HPCOS81

Research Proposal for Honours

Why do you need to know...

Learning Unit 2:

Table of Contents:

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1 SCIENTIFIC WRITING

1.1 Introduction

All aspects of scientific writing discussed in this section apply to writing a research proposal, dissertation/thesis and research article.

All scientific documents such as research proposals, submissions of chapters for a dissertation or a thesis (no matter the stage of completion of these) and articles for scientific journals must comply with the general rules for scientific writing. All work submitted by students are judged according to these criteria. So, there is no better time to start doing things correctly than NOW; from this moment onwards. By doing so, you might protect yourself against unnecessary critique and time consuming revisions of your manuscript.

1.2 Writing style

Study and *apply* the following rigorously to all the scientific documents which you produce (e.g. proposals, dissertations/theses and articles).

1.3 General aspects

The writing style must be concise and to the point. This can only be achieved once you have read widely on the applicable research topic, having put onto paper all relevant information, having integrated these and having deleted unnecessary repetitions, wordiness and irrelevant information. In short, writing can only be to the point once you have made all the information gathered, your own.

The document must bear evidence of a formal writing style.

The document must also bear evidence of a balanced approach by including various perspectives and/or opinions. This refers to the balance of viewpoint included in the literature review, the discussion of possible ethical issues, the presentation of data in an objective manner without omitting findings that might contradict the researcher's (your) point of view. In short, never do research with the aim of proving something, usually a preconceived idea. It is unscientific and unethical.

The author must maintain an objective writing style. Subjective and unsubstantiated statements should not appear in the document. In addition, emotional and unsubstantiated sweeping statements must be avoided. However, an informed educated guess (statement) is called for as this usually forms the basis of the type of argument in which master's and doctoral students should become involved during their studies; their writing must reflect this. Such balanced arguments give evidence of objectivity on the part of the author.

To further maintain objectivity, authors must avoid emotionally laden statements and exaggerations.

Should personal opinions be stated, these should be identified as such and must be substantiated. Such opinions usually derive from experience in practice or from personal understanding of a subject at any point in time. Nonetheless, such statements must be qualified accordingly.

All statements must be justified by referring to reputable publications and/or research results. In this regard, also see the section on references and plagiarism.

All terminology must be defined (from the point of view of at least three sources) and the application of theory to practice in research and academically should be assessed against these definitions for the correctness of application.

1.4 Language use

It can only be to your benefit if English is your second language, to brush up on you English proficiency; grammar, tenses, vocabulary and writing style, in a formal manner (and sometimes even if it is your first language). The literature review, if done properly and if your reading is done with specific attention to grammar and writing style, could be of great help in this regard. Other general aspects that apply to language usage involve the following:

Language usage must be to the point. (See writing style under 3.2 above in this regard.)

The meanings of concepts used must be clear. These must be, where applicable, discipline specific, or specific in terms of the theory and/or philosophy underlying the research or article.

Scientific language, including subject-specific terminology, must be used throughout scientific documents. Note that this is not “jargon”. Jargon refers to such scientific and technical language being used in an inappropriate context. Thus, showing off one’s scientific vocabulary in a colloquial conversation would imply “jargon”. Also, when discipline specific terminology is used inappropriately and incorrectly in any “scientific” writing, it may be considered jargon; more exactly, this could be seen as being pretentious. It is hardly possible that a scientific paper could contain “jargon” when the writing is scientific and subject or specialisation specific. After all, part of being educated within a specific discipline resides in mastering the language of that discipline. In this regard, consider the use and value of definitions in any academic and scientific discipline.

Sentence construction must bear evidence of positive constructions rather than be stated in the passive voice. In addition, sentences must as far as possible be simple and clear. Long, complex and complicated sentences must be avoided. It is, however, also true that a single complex sentence might convey an idea more clearly than a collection of shorter sentences. Discretion should be applied in this instance.

Correct use of grammar and spelling are essential. A good spelling, thesaurus and grammar program loaded onto your computer will be invaluable to you. A thorough literature review can also assist in this regard.

The School of Computing prefers the application of the UK spelling rules and principles. In other words, use the UK word “behaviour” (and other such words) instead of the American word “behavior”. Further use an “s” in words such as intellectualisation, and not a “z”. However, direct quotations must be exactly as the original, including spelling mistakes and punctuation. Officially registered names such as the World Health Organization must be spelled with the original “z”.

It will be useful to set your computer's dictionary and spell check to "UK English". This is done by clicking on the following:

MS Office 2003	**MS Office 2007**	**MS Office 2010**
"Tools" (tool bar)	"Review" (tool bar)	"Review" (tool bar)
Language	Set Language	Language
Set language	English (UK)	Set Proofing Language
English (UK)		English (UK)

- Tenses could also pose a problem. The main point is to think logically and chronologically about one's writing as well as about the time the writings will be read.
- The research proposal will for instance, for a large part, be written in the future tense: "The researcher will implement purposive sampling techniques because …"
- The text of a dissertation, thesis and article will indicate what has already been done such as the research per se and the findings obtained. Aspects related to your study and your research findings must, therefore, be written in the past tense: "The researcher implemented purposive sampling techniques…"
- Recommendations within a dissertation, thesis and article might take on the present tense: "It is recommended that …"
- Sources are referred to in the present tense. Please note that the sources are acknowledged and not so much the author(s). The rationale behind using the present tense is that the sources "state" all the time whatever they state and will continue doing so long after the author(s)' death.
- Generally speaking, students commit fewer grammar errors if they use the past tense and plural nouns, wherever possible.

1.5 Abbreviations and acronyms

The use of abbreviations must be limited as far as possible. This also applies to acknowledged abbreviations.

Abbreviations are written without full stops between letters. (For example, the Council for Scientific and Industrial Research is abbreviated by the letters CSIR not C.S.I.R.)

Before an acronym can be used, the full detail of what it stands for should be indicated, for example:

The Council for Scientific and Industrial Research (CSIR) …

Hereafter, the acronym CSIR may be used in the text. Please note that acronyms, when written, request an article as they are not actual names. Thus, when referring to these they should be preceded by “the”:

“The CSIR requires ...” and “The WHO states ...”

In headings and sub-headings terms are written out in full; abbreviations are not allowed in these instances. This is also the case for thesis titles where no acronyms or abbreviations are allowed, even of simple terms such as ICT.

1.6 Content coverage

Your manuscript must bear evidence of the fact that you have:

- covered the entire research process
- outlined the research topic adequately and the research problem is evident
- adequately covered relevant aspects related to your research topic

1.7 Structure, organisation and internal consistency

Internal consistency refers to the degree of integration and logical deployment and exposition of the contents of scientific writing. The table of contents should clearly reflect the internal consistency of the document and the layout of the document should be according to the dictates of the section on “You and your computer”. With regard to internal consistency, please consider the following aspects:

The document must bear evidence of logical thematic development. The key to this is structure, structure, structure! This in turn is founded on knowledge of and familiarity with the topic and literature and the extent to which you succeeded in “making information your own”.

The discussions must be consistent with the title and research problem. This can only be achieved through the systematic development of themes and sub-themes. This in turn implies the development of headings, sub-headings and sub-sub-headings. In each case it is important for the contents to relate pertinently to the headings and sub-headings. This can only be achieved once the structure of the phenomenon under investigation is well understood.

Structure and internal consistency are further enhanced by the “logic” of the research process and the structure which research designs provide (in quantitative research).

The chosen research design should be appropriate, considering the research problem and purpose.

The proposed methods and techniques ought to be consistent with the selected research design.

Internal consistency can further be enhanced or eroded by one’s writing style. In this regard, one should be on the alert for “reference” words such as “they”, “them”, “those” and the like. Often, it is better to remind the reader pertinently what these refer to, especially if some discussion ensues after an issue has been mentioned pertinently.

Fragmentation of contents is yet another issue that blemishes internal consistency of a scientific document. Several factors could cause this, including not knowing the structure, taking detours and not keeping to sub-headings. Fragmentation can be avoided by using the structure of an existing theory, model or conceptual framework, or by carefully planning the structure of one's discussions. It is also advisable to address only one idea in any given paragraph and to avoid repetitive discussions. Individual paragraphs ought to consist of statements which communicate an introduction, a body and a conclusion.

All scientific documents must consist of a clear topic, an abstract, an introduction, a well-structured body of knowledge, implications, recommendations and conclusions. These may take on different forms in different types of documents.

Make the work your own by interpreting and paraphrasing the ideas which you obtained in the literature. Many students simply copy text from different sources. The result is fragmented discussions which do not make much sense.

1.8 Tables

The following guidelines apply to tables:

- Tables must be numbered consecutively according to the chapters of the dissertation/thesis and the numbers of the tables within the different chapters.
- Each table must have a "name" or label indicated **above** the table.
- A reference for a table, where applicable, appears at the bottom of the table, in size 10 lettering, aligned to the right. Naturally, this does not apply to tables exhibiting data gathered during the research being reported on.
- Line spacing for tables must be set at 1 and not 1.5 as in the text.
- Table contents are presented in a letter size smaller than the general text, usually size 10. Be on the alert when copying statistical data from SPSS and other statistical packages. Often lettering appears minute and unreadable in the Word documents. Tables must be centred on a page if it does not fill the whole space between the left and right margins.
- Whenever practical, tables should not run over from one page to another. If the text cannot be adapted, rather leave a blank space following on the text on the page preceding the page on which a table is fitted. However, when reporting data, it might be necessary for a table to extend over two or more pages. In such cases, ensure that the columns (running vertically down the pages) are identical on all pages.

Tables can take on many different forms within these specifications. However, the layouts must be consistent and standardised for a single document (article, proposal, dissertation or thesis).

Two examples are shown below:

The fifth table to appear in chapter 7 of a dissertation/thesis, obtained from Mouton (2006:207), may be displayed in any of the following two formats, but use the same format consistently throughout your dissertation/thesis.

TABLE 7.5: FREQUENCY DISTRIBUTION OF THE AGE OF RESPONDENTS (N = 299)

AGE GROUPS	F	X	Fx^1	%
46–50	1	4	528	3
41–45	8	4	344	2
36–40	2	3	1064	9
31–35	5	3	1716	17.4
26–30	102	2	2856	34.1
21–25	8	2	2024	29.4
16–20	1	1	180	3
	$\sum f = 299$		8712	
Mean = $\frac{\sum fx^1}{N} = \frac{1712}{299} = 29.1$				

(Mouton 2006:207)

OR

TABLE 7.5: FREQUENCY DISTRIBUTION OF THE AGE OF RESPONDENTS (N =				
AGE GROUPS	F	X	Fx^1	%
46–50	11	4	528	3.7
41–45	8	4	344	2.7
36–40	28	3	1064	9.4
31–35	52	3	1716	
26–30	102	2	2856	
21–25	88	2	2024	
16–20	10	1	180	3.3
	$\sum f = 299$		8712	
Mean = $\frac{\sum fx^1}{N} = \frac{1712}{299} = 29.1$				

(Mouton 2006:207)

1.9 Figures

The following guidelines apply to figures. Figures include models, diagrams (pie diagrams, bar diagrams), graphs, maps, photos and theoretical and conceptual diagrams (frameworks):

- Figures must be numbered consecutively according to the chapters of the dissertation/thesis.
- Each figure must have a name or label indicated at the bottom or underneath it.
- A reference for a figure, where applicable, appears at the bottom of the figure, in size 10 lettering, aligned to the right. Naturally, this does not apply to conceptual models and diagrams structured during a study by the candidate, nor the figures presenting your research results.
- Figures are usually presented in a letter size smaller than the general text, usually a font size 10, though this depends on the density of the figure, the number of labels and the space available. Be on the alert when copying diagrams from SPSS and other statistical packages. Often lettering appears minute and unreadable in the MS Word document.
- Each figure must be centred on a page between the left and right margin if it does not fill the whole space between these margins.

1.10 Table of contents

Thus, the table of contents must:

- correspond with the content of the document (Headings and sub-headings must be exactly the same as in the document.)
- indicate the correct page number on which different headings and sub-headings appear in the text (These must be indicated next to these headings and sub-headings, aligned to the right-hand margin.)
- give evidence of the logical use of headings and sub-headings for easy reading and understanding of the flow of argumentation
- reveal the structure of the different topics under discussion in a logical manner

In the case of dissertations and theses, additional and separate “tables of contents” meeting the requirements set out above must be given for the following:

- list of tables
- list of figures

1.11 Plagiarism

The issue of plagiarism is very important to postgraduate students and you are advised to study this section very carefully. In this section, intellectual property and strategies to avoid committing plagiarism are discussed. This is in the interest of protecting the intellectual property of the authors of the publications which you consult and to ensure scientific integrity. You are advised to read the information on plagiarism which you received from the Unisa Library, in addition to the information supplied in this section.

You are issued with the *Student's Disciplinary Code* (2007) at registration. The University may take disciplinary action against students found guilty of plagiarism.

1.12 Intellectual property

Intellectual property is a form of creative endeavour that can be protected through a copyright, trademark, patent or industrial design. For the purposes of this discussion, we shall focus on copyright, which involves:

- granting the legal right to an author, composer, playwright, publisher, or distributor to the exclusive publication, production, sale, or distribution of a literary, musical, dramatic, or artistic work;

- protecting literary, dramatic, artistic, and musical works, sound recordings, performances, and communication signals; providing creators with the legal right to be paid for – and to control the use of – their creations; providing exceptions to the rights of creators for users, like educational institutions, who want access to material protected by copyright. A balance is achieved by providing creators with legal "rights" and then limiting those rights through "exceptions".

The copyright holder has the sole right to produce or reproduce his/her work through publication or performance, or to authorise such activities by others. Anyone who engages in such activities without permission is infringing on the copyright holder's rights. One specific form of infringement is plagiarism.

The following concepts refer to the responsible utilisation of other people's ideas:

- Attribution refers to the ascribing of a work or an idea to a particular author or artist. Citation indicates the act of directly quoting and giving intellectual credit to another person's work or ideas.
- Fair dealing pertains to the use of copyright material in such a way that it does not infringe on the copyright of that material. Any "fair dealing" with a work for the purposes of private study or research, or for criticism, review, or news reporting is not an infringement. However, in the case of criticism, review, or news reporting, the user is required to supply the source and the author's, performer's, sound recording maker's or broadcaster's name if known.
- Paraphrasing referred to earlier in this tutorial involves a restatement of a text or passage in another form or other words, often to clarify meaning or the restatement of texts in other words as a studying or teaching device.

1.13 General comments on plagiarism

Plagiarism entails using another person's ideas or expressions in your writing without acknowledging the source. Derived from the Latin *plagiarius* ("kidnapper"), plagiarism refers to a form of intellectual theft. To plagiarise is to give the impression that you wrote or thought something that you in fact borrowed from someone else. Doing so is a violation of professional ethics (Gibaldi 1998:151).

It is for because of plagiarism that referencing and listing of sources are emphasised. Your attention is drawn to the fact that numerous computer programs are currently available, to which any "scientific" writings can be submitted to identify cases of *cyberplagiarism*.

Cyberplagiarism entails copying or downloading in part, or in their entirety, articles or research papers found on the internet or copying ideas found on the web and not giving proper attribution.

Deliberate plagiarism refers to the "wholesale copying of another's paper with the intention of representing it as one's own" (http://www.jmir.org/2000/1/e4/). In addition, the definition of deliberate or intentional plagiarism includes the theft of another person's ideas.

Unintentional plagiarism can be described as careless paraphrasing and citing of source material such that improper or misleading credit is given. This can also be due to moral ignorance on the part of the person who commits plagiarism.

It is needless to say that all these forms of plagiarism are unacceptable and should be avoided at all cost.

The origin of information, whether cited directly or indirectly, must always be acknowledged in all scientific writings including your proposal. Plagiarism, intentionally or unintentionally, relates to slackness with regard to referencing and listing of sources. This could have grave results: master's dissertations and doctoral theses accepted and degrees being conferred upon candidates might be withdrawn, expensive court cases might result and the university's academic and ethical integrity could be jeopardised. Many a good dissertation and thesis have been turned down due to slackness with regard to referencing and listing. It is, therefore, important that you maintain a high standard of referencing, both in technique and in accuracy.

Take note of the following guidelines pertaining to acknowledging the sources which you consulted:

- All sources consulted must be referred to, that is, must be "referenced" in the text and listed in the list of references (or bibliography) at the end of the document.

- All sources referred to in the text must be included in the bibliography. Likewise, all sources entered into the list of references must have a corresponding text reference. However, it may be acceptable to provide a "list of sources consulted but not referred to" in addition to the list of references.

- All references must appear in a complete and accurate form. This applies to the author(s), spelling, year of publication, page numbers and titles.
- Information contained in the text references must correspond with the information in the list of references with regard to spelling, date of publication and page numbers.
- In cases where the ideas of different authors are used in one paragraph in the text, they should be sequenced within one set of brackets in alphabetical order according to the surnames of the first authors, with complete publication dates and relevant page numbers. This facilitates the task of the examiners to check your references.
- Remember that we acknowledge sources rather than authors. For this reason, one would indicate:

  "… cited **in** Bell (2010:9)" and not "… cited **by** Bell (2010:9)".

- In addition, sources are referred to in the present tense:

  "Bell (2010:9) states …" or

  "Ehlers et al (2006:14) corroborate this by indicating …"

Within the text, generally, the following must be indicated in brackets when referring to, or acknowledging, a source:

- the surname of the author
- the year of publication
- the relevant page number(s)

In this regard, please study the section on specific reference and listing techniques. It is of the utmost importance that this section be studied to acquaint yourself with the different reference and listing techniques required by the different data sources.

1.14 Where to insert references in the text

Indicate a reference at the end of a discussion as follows:

- If you write a paragraph on information obtained from one source, followed by a paragraph containing information from another source, references should be provided at the end of each of these paragraphs.
- When more than one source is used for the same idea in a paragraph, all the sources should be listed in the same brackets separated by a semi-colon. The sources must be organised in alphabetical order. In this case, the paragraph is ended with a bracket, followed by a full stop.

- It is sometimes necessary to include a text reference after a single or couple of sentences within a paragraph. A direct quotation is an example in case.

1.15 Quotations

The term “quotation” refers to using or copying the exact words, grammar and writing style from a source. Quotations involve directly copying a phrase or idea from a source. These must be used sparingly and wisely, and should only serve to emphasise another author’s unique point of view or unique and catching way of putting an idea across. Quotations demand pertinent referencing and acknowledgement.

Instead of using a direct quotation, one could paraphrase another author’s intention. In this instance, merely replacing a number of words by synonyms is not permissible. You are required to interpret and report on the ideas which you obtain from existing sources. In order to achieve this, you should reflect on other authors’ ideas, analyse them and re-interpret them to fit your own research or scientific thinking. This usually involves summarising authors’ contributions in your own words – paraphrasing. Paraphrases should be accompanied by references.

Quotations should only be used to enhance the effect of a statement or to illustrate a concept. When a quotation is unavoidable, the following applies:

- Do not use long quotations. In general, no quotation should exceed five lines.
- Quotations should never be chained to make up paragraphs. Stringing quotations is not permissible and only serves to reflect an author’s inability to interpret text or her/his inability to present the information in her/his own words. Thus, it indicates the author’s lack of control over, and knowledge about, the research topic. Stringing is both pretentious and in a sense opportunistic. It implies superficial eclectic thinking instead of in-depth dialectic argumentation required and expected from students at the master’s and doctoral levels of academic development.
- Quotations should be in the original language in which they appeared. The exact spelling and punctuation of the original source must be retained, including spelling and typing errors. Quotations in other languages should be followed by an English translation in brackets to ensure that all readers understand the essence of the quotation.
- If you wish to emphasise part of a quotation you may italicise (or underline) it and add the phrase (“I emphasise” or “I italicise”) at the end of the sentence in brackets.
- Words omitted from a quotation must be indicated by an ellipsis – a series of three full stops (“...”).
    - Words added to a quotation, for the sake of flow, clarity or emphasis must be placed in square brackets: “This [situation] is of significant concern to the IT industry” (Smith 2011:43).

Whenever a direct quotation is used, it should be placed in inverted commas "..." or in italics followed by a pertinent reference. Inverted commas are, however, preferred as you might want to use italics to emphasise other aspects or words in the text. Using italics for both might become confusing to the reader: Smith (2011:43) states: "This problem is of significant concern to the IT industry". OR "This problem is of significant concern to the IT industry" (Smith 2011:43).

1.16 General aspects of listing

Listing refers to the list of references or the bibliography inserted at the end of any scientific document. All sources referred to in the text are listed in this section giving full bibliographic details of these. You are again strongly advised to study the section that follows on specific reference and listing techniques required by different literature and electronic information sources. This section serves to acquaint yourself with, and alert you to, the different sources you may encounter during your study and the array of sources available to you.

In general, it is good practice to avoid sources that are more than five years old, unless you are referring to seminal works in the field older than this, or if you are discussing the historical development of a concept or a discourse. In fact, when focusing on the core of your research it is good to give prominence to the most recent good quality sources that you could find. It is of the utmost importance to continue to update your discussions and sources as you progress with your dissertation or thesis. No chapter should be regarded as finalised until you are ready to submit the dissertation for examination purposes.

The following general issues apply to listing:

- All references in the text need to be supplemented by a detailed list of sources at the end of the document. The list of sources should commence on a new page.
- List sources alphabetically according to the authors' surnames.
- Sources should not be numbered.

The following must be indicated when listing a book:

- the author's surname, followed by a comma and initial(s), followed by a full stop
- the year of publication, full stop
- the title of the book, full stop (Only the first letter of the title should be capitalised and the title should be underlined or italicised.)
- an indication of the edition (2nd edition) where more than one edition exist – never refer to the 1st edition as such
- the place (city or town) of publication (not the place of printing) followed by a colon
- the name of the publishers, followed by a full stop

If you consulted more than one publication by the same author, these are arranged chronologically according to the date of publication.

If more than one publication by the same author in the same year have been consulted, distinguish between them by the addition of “a”, “b”, and so on after the year of publication (see example in the compiled list of sources).

Details of a source are given in the language of the source itself. If you use a German book, its place of publication should be München, not Munich, for example.

In the case of a report or article, it is customary to include only those references to which one has actually referred (whilst in a dissertation one may include some items to which no direct references were made but which were studied).

When newspaper reports are referred to, these must be included in the bibliography and photocopies of the newspaper cuttings together with the name of the newspaper and date of publication must be included as an annexure to your thesis or dissertation.

Cross referencing in the list of sources should be made in cases of shortened text references for example CSIR, Unisa, and so forth. The reader will look for the word CSIR in the list of sources. There it will be indicated that the full reference is Council for Scientific and Industrial Research, and “ CSIR: See Council for Scientific and Industrial Research”.

We now provide a number of useful tips for managing your sources.

Keep a separate file. Enter the complete details of all sources you take in hand, even before reading them and even if you do not refer to them later, into this file. It is easier to delete sources to which you have not referred to than to search for these sources when you try to compile a list of references at an advanced stage of completion of your dissertation/thesis. Please take this advice seriously. Alternatively, you could enquire from your librarian on how to use Refworks to store a database with your references via the library website. This is probably the best way to maintain a flexible database with all your sources.

1.17 Referencing and citation styles

Please study Referencing and citation styles thoroughly to acquaint yourself with the different sources you may encounter during your studies. Adhere to the requirements of these throughout your study, from the first submission of the research proposal to the final copy of your dissertation/thesis. When referring and listing revisit this section and note exactly how to refer to, and how to list a specific source. References and listing of sources MUST be done correctly from the onset of your studies and throughout your studies.

Many variables influence the way in which one refers to a source. Some of these include:

- the number of authors
- whether authors actually authored the source or only contributed towards it in part whether the source appears under the name of an editor(s)

- whether it is a book, an article, legislation, conference presentation, magazine or newspaper or other publications
- whether it is from the printed media, electronic media, radio, television, CD, CD-ROM, or whatever other format
- the date of publication, reprint and re-editions

Suggested citation styles for the School of Computing:

1. Harvard British Standard BS ISO 690
2. Harvard
3. APA American Psychological Association (6th ed).

1.18 Conclusion

In this section, we explained how to prepare a scientific document. We covered aspects related to scientific writing and especially reference techniques. We also explained what plagiarism is and how to avoid it.

2 THE LITERATURE REVIEW

2.1 Introduction

A literature review is required to enable you to write a good research proposal, dissertation or thesis. A preliminary literature review will enable you to develop a feasible research problem and research methodology, and write the research proposal. Once your research proposal has been accepted and incorporated into chapter one of your dissertation or thesis, your supervisor will request that you conduct an in-depth literature review on the research topic and write a literature review chapter. In addition, you will be required to update and extend the literature review once you have analysed the collected data. This will enable you to link the research findings with existing knowledge.

In this section, you are introduced to different issues relating to the literature review and writing a literature review. These issues involve: (1) sources to consult on theory of research; (2) assessing websites and web-based information; and (3) writing the literature review.

2.2 Useful sources that could be consulted

You will be required to consult sources on your research topic and the research methodologies.

It is highly recommended that you should visit a library and study the contents of some journals deemed relevant to your research topic. Start with the latest copies and go back to 2002, for example. Make copies of articles relevant to your research topic and study these prior to embarking on writing your research proposal, dissertation or thesis.

Also obtain the latest available editions of research publications. These publications will assist you in developing the methodology for your research.

Students often ask questions about the number of references required. This depends on the topic and the amount of literature available but as a rough guide the following could serve as indications:

- Research projects: at least 30 references about the topic of research and 5 references about research methodology.

2.3 Useful research publications

We are unable to provide a list of sources pertaining to your research topic because each student's topic is unique. It is our responsibility to request the subject librarian to compile a bibliography on your research topic. You need to provide the subject librarian with the key terms pertaining to your research.

The following sources are useful research publications. They will enable you to write your research proposal, dissertation/theses and/or article. The list does not claim to be complete. Students are welcome to consult any additional sources.

2.4 Books

Cornford, T & Smithson, S. 2006. *Project research in information systems: a student's guide*. 2nd edition. Basingstoke: Palgrave Macmillan.

Creswell, JW. 2009. *Research design: qualitative, quantitative, and mixed methods approaches.* 3rd edition. Los Angeles, CA: Sage.

Hofstee, E. 2006. *Constructing a good dissertation*. Sandton: EPE.

Mouton, J. 2001. *How to succeed in your master's and doctoral studies: a South African guide and resource book*. Pretoria: Van Schaik.

Myers, MD. 2009. *Qualitative research in business & management*. Los Angeles, CA: Sage.

Oates, BJ. 2006. *Researching information systems and computing*. London: Sage.

Olivier, MS. 2009. *Information technology research: a practical guide for computer science and informatics*. 3rd edition. Pretoria: Van Schaik.

2.5 Journals

At postgraduate level, the majority of sources that you consult should be the highly esteemed academic journals in your specific field of interest. Regular and careful consultation of these journals is essential. You need to ensure that your own thesis "fits into" this bigger picture and you need to show in your literature review that you are aware of the latest ideas and discourses in your knowledge field.

Another tip that is worth remembering is that articles that are eminently suitable for informing your own research will probably have a list of references that you may want to read as well for potential inclusion into your own reference list.

2.6 Web pages and websites

Please note that web pages and websites on the open internet (in contrast to information found on academic databases and academic journal websites on the internet) normally would not carry much academic weight in terms of inclusion into your literature review. Be very careful not to found any core aspects of your research on the basis of information obtained on such a website. Nevertheless, where specific documents have been accessed (e.g. government or university websites) for relevant information you need to cite these in the correct format. Make sure that the date that you accessed the website is clearly indicated, as websites have a tendency of changing and disappearing.

2.7 Assessing websites and associated information

As indicated in the previous section, it is important to understand that the information contained in non-academic websites may potentially be of questionable quality. Similar to all sources used for research purposes, websites need to be carefully evaluated for their scientific and academic standing and standard. In this regard, you need to keep the following in mind when assessing the information accessed via a website:

Authority

Ask yourself whether the following is clearly indicated:

- who the author is
- whether the author is an expert on the topic (and not just in his/her own opinion)
- whether the person or institution who owns the contents of the page is credible and trustworthy
- whether the page is linked to information describing the goals, purposes and intentions of the sponsoring organisation is available and whether the legitimacy of the page's sponsor(s) can be verified
- whether there is sufficient contact information available in the form of phone numbers or postal addresses (not just e-mail addresses) for persons to contact should you require more information
- whether there is evidence of the information having been through a form of peer review process (this is usually not the case for open website information, which is why the scientific credibility is low)
- whether there is information on copyright and the name of the copyright holder

Accuracy

With regard to the accuracy of information on web pages, question the following aspects:

- Are sources of factual information clearly listed and verifiable?
- Is the standard of language good? (Bad language can lead to inaccurate interpretation of the facts on the web page.)
- Is it clear who the person is that has the ultimate responsibility for the accuracy of the content of the material?
- Are charts and graphs and their labels readable and clear?

Objectivity

With regard to objectivity, ask yourself the following:

- Is the information provided as a public service? Such information might not always be very scientific.
- Is the web page free of advertising? Information might be presented in a way that promotes a certain product or service. One should be alerted by advertisements appearing with information on a web page. Again, this might not be scientific information at all.

Currency

As a general rule regarding sources of information, one needs to establish the currency of the information with regard to the dates indicating when the page was written, first published on the web page and when the last revision was done. Also check whether the date of any data reported on is provided and whether you can establish which version of the web page you are looking at.

Coverage

With regard to coverage, check that the web page is not under construction and whether a printed equivalent to the web page is available – if so, whether the entire document is available on the web or only sections of it.

2.8 The literature review

2.8.1 Introduction

The purpose of research is to contribute to the existing body of knowledge and to improve the life world of people. The existing body of knowledge figures in a number of ways including the theoretical (theories, concepts, models, frameworks, etc) and the empirical (research reports, statistics, published reports, etc).

A research projects contribution toward the existing body of knowledge may be in the form of:

1. the validation of existing knowledge

2. the rejection of existing knowledge
3. the creation of new knowledge that fills in gaps existing in the current knowledge base
4. the generation of new knowledge to be added to the existing body of knowledge

It is essential for researchers to be cognisant of the scope of coverage and extent to which a topic chosen for research is covered in the existing body of knowledge. It is normally required from a student to establish the scope and extent of existing knowledge through conducting an in-depth literature review. The literature review is thus equally appropriate to identify any gaps in the existing pool of knowledge on a specific topic.

For the most part, the initial proposals students submit reflect “unsubstantiated certainty”. This is mainly reflected by the few, and sometimes total, absence of references to substantiate what is said. From a scientific point of view, “certainty” without substantiation or evidence is not valid. Though such certainty may be based on experience and is essential for a problem-based orientation towards research, on its own, it does not meet with the research criteria of validity, generalisability and probability. What students need to do is to cultivate a feeling of unease and uncertainty with regard to the research topic; an uncertainty and unease that cultivates inquisitiveness and motivation to know more. This position is often prompted by the critique that supervisors offer as feedback on the initial unsubstantiated research proposal. Once a position of unease and uncertainty is reached, one can move towards reflection via a literature review. Such reflection leads to the identification of knowledge gaps, whether pertaining to one’s own level of knowledge or to the research topic. Knowledge gaps are then addressed by a search for evidence in both the literature review and the actual research which finally cancels out the initial unsubstantiated position with evidence-based certainty or scholarly confidence.

By the time that you start with empirical research in your academic career, it is assumed that you have successfully completed as part of your earlier studies an advanced module in research methodology. The “unsubstantiated certainty” is thus not easily tolerated. For this reason too, this tutorial letter is not intended to explain the process of conducting a literature review, but to clarify some of the questions students have, and to illuminate some of the difficulties they encounter in conducting a literature review; in weaning themselves from unsubstantiated certainty.

2.8.2 Starting the literature review

Where should a literature review start? It is strongly suggested that an extensive review of theoretical and empirical literature related to the topic be undertaken before writing the research proposal. An in-depth literature review enables the researcher to develop and refine a research problem relating to the chosen research topic; to select a suitable theoretical framework and research design for the study; and to develop an appropriate research method. It is, therefore, essential to consult sources relevant to both the research topic and the implied research methods.

Some controversy, however, exists with regard to the extent of the review of the literature conducted prior to conducting the actual empirical research. Some qualitative researchers argue that an extensive literature review prior to a qualitative research study might pre-empt theory skewing the outcome of the study. This has even led to some students thinking that no literature review is conducted in qualitative research at all. This is normally not the case at all and the idea of not being au fait with the most current literature in the field of study is based on a misconception regarding the nature of research.

The School of Computing's position in this is, therefore, that a preliminary literature review must be conducted prior to writing the research proposal. This literature review serves to enable you to develop your research problem. In addition to this, an extensive literature review will be conducted prior to conducting your research. It is also necessary to revisit the literature review after you have analysed the data obtained to enable you to link your results to existing knowledge. The literature review could assist you in foundational aspects of research such as the acquisition of the required vocabulary to communicate in the scientific communities and in your field of expertise, practice in scientific writing and general improvement of language abilities.

Generally, the main purpose of the literature review is the following:

- to sensitise the researcher to the phenomenon being researched, which in turn assists the researcher in designing the general research approach, data gathering instruments and analysis of the data
- to stimulate the researcher to think about the essence of the problem and scientific ways of solving it
- to help the researcher in understanding the main perspectives and ideas that inform the knowledge area that the topic is situated in
- to help the researcher ensuring that the proposed study will not accidentally result in repetition of research through enabling an understanding of the context for the proposed study and how it relates to existing research work
- to help the researcher enabling a focused refining of the topic
- to assist the researcher in selecting or crafting an appropriate research design

2.8.3 Identifying concepts relating to the research topic

The literature review should cover the main concepts related to your research topic. The issue at this point is about the concepts that are related to the research topic and not so much about their relevance. Related concepts can be identified by:

- Identify the key concepts from the research topic.
- Expand these by utilising the basic principles of concept analysis namely:
    - Use thesauruses to find synonyms of the identified key concepts.

- Scrutinise existing formal theory that describes the identified concepts and note the relative specific definitions of these concepts.
- Look up alternative academic discipline specific definitions for these concepts (such as in psychology, sociology, philosophy, anthropology and the like).
- Delve into the concept/word's etymology (origin of words).
- Select sources and information related to the concepts and aspects of your topic.
- From the initial sources, read and identify the names of authors decidedly associated with the topic and concepts as experts.
- Access these sources and use the principles of "snowballing" with regard to both concepts and authors (experts) to extend the literature review.

As an example, consider the following research topic:

"The promotion of internet-based mental health materials among aging users moving to retirement homes."

In this case, the literature review should cover:

- adoption and use of the internet amongst various sectors of society
- mental health information requirements
- the unique aspects of aging users moving home
- aspects of internet connectivity related to retirement homes

Keeping in mind the basic principles of concept analysis referred to above, the concept:

"Adoption and use of the internet amongst various sectors of society" may reveal quite surprising results.

For instance:

- functionalist perspectives (models predicting adoption and use)
- sociotechnical perspectives (activity-based or social network-based perspectives)
- critical perspectives (the power and politics of health information on the internet)

Similarly, issues in internet connectivity will not be the same across the world. You will need to look at the specific context where your research is situated.

2.8.4 The type of literature review to be conducted

The main focus of the literature review is around the research topic, the main discourses that inform research and knowledge on the topic and theories and

conceptualisation of the topic at a scientific level. However, it is also good to investigate the ways in which the topic has previously been researched, that is, aspects of methodology and research design reported on in literature. These two aspects would typically not be reported on in the same chapter – the methodology and research design with its associated contextual material would constitute a separate chapter from the chapter reporting on the research topic and its context.

It should, therefore, be clear that though the research topic takes precedence over methodology because the literature review is primarily planned around and guided by the research topic, in master's and doctoral studies, methodology is quite important. Therefore, a whole chapter should after all be devoted to methodology (research design and methods) and the philosophical underpinnings of the research.

It is strongly suggested that when you start off with the literature review, to record (maybe in a separate document) all issues relating to the research designs and methods which other researchers have used in investigating different aspects of the topic and phenomenon relevant to your study. This will greatly assist you in deciding on the paradigm, design and methods to use in your research. In the case of quantitative research, it will most certainly assist you in coming to grips with some of the statistical calculations to be conducted.

Always consult the latest sources that are available and, in addition, remember to consult seminal older sources that have been extensively cited by researchers in the field. Academic journal articles on the topic that you study are the most important sources in obtaining the latest information and trends.

Two final issues on the two major themes to be covered by the literature review: It is important to understand the context of previous empirical studies – you should therefore indicate any potential limitations that the previous studies entail (e.g. limits in terms of geographic area, group of participants, time of study, etc) that may impact on the relevance of the source. Secondly, it is extremely important that you always argue a point, that is, you need to present both supporting and contradicting evidence on any point, then provide reasons on which view you support in the context of your studies.

2.8.5 Writing the literature review chapter

Please review the section on "Scientific writing" and apply it to this section on the literature review.

4.8.6 Currency of literature

The question about the currency of literature to be reviewed is perhaps one of the most pressing and most diverse. Literature on the most recent discourses on the topic and on research methods and designs should preferably not be much older than five years. General consensus is that the most current edition of such sources should be consulted and referred to in most instances. In the realm of qualitative research, and especially with regard to methodology and studies at the doctoral level, students are often advised to return to "classic" or seminal sources in your research field. Note, however, that not just any "old" source is a "classic". "Classic" is a special status among

sources earned by virtue of the source's authority on a specific topic. True "classics" in any field of research are relatively scarce. These may often be identified by the fact that they have been cited by others in the field hundreds or sometimes even thousands of times (see the citation statistics in Google Scholar for an indication of a paper's "seminal" status). For instance, if you were to search on Google Scholar for the paper "Computing Machinery and Intelligence" by Alan Turing that was published in the journal "Mind" in 1950, you will see that it has been cited almost 5 500 times. This is an example of a seminal work. Older papers that have never been cited by other researchers are probably not particularly informative and you should consider carefully whether they represent a useful read, or whether you should focus on more recent papers instead.

In addition to the above, the research turnover in a specific field also influences the "currency" of sources. In the fields related to computing, new knowledge is generated and technologies are developed constantly which render sources older than a few years outdated. Again, some caution is in order; not all aspects of a given phenomenon enjoy equal interest from researchers which leaves certain areas relatively "current" though older.

Nonetheless, you should include current, preferably the most recent, sources in your dissertation, thesis or article. The general impression left by a list of reference not containing current sources is that the contents may have been copied from an existing study (please refer back to the section on plagiarism), or that the researcher is not devoted and is lazy.

Currency of literature is also influenced by the context of the research in terms of time and geographical area. Naturally, a more retrospective and even historically based project will demand chronologically older sources. On the other hand, certain phenomena might not have been researched in certain geographical areas in years; perhaps even not at all.

Overall, poor listing and referencing inevitably lead to poor feedback of which the ultimate objection could be that the study is turned down. Many good research studies have been turned down (failed) due to poor referencing and listing (of which outdated sources are part) and questionable research ethics.

2.8.7 Terminating the literature review

A literature review is not a once-off event. You will have to continue reading and updating information and sources up to the point that the dissertation or thesis is finalised. It is usually easier in a quantitative study to end the literature review than it is in a qualitative study. The reason for this is that during the latter type of study, the literature review takes on a form of data gathering during the later stages of the research. This often leads to new findings and a further refinement of the reconstruction of the phenomenon under investigation, kindling a new interest in the researcher towards the research topic. However, at some point the literature review and the research need to end. More often than not, this point is reached by most students prematurely, primarily because students do not realise the amount of work that goes into a dissertation or thesis and are not familiar with the standard of work expected of them. Sometimes, they are also too focused on being conferred a degree than in acquiring the basic skills of research and scientific writing.

Though the latter may be most students' ultimate aim and motivation, it is unfortunately not enough in order to sustain and motivate a researcher on a day-to-day basis. True interest in research and the research topic is the only real source of enduring fulfilment and the only way for becoming an established researcher.

3 Research Purpose, Question and Objectives

3.1. Research purpose

The research purpose is generated from the research problem; it identifies the specific aim or goal of the study. The aim/purpose of research at the academic level is first and foremost to contribute to the existing body of knowledge in a specific discipline. This is what distinguishes scholarly research from other research projects. Secondly, research is aimed at improving a particular area of life, including any professional practice. This to some is a thorny ethical issue. To compromise, let us agree that improving knowledge and practice are equally important. Practice can only benefit from the critical minutiae of academic research; something advanced students must come to peace to right from the start. If not, it is going to cause students endless unnecessary and unwanted critique from the supervisor.

Note that there is a difference between the research purpose and the significance of the research. Please consult your textbooks on how to formulate a research purpose. Indicate what the purpose of your study is. Keep your research title, research problem and your problem statement in mind when formulating the research purpose. The research purpose must be derived from and is more specific than the problem statement.

Please note that "making recommendations" is NOT a purpose of a study, as it is parcel of all research and report writing. It goes without saying that certain recommendation will be made once the study has been completed.

3.2. Research questions

Research questions and hypotheses both derive from the background to the study as well as the stated research problem. Hypotheses could, however, also be derived from the theory chosen for the research.

While the research objectives are declarative statements, the research question is an interrogative statement. Research questions may be used in addition to objectives or, the research can be conducted without stating a pertinent research question(s). This relativism need to be discussed with your supervisor in relation to your research problem. Remember a question is a statement that ends with, or need to end with a question mark (?).

You have to formulate a research hypothesis or hypotheses if you intend to statistically determine the relationship between variables or to measure the differences between two or more groups of participants. Please note the words “relationship” or “correlation” do NOT necessarily indicate a causal relationship between independent and dependent variables. The latter, strictly speaking, can only be determined under controlled (experimental) conditions which can be maintained by applying a true experimental design (something achieved by few postgraduate students in social science research fields). The theory one chooses to apply during a study usually is a rich source to generate hypotheses from.

3.3. Research objectives

Objectives refer to what it is that you wish to attain during the research. Attaining objectives is a fundamental sub-process inherent in the research process. Research objectives are clear, concise, declarative statements involving the central variables of the research and contain verbs highly associated with research such as to describe, explore, identify, analyse and the like. Objectives should assist in clarifying how the aim or purpose of the research will be realised in brief terms.

Please note that “making recommendations” is NOT an objective of a study, as it is parcel of all research and report writing. It goes without saying that certain recommendation will be made once the study has been completed.

4 Conclusion

In this section, we provided guidelines on how to conduct and report on a literature review. Please remember that the literature review should be regarded to be an integral part of a research proposal, dissertation/thesis and article. It is necessary to consult sources about your research topic and research methodology. A literature review is not a once-off event. It is a continuous process which enables a researcher to develop sound arguments and make substantiated statements based on the latest developments in your field of research.