Thesis Writing for Scientists and Engineers
The Literature Survey

A: WHAT AND WHERE IS A LITERATURE REVIEW?

Introductory Task

What do you think?

Discuss your reactions to the following statements with a partner.

1) All theses and dissertations include a literature review.

2) A literature review should be exhaustive (i.e. it should mention all the possible literature about the topic of the research).

3) Literature reviews follow a standard, expected format that all writers need to follow.

4) By the end of the first year of PhD studies, a student should know more about the literature than his or her supervisor.

5) A good literature review summarises but does not critically evaluate research done by others.

Task 1

Read the following text that gives advice to computer science thesis writers. Do you think the advice could be relevant to writers in your own discipline?

Surveying related work

A literature survey is a necessary part of any thesis. It can take different forms, e.g. bunched in one place or distributed across several chapters so that literature is discussed in the context where it is relevant (make sure the reader knows which you are doing - e.g. after the first portion of a literature survey state that remaining literature will be surveyed in other chapters where it is relevant).

One thing you should avoid is a very superficial survey in which you cover 25 authors in 10 pages giving a potted summary of each that will give little information to readers who do not already know the work.

Choose a few of the authors who have made the main contribution to the field and give an in depth discussion that will show the examiners that you are able to expound the work of someone else clearly, accurately, and critically. Then, if necessary, give a list of other work in the field saying that you don't have space to survey it in detail. At least that will show that you are aware of it. Better still if there are different approaches, different views, or different kinds of results, etc. then organise the list into different categories.

If possible choose at least one author whose views are opposed to yours and discuss the issues in detail.

Imposing a new structure on previous work in the field is one way of making a contribution to knowledge.

Tracking down relevant literature is less fun than working on your research, and therefore too many students don't do the job properly. It is your responsibility to make sure that you have covered all the main relevant work. By the end of the first year or so, any good research student should know more about recent literature in the field than his or her supervisor, who is probably too busy to keep up properly. So don't just depend on your supervisor to tell you what to read.

Your survey must include both recent work and the most important earlier work, which you can track down by following up references in other people's bibliographies. If you don't look at the history of your topic you are in danger of re-inventing wheels (repeating research that has already been done) or proposing solutions that other people have demonstrated don't work. (This happens too often.)

Two kinds of literature survey: scene-setting and critical

It's up to you whether you expound your ideas before or after the literature survey. Sometimes discussion of other work nicely sets the stage for your solution. In other cases your own analysis provides a conceptual framework that makes it easier to expound and classify or criticise the work of others.

It may be useful to distinguish two kinds of literature survey: scene-setting (contextualising) and comparative evaluation.

An early chapter (e.g. chapter 1 or chapter 2) can include a "**scene setting**" survey to help the reader understand what problems you are addressing and how they relate to the work of others. Later on, either in a separate chapter, or distributed over several chapters, you can include "**comparative evaluation**" surveys to show in detail how your work extends or improves on others (or how it doesn't!) This is part of the process of convincing examiners that you have done something significant that contributes to the literature.

Criticising the work of others

Remember that before refuting X you should present the views of X in as strong and convincing a form as possible: otherwise you risk being accused of refuting a caricature or ‘straw man’. (i.e. presenting and destroying an argument or idea that is clearly weak and so easy for you to demolish). There is no point arguing against a view that only a fool or non-expert would support.

If possible, improve on X's own arguments before you try to refute them - i.e. anticipate possible ways of wriggling out of your criticisms. Too often people write criticisms of a particular view without asking "How would I react to this criticism if I were a really intelligent and well informed person on the other side?".

Adapted from: Sloman, A. Notes on presenting theses, School of Computer Science, University of Birmingham. Available at https://www.cs.bham.ac.uk/internal/research_students/theses.php#survey. Updated (SJV) Jul 2010 [Accessed 01 June 2015].

Task 2

Literature reviews are not always given a clear title and may be developed over more than one section. Look at the Table of Contents from a thesis entitled 'Taxonomies for Software Security'. Highlight the sections of the thesis that you think will include a literature review.

Table of Contents

2) Now check the thesis overview below. Were you right?

1.2 Overview

We first offer an overview of the various tools that have been used for security and describe the concepts behind them. This part is covered in the literature overview in the "Research Context" and "Secure Languages and Tools" . In the "Flavors of Logic" chapter, we revise the various flavors of logic that offer insight on how to deal with concurrency where security and program safety is cucial.

In the "Signals and Events", we describe the implementation of signals and observe that a split between one-shot and persistent signal handlers is available in the implementation. Based on these functions, we then explain in detail how the signaling mechanism is designed.

The centerpiece of the thesis consists of a taxonomy, in the "A Taxonomy on Layers of Abstraction" chapter, that summarizes all the literature overview and offers taxonomy trees that allow us to classify vulnerabilities using shared properties. We expand the concept of traces and use swimlane diagrams to depict traces pictorially, thereby offering a graphical overview of control flow. We reason about vulnerabilities but we also show measures that could be taken in order to prevent attacks that follow similar and related attack patterns.

Additionally, since we classify Denial of Service (DoS) as a self-standing taxonomy tree, we identify three types of classic DoS attacks that abuse programs in different ways. We use automata to describe the attacks and make the connection with swimlane diagrams that we mention in the former chapters on taxonomies.

The last chapter contains conclusions and further directions that could be followed in order to expand the taxonomy that we provide to a broader palette of attacks.

Task 3

In science and engineering, literature reviews can form a separate stand-alone section of a thesis or may be developed as part of a discussion of the state of the art or a chronological analysis of technological developments within the introduction.

This kind of literature review may include information about approaches and solutions (e.g. patents, instruments, protocols and programmes) developed by others and will mostly be in the past tense.

1) Read the extract from a thesis entitled 'Software Based Solutions for Mobile Positioning'. Which section of the thesis is this extract from (look at the Table of Contents below)?

Table of Contents

When GPS was made available for civilian use, the high accuracy of the positioning service was reserved to the US military. Moreover, GPS devices require clear views of the sky to receive at least four satellite signals and produce a position fix. As a result, GPS was clearly not adequate for use for AVL application at the time[3]. As a result, most AVL systems had to rely on dead reckoning measurements and some sort of radiolocation method to correct the incremental errors of dead reckoning. Some AVL companies deployed dedicated radiolocation infrastructures which were expensive, while others used existing Loran-C and Decca infrastructures, which had limited coverage and accuracy in urban areas [Sco93]. The successful deployment of analogue cellular networks in the eighties attracted the researchers within the AVL community who realised the cost-saving advantages of exploiting the nationwide cellular coverage [Sag93][She91]. In addition to providing means for voice and data communication, cellular networks also provided AVL systems with the infrastructure for implementing radiolocation techniques. As a result, AVL research linked radiolocation to mobile telephony giving birth to the field of cellular positioning, which is the main concern of this thesis.

2) All the verbs in the text above are in the past tense except two. Identify them. Why are these verbs in the present tense?

3) You will need to choose a referencing style that is acceptable and consistent. Different disciplines (and supervisors) may have preferences and it is up to you to find out what these are.

Look at the short in-text citations and the long references taken from the end of the thesis reproduced below. Which style has this doctoral student used?

[Sag93] Willian E. Sagey, "Cellular Telephone Service Using Spread Spectrum Transmission", US Patent, no 52186188, Jun , 1993.

[Sco93] Tony Scorer, "Vehicle Location and Fleet Management Systems", IEE Colloquium on Date of Conference, 8 Jun 1993.

[She91] Eliezer A. Sheffer, "Vehicle Location System", United States Patent, no 5055851, Oct 8, 1991.

B. SHOWING STANCE IN THE LITERATURE SURVEY

Task 1

1) Read the following claims:

1. Unemployment causes crime.
2. Unemployment causes crime (Smith 1998).
3. As Smith argues, "unemployment causes crime." (Smith 1998: 23).
4. Smith points out that "unemployment causes crime." (Smith 1998: 23).
5. According to Smith (1998: 23), "unemployment causes crime."

In each of the sentences, the **reader** gets a slightly different idea about the **writer's** opinion of the original author (Smith)'s claim in each one.

Look at the differences in each sentence and decide how the writer feels about what the author said and comment on the "voice" (the author's, the writer's, both?) heard by the reader[i].

1. With a neighbour, comment on the way the writer made reference to the claims.
2. Does the writer accept what the author said or not? How do you know?

The essential purpose of the literature survey is to describe the research lines that you wish to follow and point out what has been done on these topics in the past.

This is a difficult writing skill to learn since you have to balance the weight of your own voice or position with the many voices of other authors in your field.

Task 2

Here is the beginning of the literature survey of a Civil Engineering thesis. In this case, the Literature Review is a stand-alone chapter. You don't need to read it in detail. With a neighbour:

1. Circle the names of the authors that are mentioned both within and outside brackets.

2. Underline the words that show whether the writer agrees with those authors' claims or not.

CHAPTER 2: REVIEW OF THE LITERATURE

2.1 Overview of Chapter

This literature review starts with an introduction to the different types of ponds. The review then moves on to current design practice, starting with simplistic loading rates and

progressing through a thorough review of the application of reactor theory. An evaluation of current design practice is made and a case argued for focusing on improving fundamental understanding of waste stabilisation ponds.

Mechanistic pond modelling is reviewed, followed by a general review of influences on fluid flow and mixing in ponds. It continues with a discussion of experimental techniques for studying pond hydraulics, followed by a review of the use of these techniques on full size field ponds. The technique of studying pond hydraulics in laboratory scale models is discussed next and the chapter then finishes with a review of the mathematical modelling of pond hydraulics.

2.2 Pond Types

There are a number of variations in the way ponds are designed and applied to the task of wastewater stabilisation. The purpose of this section is to briefly introduce these various alternatives.

2.2.1 Anaerobic Ponds

Designed to receive high organic loading, anaerobic ponds are typically found at the front end of a series of ponds. Their treatment function is to undertake bulk removal of the organic load, (typically expressed in terms of biochemical oxygen demand, BOD).

They range in depth between two and five metres and are generally loaded at in excess of 100g.BOD/m3.day. They are normally absent of dissolved oxygen and contain no significant algal population. They are particularly effective in warmer climates. At temperatures above twenty degrees Celsius, one day retention time is sufficient to achieve sixty percent BOD removal (Mara et al., 1992a).

A more recent innovation has been the concept of fermentation pits, as discussed by Oswald et al., (1994). Built within a facultative pond, these consist of a semi-enclosed pit operating under anaerobic conditions like a low-rate digester. The pit receives the raw influent and has a retention time of around one day. The authors claim that these systems have the ability to remove suspended solids (SS) and BOD more effectively than conventional anaerobic ponds, and that they have less potential for odour problems.

A primary concern with anaerobic ponds is the generation of objectionable malodour via the production of hydrogen sulphide and various volatile by-products of the fermentative process. It has, however, been reported that malodour generation can be controlled if the sulphate concentration in the influent is less than 500 g/m3 by ensuring the organic loading is kept below 400 g/m3.d (Meiring et al., 1968, in Curtis and Mara, 1994).

2.2.2 Anoxic Ponds

Almasi and Pescod (1996) reported on the performance of ponds that operate in the area of organic loading that exists between the typical values used for design of anaerobic and facultative ponds.

They also believe that ponds designed to operate in the anoxic range have the potential to avoid the odour risk that has been associated with anaerobic ponds while reducing the high land area requirements that are associated with facultative ponds.

2.2.3 Facultative Ponds

Undoubtedly the most common type of pond in use throughout the world, facultative ponds have been defined as being either primary or secondary. A primary pond receives raw wastewater, while a secondary pond receives effluent that has already undergone treatment in an anaerobic pond or some form of prior treatment.

Mara (1997) states that an anaerobic pond followed by a facultative pond generally has the ability of achieving a BOD of 25mg/l or better. In countries such as New Zealand, the majority of pond systems are of the primary facultative type, but Mara predicts that eventually the anaerobic pond and secondary facultative pond combination will become standard as the benefits of its design becomes more recognised and accepted. Built with a depth of one to two metres, facultative ponds are designed for BOD removal at surface loading rates of between 100 to 400kg.BOD/ha.day (Mara et al., 1992a). The term facultative refers to the fact that these ponds operate with aerobic and anaerobic zones as shown in Figure 2-1 below.

[Figure 2-1 Facultative pond (Tchobanoglous and Schroeder, 1985, pg. 635)]

The lower layer functions with similar characteristics as an anaerobic pond. It consists of a benthic zone (or sludge layer) overlaid with an anoxic zone in the water column. At higher levels in the water column the water becomes oxygenated due to the presence of oxygen producing algae and diffusion of oxygen from the atmosphere.

The upper reaches of the pond have high concentrations of algae. Throughout the aerobic zone of the water column, facultative bacteria are found consuming the waste organics. Closer to the surface it is possible that strict aerobic bacteria exist, although research on this is limited (Mara, 1997).

2.2.4 Aerated Ponds/Lagoons

A number of facultative ponds have been designed, or more commonly retrofitted, with surface aerators to boost dissolved oxygen levels and/or to aid mixing. There is often confusion between these systems and what are typically called aerated lagoons. Unlike facultative ponds, aerated lagoons are designed to operate at high bacterial cell mass concentrations. These require a high power input for aeration and in some cases incorporate biomass return. They operate at much shorter hydraulic residence times and as a consequence of this, and their increased depth, do not develop significant algal populations. Aerated lagoons are essentially designed to work as a form of lowly loaded activated sludge.

2.2.5 Maturation Ponds

Maturation ponds typically follow facultative ponds in series. They have also been used for ‘polishing’ following conventional treatment. Their primary function is to remove pathogens, but they can also achieve significant nutrient removal (Mara et al., 1992b).

Although similar in appearance to facultative ponds, they may be somewhat shallower at 1.0 to 1.5 metres in depth. Even shallower ponds have been tested at the EXTRABES research station in Brazil, although Mara (1997) believes that at these reduced depths emergent plant growth and mosquito breeding problems can result.

Mara (1997) notes that if an anaerobic and secondary facultative pond system is used, this will produce an effluent suitable for restricted irrigation. Therefore, additional maturation ponds will only be needed if a higher quality effluent is required.

2.2.6 High-Rate Algal Ponds

Originally developed by Oswald at the University of California in the sixties (Shelef and Azov, 1987), high rate algal ponds have continued to be developed and implemented particularly in the United States and Israel. These systems are shallower than a facultative pond and operate at shorter hydraulic retention times. A paddlewheel is normally incorporated to drive the water around a 'race-track' shaped pond. The oxygen production is reported to be significantly higher than typical facultative pond designs. The micro algae produced in these systems are also reported to have good settling properties (Green et al., 1996).

The indication of stance or how you communicate your point of view regarding the literature cited (basically indicating whether you agree, disagree or are neutral about it) depends on the verbs and other reporting structures that you use.

C. STEPS IN THE LITERATURE SURVEY

In the following example, the following steps can be identified **for each topic of the research:**

a. Introduction of Topic
b. Summary of Main Idea
c. Description of Previous Research
d. Evaluation

(a) Much of the research work concerned with the teaching of writing to overseas students has concentrated on the introduction. **(b)** It has been shown that introductions follow regular patterns that can be used as a basis for teaching. **(c)** Swales (1991), for example proposed a structure consisting of four moves for article introductions selected from a wide range of subjects. McKinley (1992) and Peng (1996) found similar patterns in medical and chemical engineering articles respectively. Dudley-Evans (forthcoming) shows that the Swales model for article introductions can be adapted for use with students who are writing theses. He shows that thesis introductions consist of six moves. **(d)** All of this work is very helpful in the writing of courses for overseas students doing postgraduate research.

(a) A number of other research workers have also considered the organisation of discussion of results sections. It has been found that these sections also follow a regular pattern, but the

number of possible moves is much greater than in the introduction. **(b)** Most moves are also optional. **(c)** Belanger (1993) investigated the discussion sections of medical journals and suggested that they follow cyclical patterns. McKinley (1993) also found similar patterns in the medical articles she investigated. Their work was expanded by Hopkins (1995) and Peng (1996). **(d)** The work on the discussion section, however, still needs to be developed and further work carried out to establish the validity of their observations.

Task 1

Can you identify the same steps in the following short extract from a journal article[ii]?

Systematic genome-wide gene deletion collections of eukaryotic organisms provide powerful tools for investigating molecular mechanisms in basic biology and for identifying pathways that can be targeted in bioengineering or medical applications, as shown by pioneering studies with the budding yeast Saccharomyces cerevisiae[1, 2, 3, 4, 5]. The construction of systematic gene deletion collections is difficult, although RNA interference (RNAi) provides a popular alternative approach to ablate gene activity in many organisms.

D: LANGUAGE FOR REPORTING THE WORK OF OTHERS

1. Tense choice

1. Introducing Research – Neutral Orientation

Task 1

In academic writing, the choice of tense is important in introducing and referring to previous recent work. The usual "introducing" tense in a literature survey is the Present Perfect. Underline the present perfect verb structures as in the following citations drawn from papers in Plant Biology and Civil Engineering:

1) Various agencies have attempted to create computer models to do the sam
2) one of the factors causing loss of viability in cereals has been produced by Tuite and Christersen {1955),
3) other means of rapid non-destructive pavement evaluation has been utilised by Sir William Halcrow and Partners.
4) to date have been successful. Research recently completed has tested the recipe method of mix design and has oft
5) tenable since the existence of a tertiary gene pool has been demonstrated by Newell and Hymowitz (1982)who
6) The UK Department of Transport has published a Code of Practice for the routine maint
7) seed was using up its metabolities. But more recent work has indicated that the greater part of this respirator

2. Strong Author Orientation

If the **author is mentioned in the sentence and not in brackets**, either as the subject of the sentence or as the agent of a passive verb the **past tense** may be used to give prominence to the author rather than the idea. This is especially common when discussing developments in the state of the art chronologically and/or when comparing the approaches of different authors in previous research.

Look at these examples:

> *Swales (1991), for example, proposed a structure consisting of four moves for article introductions.*
>
> *Their work was expanded by Hopkins (1995) and Peng (1996).*

3. Weak Author Orientation.

If the **name** of the **researchers** is **not mentioned,** but a more general phrase like 'other research workers' 'various writers' 'scientists', etc. is used, then the **present perfect** is used.

> *A number of research workers have also considered the organisation of discussion of results sections.*
>
> *In particular, several studies of NSAIDs have shown that NSAID use is associated with a reduced risk of breast cancer, especially hormone receptor–positive tumors (17, 35, 36).*

4. Topic Orientation

If the report is concerned with the **topic**, rather than the author, then the **present simple** is normally used.

> *Migraine is primarily a premenopausal disease and the studies focusing on hormone levels in premenopausal women in relation to breast cancer are few and the evidence is mixed (43-45.)*
>
> *Smith (1997) **discusses** the idea that universities should teach on Saturday mornings.*

Notice that tense use is not always related to the year of publication!

If in doubt, use present perfect or present tense .

Summary:

Focus on author	Neutral or weak focus on author	Focus on topic
simple past	present perfect	simple present

Task 2

In the following example, identify the different types of orientation for the parts underlined:

Previous research has largely concentrated on specific features or article introductions: Oster (1991) examined tense usage in Engineering articles, Dubois (1991) investigated the key noun phrases in Biomedical Journal Introductions. Evidence of above-average occurrence of that-nominal constructions in the Literature Survey sections has also been reported (West 1990). The only description in the literature of a general proposed structure is of the problem solution type (Hepworth 1988).

Task 3

In science and engineering texts that review the state of the art as part of the Literature Review, a variety of tenses can be used and these again are not always related to the time of publication.

Look at the tense of the verb 'use' in the extract from a thesis entitled 'Design Improvements of Micro-Tubular Solid Oxide Fuel Cells for Unmanned Aircraft Applications' below. Why have different tenses been used?

Sammes et al. [196] use a metal plate with two extended cylinders; one fits around the outside of the tube, making contact with the cathode, and the other slips inside, making contact with the anode. This allows for simple connection of cells in series forming planar layers (see Figure 78). Obviously the cells must be joined to this interconnector to prevent slipping on heating and cooling or vibration. In this work, **brazing was used.** Silver was chosen due to its thermal expansion being compatible with that of both the cell and the interconnection material and its melting temperature and conductivity being sufficiently high. The brazing procedure had to be conducted carefully under a controlled atmosphere to prevent damage. This fabrication method therefore requires a larger number of carefully controlled stages than the in-house technique, and gives longer current collection paths for the cathode especially, but removes the problem of having many thin silver wires and provides an intuitive basis for a stack.
[...]
With the longer cells, conductivity along the anode or cathode length is a much greater issue, and the use of woven or knitted wire meshes to increase conductivity has been patented [235]. **Homel et al. [236] used** woven silver and copper meshes on the cathode and anode, respectively, to ensure good conductivity, with wires connected to the meshes. Conducting spines [234] along both the anode and cathode **have also been used** to increase conductivity along the electrode. Combinations and variations of these techniques were tested with the longer tubes.

196. Sammes, N.M., Y. Du, and R. Bove, Design and fabrication of a 100 W anode supported micro-tubular SOFC stack. *Journal of Power Sources*, 2005. 145(2): p. 428-434.

236. Homel, M., et al., Carbon monoxide-fueled solid oxide fuel cell. *Journal of Power Sources*, 2010. 195(19): p. 6367-6372.

2. Verb Patterns

There are three basic forms that are used with reporting verbs:

a) Verb + Noun
*e.g. Smith **discusses** the idea (that universities should teach on Saturday mornings).*

b) Verb + that + sentence
*e.g. Smith **suggests** that* universities should teach on Saturday mornings.

c) Verb + 'wh' word + sentence
*e.g. McCarthy **shows** why universities should not teach on Saturday mornings.*

We can summarise the forms with the common verbs in the table below.

Task 4

1) One of these ticks should be deleted. Which one?

Tip: put the verbs in a sentence. Can you say: "Li noted the point that.../noted that.../noted why ...?

Verb	**Verb + Noun**	**Verb + that + sentence**	**Verb + 'wh' word + sentence**
report, reveal, show, stress, suggest, note, observe, point out, emphasises, take for granted	√	√	√
find, propose, recommend, assume, imply	√	√	
discuss, examine, describe, investigate, study, refer to, draw attention to, focus on	√	√	√
develop, identify, refine, summarise, support	√		
claim, argue, contend, state, declare, conclude, hold, maintain		√	

2) Reporting verbs can be used with different tenses, as we have seen above. However, in some disciplines, the repeated use of author's name + present tense is often found when making further critical comment on or interpretation of the literature cited.

Look at the extract below taken from a thesis in public health. Find and underline the reporting verbs.

2.2.6 Are all relevant 'goods' commensurable?

There may be many different kinds of 'goods' (see above). Economic methods of evaluation such as CBA, CEA and CUA generally describe outputs using common units of measurement. Can all 'goods' be reduced to a common measure and placed on the same scale? One way of investigating this question is to ask if increasing one 'good' can compensate for lack of another. Wolff & De-Shalit (2007) suggest that a plausible monism (a single scale of measurement used for comparison) must adopt a 'compensation paradigm' (p25). The authors then provide a formal argument against substitution monism (p26). Wolff & De-Shalit also argue that no amount of money can compensate for a high risk of death. It is hard to see how a loss of dignity at the end of their lives, or long-term effects on significant attachments could be compensated for. Loss of public confidence in a health system could be compensated for by providing access to another health system, but fear of hospitalisation consequent on a poor hospital experience would remain uncompensated (even if provision of an alternative health system was feasible).

3. Reporting verbs in 'introductory *it'*- clauses[iii]

A common perception of academic text is that its main purpose is to present information in an objective and impersonal way. One way of doing this is by using 'introductory it'-clauses, in which the subject is placed at the end of the clause and 'it' inserted in the normal subject position:

That these results are provisional must be emphasized.	**It** must be emphasised that these results are provisional.
To acknowledge the differences is important.	**It** is important to acknowledge the differences.

It-clauses have been found to be relatively frequent in academic writing when compared with other registers. Hewings and Hewings (2002) argue that they are a feature of academic writing which functions to both express opinions and to comment on and evaluate propositions in a way that allows the writer to remain in the background.

Such strategies add to the impression of the presentation of objective, impersonal knowledge.

The pattern, however, causes problems for non-native speakers: many languages have no counterpart to anticipatory it-clauses (Jacobs, 1995). Problems include clear grammatical errors such as those in the following sentences:

- *As it has been claimed, strong culture is associated with corporate success, but this can only hold if ... **

and also instances which, while there is no grammatical error as such, are in some other way problematic, as in:

- *It may be clear that such restrictive practices convinced the United Nations to interfere. **

There seem to be four main ways in which academic writers use *it has been _____ that X*:

1. **Low-level topic priming**: the writer introduces the topic and prepares the reader for what follows in the paragraph or section:

> **It has been supposed** by some observers **that** most deforestation is quickly compensated for by regrowth, and that areas cleared and then abandoned are soon covered with secondary forest. This conclusion is questionable, according to the survey's findings. For one thing, deforested areas are not usually abandoned nowadays ...

2. **Self referencing**:

> This has been confirmed in rigorous calculations by Konkowski and Helliwell (1989). **It has also been argued** in the previous chapter **that** these singularities have similar properties to the fold singularities ...

3. **Bringing in outside information** from a non-cited source:

> Watching the sleep of other people and of animals confirms that sleep can be quiet, with deep, slower breathing, or apparently eventful with body movements and even sounds being made. **It has been known** for some years now **that** records of the electricity activity of the brain during sleep - by electrodes attached to the scalp, face and neck - confirm that different types of sleep exist.

4. **Bringing in outside information** from a cited source

> Rising crime is not an inevitable nor universal problem. It was noted above that for an extended period of our history crime was actually falling. The overall trajectory since the early nineteenth century seems to be a rough U-shape: falling down to the early 1900s, a plateau until the mid-1950s, and a steepening rise since then. It is plausible that disorder follows a similar pattern. **It has been shown**, for example, **that** levels of violence during industrial disputes fell in the first three-quarters of this century, but that this trend has been reversed more recently (Geary, 1985).

The writer's own opinion about the information introduced by this phrase may be positive, negative or neutral. Here is an example of a negative opinion:

> **It has been supposed** by some observers **that** most deforestation is quickly compensated for by regrowth, and that areas cleared and then abandoned are soon covered with secondary forest. This conclusion is questionable, according to the survey's findings.

Task 5

Look at the following paragraphs from a variety of scientific and engineering academic writing. In each example the writer has used the phrase *it has been* _____ *that X* at least once.

(1) Underline the phrase(s) in each example and (2) decide which function the writer has given it. (3) Is the writer's opinion positive, negative or neutral about the information introduced by the phrase?

1. Prominent amongst such soils are clays deriving from the weathering of volcanic ash, and examples of these effects are shown in Fig.2.5 and in Table 2.5. For classification purposes it has been suggested that such soils should be heavily worked until their

structure is completely broken down before they are tested. But this would defeat the engineering purpose of the classification, since it is vital to be aware of the presence of this structure and how it can be employed, if possible to advantage, during construction.

2. The disposal of the dredged materials is yet another pollution problem. For several of these pollutants, the harm results from their depletion of dissolved oxygen in restricted or poorly mixed bodies of water. However, the effect on the ocean's total oxygen content and the implications for humans has sometimes been exaggerated. For example, it has been suggested that oxygen decrease or elimination in the ocean would drastically affect atmospheric oxygen content. This is not correct, because the production and consumption of oxygen in the ocean is essentially steady-state, and the net exchange with the atmosphere is fairly small. It has been estimated that if all marine photosynthesis were to stop, the atmospheric concentration of oxygen would drop about 10 percent in 1 million years. Such a loss, although undesirable, probably could be tolerated by most nonmarine species of life. Life in the ocean, however, would be devastated.

3. Residence time is based on some other assumptions as well. One is that the elements are uniformly and quickly mixed within the ocean. Another is that most elements are introduced by rivers, and in fact, early estimates of residence time considered the amount of the elements introduced by rivers. Later, scientists emphasized the amount of elements in sediments (Table 7-3). More recently it has been recognized that the input from seafloor vents also must be considered.

Key

A: WHAT AND WHERE IS A LITERATURE REVIEW?

Task 2

Chapter 1, 1.3 research context; Chapter 2, Secure Languages and Tools, possibly also in Chapter 3, Flavors of Logic and Chapter 5, A Taxonomy on Layers of Abstraction.

Task 3

1) 1.2.1 AVL origins
2) GPS devices require (present tense factual explanation of a key concept. …cellular positioning… which is the main concern (focus of this thesis – linking the literature with the present study)
3) Alpha system used when using digital citation systems e.g. LaTex

B: SHOWING STANCE IN THE LITERATURE SURVEY

Task 1

Unemployment causes crime. The writer has done more than accept the view: s/he has taken it and plagiarised it or at best presented a claim made by another author (in this case, Smith) with no support. [writer totally present, author absent]
Unemployment causes crime. (Smith 1998). The writer has not referenced well: there is no page number and it is not clear if this is a quote or a paraphrase. It looks as if the writer is using the author's view to make their point. [writer dominant, author subordinate]
As Smith argues, "unemployment causes crime." (Smith 1998: 23). This quote is embedded well in the text. 'Argues' suggests that the writer may not actually accept the author's idea. [writer and author's voices have equal status]
Smith points out that "unemployment causes crime." (Smith 1998: 23). This is correctly referenced, but a paraphrase would have been better. 'Point out' suggests that the author put their views quite strongly, and that the writer agrees. [writer subordinate, author dominant]
According to Smith (1998: 23), "unemployment causes crime." The reference is fine. 'According to ..." is a neutral way to present somebody's words, although it is possible that the writer is distancing themselves from the idea by making it clear that it is attributable to somebody else. [writer not so important, author most important]

Task 2

2 REVIEW OF THE LITERATURE
2.1 Overview of Chapter
2.2 Pond Types
2.2.1 Anaerobic Ponds

At temperatures above twenty degrees Celsius, one day retention time is sufficient to achieve sixty percent BOD removal (**Mara et al**., 1992a). [simple present, writer agrees]
A more recent innovation has been the concept of fermentation pits, as discussed by **Oswald et al**., (1994). ['discussed': neutral]
It has, however, been reported that malodour generation can be controlled if the sulphate concentration in the influent is less than 500 g/m3 by ensuring the organic loading is kept below 400 g/m3.d (**Meiring et al**., 1968, in **Curtis and Mara**, 1994). [report: neutral]
2.2.2 Anoxic Ponds
Almasi and Pescod (1996) reported on the performance of ponds that operate in the area of organic loading that exists between the typical values used for design of anaerobic and facultative ponds. [report: neutral]
They also believe that ponds designed to operate in the anoxic range have the potential to avoid the odour risk that has been associated with anaerobic ponds while reducing the high land area requirements that are associated with facultative ponds. [believe: writer has distanced him/herself]
2.2.3 Facultative Ponds
Mara (1997) states [neutral] that an anaerobic pond followed by a facultative pond generally has the ability of achieving a BOD of 25mg/l or better. In countries such as New Zealand, the majority of pond systems are of the primary facultative type, but **Mara** predicts that [not a fact] eventually the anaerobic pond and secondary facultative pond combination will become standard as the benefits of its design becomes more recognised and accepted.
Built with a depth of one to two metres, facultative ponds are designed for BOD removal at surface loading rates of between 100 to 400kg.BOD/ha.day (**Mara et al**., 1992a). [simple present, writer agrees]
[Figure 2-1 Facultative pond (**Tchobanoglous and Schroeder**, 1985, pg. 635)] [figure reproduces: agrees]
Closer to the surface it is possible that strict aerobic bacteria exist, although research on this is limited (**Mara, 1997**). [agrees: cautious claim though/ simple present]
2.2.4 Aerated Ponds/Lagoons
2.2.5 Maturation Ponds
Their primary function is to remove pathogens, but they can also achieve significant nutrient removal (**Mara et al., 1992b**). [agrees, cautious claim though]
Even shallower ponds have been tested at the EXTRABES research station in Brazil, although **Mara** (1997) believes that [writer not sure there is enough evidence] at these reduced depths emergent plant growth and mosquito breeding problems can result.
Mara (1997) notes [neutral] that if an anaerobic and secondary facultative pond system is used, this will produce an effluent suitable for restricted irrigation.
2.2.6 High-Rate Algal Ponds
Originally developed by Oswald at the University of California in the sixties (**Shelef and Azov, 1987**) [agrees], high rate algal ponds have continued to be developed and implemented particularly in the United States and Israel.
The micro algae produced in these systems are also reported to have good settling properties (**Green et al**., 1996). [neutral]

C: STEPS IN THE LITERATURE SURVEY

Task 1

(a) Systematic genome-wide gene deletion collections of eukaryotic organisms **(b)** provide powerful tools for investigating molecular mechanisms in basic biology and for identifying pathways that can be targeted in bioengineering or medical applications, **(c)** as shown by pioneering studies with the budding yeast *Saccharomyces cerevisiae*[1, 2, 3, 4, 5]. **(d)** The construction of systematic gene deletion collections is difficult, although RNA interference (RNAi) provides a popular alternative approach to ablate gene activity in many organisms.

D: LANGUAGE FOR REPORTING THE WORK OF OTHERS

Task 1

1) Various agencies **have attempted** to create computer models to do the sam
2) one of the factors causing loss of viability in cereals **has been produced** by Tuite and Christersen (1955),
3) other means of rapid non-destructive pavement evaluation **has been utilised** by Sir William Halcrow and Partners.
4) to date have been successful. Research recently completed **has tested** the recipe method of mix design and has oft
5) tenable since the existence of a tertiary gene pool **has been demonstrated** by Newell and Hymowitz (1982)who
6) The UK Department of Transport **has published** a Code of Practice for the routine maint
7) seed was using up its metabolities. But more recent work **has indicated** that the greater part of this respirator

Task 2

Previous research has largely **NEUTRAL/WEAK AUTHOR** concentrated on specific features or article introductions: Oster (1991) examined **STRONG AUTHOR** tense usage in Engineering articles, Dubois (1991) investigated **STRONG AUTHOR** the key noun phrases in Biomedical Journal Introductions. Evidence of above-average occurrence of that-nominal constructions in the Literature Survey sections has also been reported (West 1990) **NEUTRAL/WEAK AUTHOR**. The only description in the literature of a general proposed structure is of the problem solution type (Hepworth 1988). **TOPIC**

Task 3

The first instance is in simple present. The use of simple present focuses on topic – i.e. the method described by Sammes et al as this is the technique that was then followed by the researcher in his/her own research as indicated by 'In this work, brazing was used' (simple past – specific time i.e. in the research that I did). In the second instance (Homel et al) past tense gives more prominence to the authors with not such a clear link to the writer of the thesis and his/her own research. 'Have also been used' is the neutral reporting tense (in fact no author is given – the focus is more general).

Task 4

1)

discuss, examine, describe, investigate, study, refer to, draw attention to, focus on	√	**X**	√

2)

Wolff & De-Shalit (2007) suggest that a plausible monism (a single scale of measurement used for comparison) must adopt a 'compensation paradigm' (p25) and provide a formal argument against substitution monism (p26). Wolff & De-Shalit argue that no amount of money can co

Task 5

1. Prominent amongst such soils are clays deriving from the weathering of volcanic ash, and examples of these effects are shown in Fig.2.5 and in Table 2.5. For classification purposes **it has been suggested that** such soils should be heavily worked until their structure is completely broken down before they are tested. *But this would defeat the engineering purpose of the classification*, since it is vital to be aware of the presence of this structure and how it can be employed, if possible to advantage, during construction.

(function: bringing in information from a non-cited outside source)
[opinion: negative]

2. The disposal of the dredged materials is yet another pollution problem. For several of these pollutants, the harm results from their depletion of dissolved oxygen in restricted or poorly mixed bodies of water. However, the effect on the ocean's total oxygen content and the implications for humans has sometimes been exaggerated. For example, **it has been suggested that** oxygen decrease or elimination in the ocean would drastically affect atmospheric oxygen content. This is not correct, because the production and consumption of oxygen in the ocean is essentially steady-state, and the net exchange with the atmosphere is fairly small.

(function: bringing in information from a non-cited outside source)
[opinion: negative]

It has been estimated that if all marine photosynthesis were to stop, the atmospheric concentration of oxygen would drop about 10 percent in 1 million years. Such a loss, although undesirable, probably could be tolerated by most nonmarine species of life. Life in the ocean, however, would be devastated.

(function: bringing in information from an outside source)
[opinion: neutral]

3. Residence time is based on some other assumptions as well. One is that the elements are uniformly and quickly mixed within the ocean. Another is that most elements are introduced by rivers, and in fact, early estimates of residence time considered the amount of the elements introduced by rivers. Later, scientists emphasized the amount of elements in sediments (Table 7-3). More recently **it has been recognized that** the input from seafloor vents also must be considered.

(function: bringing in information from a non-cited outside source)
[opinion: positive]

[i] How the textual 'voice' is constructed (after Groom 2000)
[ii] http://www.nature.com/nbt/journal/vaop/ncurrent/full/nbt.1628.html#/
[iii] Hewings and Hewings 2002: 1