

Literature Review

Purpose of the Literature Review Process

In the context of the final year graduation project, the Literature Review provides

- an introduction to the study under consideration
- a justification for the research, in particular for the specific approach adopted
- essential background material (initially for the benefit of the researcher; ultimately, for that of the reader)

A Literature Review is not simply a list of pertinent references, each considered in isolation. In addition to conveying an understanding of the topic, a good Literature Review critically evaluates key ideas and observations while making meaningful comparisons between the works of various authors. In reviewing the work that has been performed on a particular topic to date, it should be possible to identify knowledge gaps or inconsistencies, which may form the basis for future experimental work.

In preparing for and producing the Literature review, you should develop a number of skills which are of relevance in almost any discipline or professional activity, including the ability to:

- locate and retrieve relevant (scientific) information from a variety of sources, including books, journals and the Internet
- organize information in a logically-structured and coherent fashion, with reference to specified objectives
- critically evaluate and compare information
- present information in a clear and concise manner, while adhering to the conventions of scientific writing

Preparing for the Literature Review

- Firstly, identify the relevant area(s) of interest (e.g. fermentation system: bacterial, fungal, plant or animal) and then focus on the specific aspect(s) under consideration (e.g. product formation, growth optimization, morphological characterization). An exploratory trawl of the available information sources may be useful at this stage.
- On the basis of your preliminary search, become familiar with the main journals of interest to you.

Handling Information

Because the time available for this exercise is limited, it is essential to develop a rigorous, consistent and efficient approach to information retrieval and management.

- Having identified the key area(s) of interest, undertake a more thorough search of the literature. But be selective in your search. Use keywords judiciously.
- Make a preliminary decision on the relevance of an article on the basis of the title, keywords and source journal; read the abstract to ascertain its significance. Subsequently, compile a list of articles for retrieval. Resist the temptation to photocopy every article unearthed in your initial search. This is a costly and time- consuming exercise, which typically yields poor returns.

Writing the Literature Review

- As early as possible, establish a structure for the Review. This may, of course, be modified, as you become more familiar with the subject, but it is useful for arranging material into coherent and manageable units. Decide on the main theme(s) for the Review, which will ultimately be contained, in sequentially numbered sections and sub-sections, between an Introduction and a Conclusion.
- Do *not* wait until you have read (and re-read) every reference in your possession before beginning to write. Using your proposed structure as a starting point, make sub-heading for each section. Allocate ideas and substantiating references to each. Re-organise these sections into a logical order as the structure develops.
- Take particular care in referencing material. Ensure accuracy in conveying the ideas or results of other workers. Use a consistent, comprehensive referencing system, allowing the reader to easily access the original source material. Remember that tables and figures must be referenced, as well as text.
- Consciously avoid plagiarism, which is defined (Dartmouth College Committee on Sources, 1988) as
 - '...direct quotation or word-for-word transcription'
 - '...mosaic or mixing paraphrase and unacknowledged quotation'
 - '...(unacknowledged) paraphrase and/or use of ideas'

In student works, plagiarism often results from either ignorance or carelessness. By familiarising yourself with both the letter and spirit of the definitions provided above, carefully documenting all reference sources and taking the time to summarise material in your own words (as well as subsequently verifying the accuracy of your summary), plagiarism can be avoided.

- In presenting the Literature Review, take care to make the material accessible to the reader. Careful use of tables and figures may avoid lengthy and confusing lists of facts; sub-sections, each addressing a single theme or idea, are preferable to one, uninterrupted chapter.

Summary of Review Articles can be tabulated as follows:

SAMPLE 1: FOR STUDY THAT INVOLVES EXPERIMENT SUBJECTS

First author (Year)	Subject	Mean(SD) Age Weight (kg) Height (m)	Conditions	Protocols	Research Instruments	Outcomes Measured
Nederhand <i>et al.</i> (2012)	11M 9 F	53.3 (8.1) 80.9 (22) 1.76(0.02)	F, EO. One 10s static trial, three 90s dynamic trials	20cm between medial malleoli, 90° outward rotation from sagittal midline	Force platform, Vicon motion system	Weight distribution, CoP shift, dynamic balance contribution.
Barnett <i>et al.</i> (2012)	5M 3F	53.3 (8.1) 80.9 (22) 1.76(0.02)	F, 6 SOT Three 20s trials each.	Ankle joint were aligned with the axis of rotation of the support platform	Equitest System	Equilibrium and strategy scores, limit of stability

SAMPLE 2: FOR IMAGE PROCESSING STUDIES

Fusion Level	Feature	Fusion Strategy	Classifiers	Author(s)
Feature	Morphology	Linear Stepwise, Z-Score Normalization	Bayesian Artificial Neural Network (BANN), <i>Support Vector Machines</i> (SVM)	(Minavathi et al., 2012, Minavathi and S., 2013, Yuan et al., 2010)
	Pixel	Kernel Self-Optimized Fisher Discriminant (KSFD), Kernel Principal Component Analysis (KPCA)	Discriminant Fusing Analysis (DFA), Receiver Operating Characteristic (ROC) Analysis and Visualize	(Li et al., 2012, Twellmann et al., 2004)
Decision	Morphology	Averaging, Likelihood Ratio, Scoring Fusion, Majority Voting	Non-Linear SVM, Likelihood Ratio, Artificial Neural Network (ANN) <i>Support Vector Machines</i> (SVM)	(Jesneck et al., 2006) (Wang et al., 2011) (Azizi et al., 2013)
	Pixel	Scoring	Artificial Neural Network (ANN)	(Wang et al., 2011)
	L1- Penalized SVM	Averaging	Non-Linear SVM	(Lesniak et al., 2012)

SAMPLE 3: FOR TISSUE ENGINEERING STUDIES

First author (Year)	Type of cells	Sample size	Scaffold material	Scaffold techniques	Characterisation techniques	Outcomes Measured
	Bovine bone	20	Hydroxyapatite (HA)	Solvent casting		
		50		Electrospinning		

Technical Matters

Poor presentation, faulty syntax, typographical errors and inconsistencies of style all detract from the reader's appreciation of any paper, however scientifically strong.

- Use a spell-checker!
- Avoid slang or colloquialisms.
- It's ~ It is; Its ~ possessive.
- Reread sentences (aloud, if necessary) for structure and sense.
- Where possible, use short, concise sentences. Use paragraphs to separate ideas.

Choice of Verb Tense when Referring to Authors

When reading academic texts, you may notice that several tenses are used to refer to the work of other authors. The tenses often used are **simple past**, **present perfect** and **simple present**. Such a range is perfectly acceptable and there are several reasons that influence the choice of tense.

Simple Past Tense tends to be the most frequently used tense to refer to the findings of another author's research. The past tense is also most commonly used when the writer uses the 'author prominent' style.

e.g. Walker (1998) **simulated** the speed needed to ...

Present Perfect Tense is often used when the focus of the work is on several authors.

e.g. Jolly [2] and Lawrence [3] **have studied** ...
A number of authors **have investigated** the strength of ... [3, 6, 9]

Present Perfect Tense may also be used when you want to refer to how much or how little research has been carried out on a particular topic.

e.g. Very little research **has been carried out** into the effects of ...

Present Tense is often used to refer to generally accepted scientific facts.

e.g. Experimental observations carried out in the past **show** that ... (Smythe, 1995).

Modal Verbs may be used if you wish to introduce a degree of tentativeness into your comments about the work of an author. In this situation the reporting verb will be in the **passive voice** and the addition of a **modal verb** will indicate the degree of confidence attributed to the information.

e.g. It has been indicated by both Wilkens (2001) and Smithson (2000) that additional parameters **should be added**.

Other modal verbs that can be used, ranging from rather weak in meaning to quite strong, are: **could, may, should, would, will**

Range of Verbs to Refer to an Author's Work

When referring to sources, your writing style will be more effective if you vary the choice of verb to refer to the source. The following is a list of frequently used verbs. When referring to an author, select a verb that is most appropriate to the context and that conveys the author's meaning accurately .

Argued	Indicated	Reasoned
Concluded	Investigated	Recorded
Demonstrated	Noted	Reported
Discussed	Pointed out	Showed
Examined	Presented	Stated
Explained	Proposed	Suggested
Found	Provided	Surveyed

Proposed structure of Chapter 2

Chapter 2: Literature Review

- 2.1 Introduction
- 2.2 Engineering fundamental of the study
- 2.3 Specific subtopic relevant to your study
 - 2.3.1
 - 2.3.1.1
- 2.4 Specific subtopic relevant to your study
- .
- .
- .
- 2.n Summary