relates what has been learnt from the critical analysis to the research problem.

If this is the first time you have undertaken any formal academic research, you may well be concerned about how and where to start the literature review process. Inevitably, the amount of time that you are able to devote to this aspect
of your research will be limited. For this reason, it is important to plan your approach to enable you to make the best possible use of the time that you have available.

5.2 Getting started

A good starting point is to begin with a single journal or magazine article relating to your chosen issue, and use it to define your initial literature search.

For example, an article in a trade journal concerned with manufacturing speculated that the adoption of a production-scheduling system based on autonomous intelligent software agents could improve manufacturing effectiveness in the defence electronics industry, as measured by increased throughput per month and reduced production lead time.

This provides the key words and terms for the search – production scheduling, autonomous intelligent software agents, defence electronics – which could be used in a search of the academic literature (using relevant databases that include books, journal papers and other published articles – see the Course Guide and the course website for further guidance) or in a Web search, using Google or other search engines. All these can lead you to further references, as described next. Do not rely only on a search engine such as Google; you must make use of the relevant academic literature, which is unlikely to be accessed via a simple Google search. Google Scholar is likely to be more help in this respect, but even better may be use of one or two appropriate academic databases such as Scopus, Business Source Complete or Web of Science. There are many, many others – see the ‘databases’ listing on the Library website at http://library.open.ac.uk/find/databases/index.cfm.

5.3 Forwards and backwards searches

You can use these references in two ways. As Figure 3 indicates, references can be used to provide further sources by working ‘backwards’ and asking ‘Who does this source reference?’, or they can be used to work ‘forwards’ by asking the question ‘Who has cited this work?’. This provides a way of progressing through the literature search, collecting further relevant references.

The usual starting point of a literature search is to ask ‘Who/what does this source reference?’. This is easily done by looking at the reference list at the end of the source. This technique moves the search backwards in time. Then, to ask the question “Who has cited this work?” we need the online facility known as a citation index (although many databases now provide citation information), which will list those works that have quoted the source. This information is valuable in several ways: it expands and progresses the search, and it provides information on which authors and papers have had the most influence. Also, most
significantly, it can reveal valuable references from other subject disciplines that
would not be located in a discipline-specific database search.

The ‘Science Citation Index’, within Web of Science, is available to T802
students via the ‘Library resources’ link on the course website. It holds citation
details for literature dating from 1900. Instructions on using the index can be
found in the ‘Library resources’ section of the course website.

There are three points to bear in mind:

- As you would expect from its name, the Science Citation Index does not
cover all technological journals and subjects. However, it is worth a try as it
is not restricted to pure science journals.

- Effective citation searching requires some time to be set aside, as it is quite
easy to get disorientated about where you are in the ‘citation chain’.

- Citations of recent papers will not appear in some disciplines for some years,
due to the inherent delays in the ‘research supply chain’ (explained under ‘the
shape of the literature’ in the Information Literacy resources linked from the
course website).

5.4 The gathering process and analysing

Armed with a plan, the next stage is gathering. This has two steps: generating (or
adding to) your list of references through literature searches, and ordering or
otherwise getting hold of the sources themselves. There is good advice on this
stage of the overall process in the Information Literacy resources provided via the
course website.

The OU Library subscribes to a very large number and a wide range of
publications, but not to everything. Some of your searches will take you straight to
the full text of journal articles. In other cases only the abstract will be immediately
available. If you carry out a search in Google Scholar or in certain databases, you
can use the ‘Find it at OU’ facility to discover whether you can access a
particular journal through the University (though be aware that sometimes there
is a time lag between the publication of articles and their availability). Failing
this, it may be possible to borrow the item from another library (see

The next stage of the process concerns reading and analysing, and is where the
real work is done. It is the most important of the stages and represents one of the
foundations of your research. The ‘SQ3R’ approach to reading is recommended
and this can be the basis of successful analysis of sources (see page 6).

The objectives of thorough reading and analysis are:

- to evaluate the source rigorously
- to identify the argument
- to analyse the approach taken – what are the assumptions that are made, what
evidence is presented, what sources are used to support arguments?
- to test for logical consistency
- to place the work in its context in terms of time (i.e. when was it written?), in
the development of the subject, place, organisations or industries
- to record the argument and quotes (remember to note the pages on which they
occur) for future use.
To complete the analysis, you should then relate the source to other sources. You may find that the use of a spray diagram (or other modelling technique) is helpful here. One useful method is to develop a relevance tree to build a structure or ‘taxonomy’ of the subject. This is an approach suggested by Sharp et al. (1996, pp. 83–4, 88) that argues that relevance trees are a valuable device for ‘developing related ideas from a starting concept’.

An early draft of a relevance tree for production planning and control is shown in Figure 4. As the example illustrates, this technique provides a way of classifying the elements in a subject and will therefore lead to the development of a structure. It also suggests alternative approaches. So, for example, it might be better to base the classification on micro versus macro control, or use a time-based approach to analyse the evolution of planning and control.

![Relevance tree example](image)

**Figure 4** A relevance tree example

Another way of relating sources to each other is to look for the gaps between them. Some examples of the sorts of gaps that I have in mind are:

- results or conclusions
- practical domains (application areas)
- methods used.

Finally, you should consider the relationship of the source to your research problem, your aim and objectives, and your research questions. Has the knowledge modified your research task? In what ways? These are crucial considerations – remember that an important purpose of reviewing the literature is to inform your own research. You may need to modify your research plan in the light of what your literature review throws up, for example, because something you thought was well established turns out to be uncertain after all, or because one of your research questions is already answered by existing knowledge.

### 6 Evaluating and reviewing literature critically

A danger in T802 is that one could spend a lot of time reading a large number of articles, books and reports and then summarise them in a continuous, and probably boring, section of perhaps 15 or more pages. A long-suffering reader might work through the detail and then finally in exasperation ask ‘So what? Where does all this lead me?’ As has been explained in Sections 2–5 above, you have the job of presenting a critical review of the literature, not a summary of it. This implies a
process of comparing and contrasting (a time-honoured academic exercise), resulting in conclusions that lead you to define your approach to the research. You thereby demonstrate an ability to understand the wider context of your research, beyond the confines of the practical problem or issue you started with.

6.1 A technique for evaluating and reviewing literature

Here is a suggested technique to make life easier, so that you can produce a critical review using your words efficiently as well as making life easier for your readers. Note that this applies particularly to the process of defining your research, where you need to draw upon a limited number of relevant references. The method can be used both as an aid to making the literature comparisons and as a means of describing them in your dissertation. The approach is as follows:

1. For this purpose, be selective about your references. Locate a small number of key journal papers or articles. At the proposal stage you might have around 4–6 of these, accumulating more as you develop the research subsequently. Aim for quality, not quantity. Look for relevant and recent publications, ideally not more than four years old, although this depends to some extent on your field of study. You will need quite a few more references in due course, to cover other aspects of your research such as methodology. However, at this stage I emphasise that you need only a few recent items, relevant to the main aspects of your research.

2. While reading these documents, aim to identify the key issues that are essential to your research. There is no recommended number, but around 4–8 issues is ideal.

3. Produce a matrix of references (rows) and issues (columns) and consider a short description to put in the boxes. What you write will have to be brief and to the point, and in some cases you’ll have to put ‘not mentioned’ or leave a box blank. In each case comment on the approach taken, with minimal detail. Note that such a matrix, occupying no more than a page, will save you writing a lot of text in the form of complete sentences, perhaps over several pages.

4. In order to compare and contrast the literature, examine the entries in the boxes, mainly by looking down the columns. Look for commonalities, agreements and disagreements, for problem identification and for possible solutions. Then write up your analysis of the comparison and any conclusions you might reach. The endpoint is when you can make an informed decision about how to proceed with your primary research, based on the work carried out by other researchers.

5. Note that ultimately there is no infallible means of assessing the value of available literature. Its source may be a useful indication (see Section 8), but you have to use your judgement about its value for your research. It is unlikely that you will dismiss a reference as ‘wrong’ or ‘total rubbish’, but you may be critical of its relevance to your research.

6.2 A practical example

Consider Table 1 (overleaf), which is adapted from an example on ‘Sustainable construction in the UK building industry’. It is fictional but realistic, and comprises a matrix of comments based on five papers and six issues, though no one paper covers all the issues.
Table 1  Matrix used for critical literature review of ‘Sustainable construction in the UK building industry’

<table>
<thead>
<tr>
<th></th>
<th>Energy efficiency</th>
<th>Life-cycle analysis</th>
<th>Green design</th>
<th>Brownfield sites</th>
<th>Waste minimisation</th>
<th>Regeneration of buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simon (2001)</td>
<td>Emphasis on combined heat and power (CHP)</td>
<td>No mention</td>
<td>Emphasis on incorporation of new technology</td>
<td>Brief consideration, minimal detail, supportive</td>
<td>No mention</td>
<td>Detailed discussion of practicalities, argues against</td>
</tr>
<tr>
<td>Schmidt and Miller (2002)</td>
<td>No mention</td>
<td>Considered in detail but not including final disposal</td>
<td>Discussed but no clear definition</td>
<td>Minimal mention, no details</td>
<td>No mention</td>
<td>Brief mention, unsupportive</td>
</tr>
<tr>
<td>Johnson and Johnson (1999)</td>
<td>High-efficiency heating system and improved construction methods</td>
<td>No mention</td>
<td>No mention</td>
<td>Main concern of report, nothing on greenfield sites, supports</td>
<td>Strong emphasis, with financial analysis example</td>
<td>Strong support, with financial evidence</td>
</tr>
<tr>
<td>Williams (2003)</td>
<td>Emphasises solar power, rejects CHP</td>
<td>Cradle-to-the-grave view of products</td>
<td>Discussed but no clear definition</td>
<td>Some detail, useful comparison with greenfield sites, supports</td>
<td>No mention</td>
<td>Brief mention, unsupportive</td>
</tr>
<tr>
<td>Bowness (2004)</td>
<td>Various new technologies, rejects CHP</td>
<td>Cradle-to-the-grave view of products</td>
<td>Uses the term without explanation</td>
<td>Strongly supportive, clear financial analysis</td>
<td>Supportive but minimal details provided</td>
<td>No mention</td>
</tr>
</tbody>
</table>

There is no need to further describe the matrix and its contents. What needs to be done next is to address the points of comparison and draw conclusions from them. In this example, discussion would include the following:

- There is little support for CHP.
- Only the two most recent reports examine the complete cradle-to-the-grave life cycle. This could be a significant omission.
- There is no agreed concept of green design.
- Three authors put emphasis on brownfield sites, and one other is supportive of them. Could be worth further investigation.
- Waste minimisation is not widely considered. Why?
- Regeneration of buildings is controversial, with arguments for and against.

The result is an effective review of at least some of the relevant literature, organised in a framework that allows additions as the literature reading and
evaluation continues throughout the course, and helpful in identifying where the primary research should expect to make a contribution.

7 Referencing

By now you should be quite familiar with the process of referring to the work of other authors or researchers when writing about your own work. It is a standard process for all academic work at undergraduate and postgraduate levels. Open University course materials and all kinds of reports, articles, journals and books reference their sources. You have probably been required to do it in your previous tutor-marked assignments (TMAs) and projects. It allows readers to trace your sources, just as you have done from the works of others (see Section 5.3). It gives credit to others, where it is due, and avoids any possible accusation of plagiarism, which is passing off the work of others as if it were your own. There is more about that in Section 7.3 below.

7.1 The process of citation

Citation (verb: to cite, citing) is the direction to a book, journal, report or other published and available document where a quotation, figure, photograph – indeed, any form of recorded information – can be found. This requires a mechanism for making the citation and getting full details of the reference itself. In Section 4 above, you have already met the need to collect details about publications. There are two ways to refer to them that apply to T802 writing, as shown in the examples following. It is likely that you will use both methods, according to the situation and the need to write in language that flows well and is not disjointed.

1 Incorporation within a sentence

Examples of the required financial audit are given in Scrooge (2001) and Lucre (2003), both of which use discounted cash-flow techniques.


2 At the end of a sentence

A number of authors report use of the statistical chi-squared technique for establishing correlation, where it exists, and explain its theoretical basis (Jenkins, 1998; Smith and Brown, 2000; Singh, 2004).

Citations, as shown above, refer to publications that are listed as references. The correct place for the list of references is on a new page directly after the last chapter but before any appendices. The list should contain all the cited documents listed alphabetically by author surname. Note that the list is called ‘References’, implying that all citations from the text are listed in it and that it contains only references to those citations. It is not termed a bibliography or reading list, which would be more appropriate in a book as a list of suggestions for further reading. A dissertation is a highly focused account of a piece of research. All citations should support the argument, and not be additions or side issues intended to amuse or educate the examiners.
7.2 Citing and referencing method (Harvard)

The method described in Section 7.1, in which citations are made using the author name and the year, is known as the Harvard referencing method. Many variants exist, and are argued over, but they all follow the basic concept of referring to publications by author surname and year of publication.

There is another method based on the use of numbers in which citations [1], [2], [3], etc. refer to a numbered reference list. This is a well-known and respectable convention, often required for conference and journal papers. However, it has the disadvantage of needing very careful recording of numbers, and can become particularly difficult when new references are inserted within the numbered list. It is therefore prone to mistakes (though the process can be software assisted). Furthermore, it is less expressive than the Harvard method, which immediately indicates the author of a work and how recent it is.

For T802 purposes please use only the Harvard method for citation and reference lists. Do not use the numbering system.

For full details of how reference lists are compiled consult the links given below, where you will find a wide range of examples:

http://library.open.ac.uk/help/howto/citeref/index.cfm
http://library.open.ac.uk/documents/Harvard_citation_hlp.doc

There are a few additional points worth noting at this stage.

1 References as objects not people

A citation is a reference to a piece of work, not to a person. Similarly, if a piece of work has more than one author it is still a single entity. Consider the following examples.

Fox (2001) describes a project to reclaim marshland in East Anglia, showing that …

Alternatively,

Jane Fox’s experience of her project to reclaim marshland in East Anglia (Fox, 2001) has shown that …

Both the above are correct, but

Fox (2001) describes her project to drain …

IS INCORRECT.

Liddle and Bigge (1999) explains a new technique for processing questionnaires ...

is correct, because Liddle and Bigge (1999) is a single reference. The fact that there are two authors does not affect the citation.

Similarly,

James et al. (1998) describes a method …

is correct because it is one piece of work, even though written by several authors, but

Liddle and Bigge (1999) explain …

IS INCORRECT.
2 Page numbers

These need to be recorded wherever possible. Referring to a book or long report without stating page numbers does not help your reader to follow up your citation. It is usual to include the page number(s) in the citation. For example:

... as described in Carpenter (2001, p. 124) ...

The associated reference would then appear in the reference list as:


3 References within references

You may wish to cite a work that is quoted within another. This is expressed logically, as in the following example.

You cite:

... as explained in the Evans (1995) technique for chromium extraction ...

Your reference list then includes:


4 Reference or primary data?

Your references may be varied – including books, journal papers, newspaper articles, even broadcast material – all of which should be in the public domain: obtainable by a reader, at least in principle if not in practice. Do not confuse this ‘literature’ with data and information, such as interview transcripts and questionnaire responses, that you obtain during your primary research. Such material should be quoted in your T802 dissertation, or placed in an appendix if bulky. Literature references are the source for your secondary research, so keep the two sources separate.

5 And finally …

Take care to record references and make citations accurately. Their purpose is to enable others to locate the same sources you used, so incorrect or incomplete information in a reference is a major deficiency. You may encounter minor disagreements in matters of punctuation and format for the Harvard system. Don’t get obsessed with such conundrums; make your decision about what is clearest and then be consistent. Make sure that all citations are matched by an entry in the reference list and that all reference list entries are cited somewhere.

7.3 Avoiding plagiarism

It is an important tradition in research to draw upon the work of previous researchers in the area. This is achieved in the T802 context by citing authors’ published work and by quoting directly from them, all of which is acceptable, provided that the authors’ contribution is clearly and explicitly acknowledged. In T802, text, diagrams, tables, photographs, experimental techniques and results are all potentially subject to plagiarism, but are easily legitimised by being given explicit references. Similarly, you can use the results of collaborative work, provided you make it clear which part you carried out and where you are using another person’s contribution.
Plagiarism might occur in a dissertation when:

- using a choice phrase or sentence that you have come across
- copying word-for-word directly from a text
- paraphrasing the words from a text very closely
- using text downloaded from the internet
- borrowing statistics or assembled facts from another person or source
- copying or downloading figures, photographs, pictures or diagrams
- copying from the notes or essays of a fellow student
- copying from your own notes if they contain direct quotations, or from a text, tutorial, video or lecture.

If a case of plagiarism is proven, this is a serious offence and Open University disciplinary procedures will be followed, as described under the Student Regulations SA 1.6 and SD 7.2.


8 What constitutes a good reference list?

A question often asked is ‘what range of references and how many are needed to make a good reference list?’ There is no straightforward answer in the context of T802, because the potential range of research subjects is so wide. However, it is possible to provide some pointers to help you in your selection of references.

An appropriate number of references would be around 15–35, though this is not a strict ruling. For example, in research involving legislation and standards documents covering a wide field, it might be necessary to cite a larger number. Conversely, in research involving specialised manufacturing processes, a smaller number of references might be relevant and sufficient. Aim for quality rather than quantity in your references; there is no credit to be gained in amassing a large amount of scarcely relevant material. In any case, it is easier and more conducive to good research to handle a small number of recent, relevant references.

Above all, the reference list must be balanced; that is, it must not be overloaded with one particular type of reference. A list dominated by text books, by newspaper articles, by government reports or by instruction manuals would not be viewed as balanced. Also, you must have some core references that are recent (published within the last four or five years) and relevant, as discussed in Section 6.1 above. You have to decide what is a suitable range of references, and this will differ for each piece of research. The following broad categories should be considered.

- **Journals**: These are an essential source of articles or ‘papers’. They may be ‘academic’, of industrial origin, or from other reputable institutes or organisations. References should be recent, though a few of historic interest may be appropriate.

- **Industrial and trade magazines**: Can be useful, but beware of the possibility of company bias, such as in articles that are little more than advertisements.

- **Text books**: May be useful to establish concepts and techniques, but should be limited in number and mainly recent.
- **Government and other official reports**: A wide range of publications, including ‘white papers’, legislation, standards definitions and DTI proposals, are potentially useful.

- **Internal company reports**: These may be useful in a few situations but should be used sparingly, particularly if they are not readily available to the wider community of researchers.

- **Manuals and handbooks**: These are of limited relevance, but may be useful to establish current techniques and procedures.

- **Newspapers**: Specialist supplements from quality newspapers can provide useful up-to-date information.

- **Special-interest magazines**: Similarly, these can provide useful up-to-date information, but may be ‘lightweight’ and lacking in analysis if they are aimed at a broad readership.

- **The World Wide Web**: This is an extremely useful source of references, particularly for an initial investigation, and is dealt with in more detail below (Section 9).

For further advice please see the Computing and Technology Information Search Guide at [http://learn.open.ac.uk/site/techis](http://learn.open.ac.uk/site/techis) (this is also linked from the course website).

*Note: personal communications such as (unpublished) letters and conversations, and the responses you might obtain from interviews and questionnaires in the course of your research, are NOT references. They should be reported as data obtained through primary research, and will appear in Chapter 4 of your dissertation.*

Note that there are well-established standards for exactly what reference details should be given in what order for each type of reference listed above. Box 1 lists the main types.

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### Box 1 References

The following list gives examples for a variety of information sources*.

**Books**

Author’s last name, initial(s) (year of publication) *title* (edition), place of publication, publisher.


**Chapters in books**

Chapter author’s last name, initial(s) (year of publication) ‘chapter title’ in author/editor, *book title*, place of publication, publisher.


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* The list is a sub-set of a more complete listing provided in the Technology Information Search Guide. See also [http://library.open.ac.uk/documents/Harvard_citation_hlp.doc](http://library.open.ac.uk/documents/Harvard_citation_hlp.doc)
9 Use of the World Wide Web

There is no denying that use of the Web is an invaluable way of starting your literature search and obtaining some useful references. You should, however, exercise caution in its use. It is not a validated or refereed source of information, so do not assume that what you locate, however well presented, is of value. It may be relevant, high-quality research from a reputable source; or it could be prejudiced, ill-informed rubbish published by someone with an axe to grind. Note also that web-based material can be transient. It is of little use as a reference if it has disappeared from the Web. You need to search widely and make careful value judgements about those references you decide to use and later cite. A few points to note are as follows:

- Give preference to websites that are operated by reputable and sizeable organisations, such as academic, government and business sites, rather than those of individuals.
- Reports that are placed on a website but that are also printed and published, such as governmental reports, standards and legislation documents, can be
considered as permanent and potentially useful references. Beware of material, even on government or academic sites, that does not have a print counterpart. Sites are often reorganised such that web-only documents become lost. This does not mean the material is necessarily less useful, but it does mean you would be well advised to save the material separately to guarantee your future access to it.

- In a reference list, identify a website under its author (a person or the organisation itself), adding its title and the URL of the site with the date on which it was accessed.

- When using a search engine, try different combinations and numbers of keywords. Sometimes, quite small changes can result in a significantly different set of results. ‘Advanced’ search options allow you to specify your target more precisely. Google Scholar searches academic sources, and its results will include academic journal abstracts or even full papers. See http://library.open.ac.uk/help/howto/access_eres.

References

