HOW TO WRITE A THESIS

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How to write a thesis ?

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ABSTRACT

A thesis is a written record of the work that has been undertaken by acandidate. It constitutes objective evidence of the author's knowledgeand capabilities in the field of interest and is therefore a fair means togauge them. But the most common, and often the only reason why athesis is written is that it has become an obligatory offering that needsto be placed at the desk of an examiner to obtain an academic degree.

As a result, most students do not really know how to undertake athesis or a dissertation. The usual practice is to plagiarize in a newpresentable fashion. This review article is intended to createawareness among the students of this very important academicexercise and also to clarify certain issues in putting up a good writtenrecord of his/her research work in a methodical manner. Althoughthesis writing may be viewed as an unpleasant obligation on the roadto acquiring a degree, the discipline it inculcates may reap lifelongbenefits.

KEY WORDS: Thesis, Reference, Introduction, Results

Introduction

According to the American Heritage Dictionary, a thesis is "a dissertation advancing an original point of view as a result of research, especially as a requirement for an academic degree. Thus, a thesis can be said to be a written record of the research work that has been undertaken by a candidate during the course of his study for obtaining an academic qualification. It constitutes objective evidence of the author's knowledge and capabilities in the field of interest and is therefore a fair means to gauge them. Although thesis writing may be viewed as an unpleasant obligation on the road to a degree, the discipline it induces may have lifelong benefits.[1] The main objective is to imbibe interest and to teach the basics of research thus aiming at improving the scientific temper of professionals. A thesis is usually confused with a 'dissertation'. Thesis is basically a proposition that one advances and maintains one's stand by argument. If the proposition is delivered without proof, then it becomes hypothesis. It has originality and review of literature does not constitute the bulk of the work. A dissertation, on the other hand, is a treatise that deals with the subject formally and systematically. In a nutshell, dissertation is more of a statistical work to agree or disagree on a particular topic/ point/ report of workers while thesis is a proposition, where an effort is made to propose something new.[2]

Structure of a thesis

While going through a research project and writing of a thesis, one has to answer the common questions of "what, why, how, where and who". Bradford Hill

[1965] evolved the IMRAD structure of thesis writing – an acronym for "Introduction, Material & methods, Results, Analysis and Discussion." It is included in nearly all the recommendations made by institutions for their students to follow. A simple structure that can be followed is as below:

1. Title Page

It includes subtitles, author, department, institution, date of delivery, research mentor(s), mentor's institution and acknowledgements [technical, intellectual as well as financial], if any. Ethical issues involved in the study, if any are clarified with explanation of how they have been taken care of. Approval of Institutional Ethical Committee, if obtained is also mentioned.

The title, akin to a baby's name, should be thought of on completion of the structure and not before the baby [research] is born. It should be expressive describing the content in few words. Words that can catch the attention of others without appearing foolish are used with some scope for minor changes at a later date.

2. Abstract

A good abstract explains in one line why the paper is important. It then goes on to give a summary of the major results, preferably couched in numbers with error limits. The final sentences explain the major implications of the work. A good abstract is concise, readable, and quantitative. Length should be about one or two paragraphs or approximately 400 words. Abstracts generally do not have citations and information in title should not be repeated. Answers to these questions should be found in the abstract: What was done? Why it was it done? What question is being attempted to be answered? How it was it done (stating the methods)? What was learnt? Major results are stated. Why does it matter? At least one significant implication is pointed out.

3. Introduction

It aims at answering why the study has been taken up on the particular topic, defining clearly the aims and objectives. It should include a statement that is an important/interesting scientific problem that the thesis either solves or addresses something sufficiently interesting to motivate the reader. The next paragraphs in the introduction should cite previous research in this area. One should then go on to explain why more work was necessary (the present work, of course.) The abstract should not be repeated. Proper acknowledgement is given to previous work(s) on which the current work is being based and built. Sufficient references, such as a reader can gather and/or verify by going to the library, achieve a sophisticated understanding of the context and significance of the question. All cited work should be directly relevant to the goals of the thesis. This is not a place to summarize everything one has ever read on a subject. The exact scope of the work is explained - what will and will not be included. It should be obvious where introductory material ("old stuff") ends and the contribution of the current work ("new stuff") begins. A good introduction cannot be written until one knows what the body of the thesis says. For this reason, it is advisable to write the introductory section(s) after completing the rest of the paper, not before.

4. Material & Methods

This section tries to answer 'what' and 'how' of the study. It should be sufficiently informative so as to enable the reader to assess the believability of the results. It should also provide information required by another researcher to replicate the experiment. One should mention in detail modifications, if any, made to the standard techniques/methods that are already mentioned in literature. It includes description of the researcher's materials, procedure, theory, calculations, technique, equipment used, limitations, assumptions, range of validity, description of analytical methods used, including reference to any specialized statistical software. One must include a proforma/ format of the study stating the inclusion and exclusion criteria used for the selection of the material. Descriptions of the results are not included in this section.[3]

5. Results/ Observations

It is the core of the dissertation. This segment answers the question of what was found. The results are actual statements of observations, including tables, statistics and graphical representation of data like line diagrams, pie-charts, photographs etc. Sufficient details are presented so that others can draw their own inferences and construct their own explanations. S.I. units (m, s, kg, W, etc.) only are used throughout the thesis. Results are reduced to logical segments by using subheadings. Key results should be stated in clear sentences at the beginning of paragraphs. Findings are described without telling the reader whether or not they are significant. Results must be unbiased and published as it is. Both the positive and negative results are mentioned. The results are not

interpreted at this stage – this would be done in the discussion. As far as possible, one must write in past tense with proper punctuation. Seemingly short length of the "results" should not be a matter of concern; rather it makes it easier for the reader to absorb the gist of the work without the need to frequently shift the mental mode.

6. Discussion

It is said that discussion is an exchange of knowledge, while argument is an exchange of ignorance. This section is meant to answer 'what do the results mean?' A few sentences that summarize the most important results must open the discussion. The discussion section should be a brief essay in itself, answering the following points:

a. Present principles, relationships and generalization observed in results with exceptions and lack of correlations,
b. Agreement or disagreement with previous work,
c. Interpretation of results in terms of background laid out in the introduction - what is the relationship of the present results to the original question?
d. Implication of the present results for other unanswered questions.
e. Things we now know or understand that we didn't know or understand before the present work, including evidence or line of reasoning supporting each interpretation.
f. Significance of the present results: why should we care?

This section should be rich in references to similar work and background needed to interpret results. However, interpretation/discussion section(s) are often too long and verbose. If there is any material that does not contribute to one of the elements listed above, this may be worth deleting or moving. The writer must make it crystal clear to the reader which statements are observations and which are interpretations. In most circumstances, this is best accomplished by physically separating statements about new observations from those that convey the meaning or significance of those observations. The interpretation is not overlaid on top of data or in figures.

7. Conclusions/ Summary & conclusions

It is the brief description [gist] of the entire study. The reader should be able to understand the entire text of the study by going through the summary. It should include the strongest and most important statement made from the observations. The summary should contain those parts of the work that the author would want the reader to remember. It would be a great idea to refer back to problem posed, and describe the conclusions that were reached from carrying out this investigation and summarize new observations, new interpretations, and new insights that have resulted from the present work. The broader implications of the results are included. The abstract, introduction or discussion should not be repeated word for word. Recommendations for further research, if any, intended to fill in gaps in present understanding should be given in this section.

8. References

These are used to cite all ideas, concepts, text and data that are not the author's own work and do not constitute the present work. If a statement is made, it should be backed with data from the presented study or a reference. All references cited in the text must be listed. Listing is of two styles - Vancouver style and Harvard style. Footnotes are not used.

In the Vancouver style, the numbering of the references is done in order of their appearance in the write up. It has a particular pattern to be followed. Examples are cited below.

a. Ruskin KJ. Venous Air Embolism. Available from: World Wide Web address or URL http://anestit.unipa.it/gta/vae.html
[for a web address]

b. Saukko P, Knight B. Knight's Forensic Pathology. 3rd ed. London: Arnold; 2004.
[for a book]

c. Groell, Reinhard, Schaffler, Gottfried J, Rienmueller, Rainer. The Peripheral Intravenous Cannula- A Cause of Venous Air Embolism. The American Journal of Medical Sciences November 1997; 314 (5): 300-302.
[for a journal article]

In the Harvard style, the numbering is done based on the alphabetical listing of the names of the first author, whose work has been cited, without attention to the order of their appearance in the text. Examples are given below.

a. Agarwal S.S., Kumar L. and Chavali K.H., (eds) (2008) Legal Medicine Manual. New Delhi, Jaypee Brothers Medical Publishers.

[for a book]

b. Daisley H. and Simmons V. (1999) Homicide by paraquat poisoning. Med Sci Law. 39, 266-69. [for a journal article]

9. Appendices

This shows all the data pertaining to the study. It includes tables (where more than 1-2 pages), calculations (where more than 1-2 pages), list of equipment used for experiment or details of complicated procedures etc. Figures and tables, including captions, should be embedded in the text and not in an appendix, unless they are more than 1-2 pages and are not critical to the argument. One may include a key article as appendix.

Conclusion

After going through the above, it can be seen that writing a thesis is simple if you know how. There are three aspects: structure, substance and style, but all three are entwined. One should start at the beginning by keeping good records. It should be understood what it is that is being done and why. One should be clear what story is going to be told. The hypothesis should be kept to the fore always. The thesis structure that has been given should be stuck to. The Experimental Chapters should be written first followed by a Literature Review if it has been done. Conclusions, Introduction and Summary, in that order, complete the rest. The other bits and pieces like the Appendices may be written as you go along.

Think, plan write and revise. Think clearly and write carefully. Clarity, precision and brevity are the three watchwords. Gaps should not be left in the chain of logic or ideas expressed. Verbiage and clutter should be avoided. It is important that one develops his/her own writing style by careful reading and even more careful writing. Repeated reading and revision help to polish what has been written. The help of the guide may be sought to critique the thesis draft and amend it accordingly. Writing a thesis should be a matter of enjoyment rather that a burden.

We hope that you enjoy writing your thesis. Good luck!

REFERENCES

1. Chandrashekhar R. How to write a thesis: A working guide. chandra@arcme.uwa.edu.au , 2002.

2. Mestri SC, Manjunatha B. Handbook on Health Professional Education. 1st ed. Jaypee Brothers Medical Publishers [P] Ltd., New Delhi; 2008.

3. Kastens K, Pfirman S et.al. How to write your thesis. Available from: World Wide Web address / URL http://www.ldeo.columbia.edu/~martins/sen_sem/thesis_org.html .

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