Chapter 17

Writing the abstract and front matter

> Science is fundamentally about communication. Un-communicated science in essence does not exist.
>
> Simeon J. Yates, Noel Williams and Ann-Florence Dujardin
>
> *Writing Geology: Key Communication Competencies for Geoscience, 2005*

The *Abstract*, sometimes called a summary, is a succinct synopsis of the report or thesis usually consisting of less than 300 words. It is the first part of the report or thesis that the reader will read. Conversely, it is the last part of the report or thesis to be written because the *Abstract* is based on the content of the entire report or thesis (see *Chapter 12—Strategies for writing a good report or thesis*). The abstract contains only key information found in the report or thesis. In some conferences, only an extended abstract (a longer version of the abstract) is published. In essence, an abstract is a mini-article (Gillaerts & de Velde, 2010).

COMPONENTS OF AN ABSTRACT

The *Abstract* is referred to as a 'mini-article' as its format corresponds to that of the report or thesis in consisting of four main components: *Introduction, Materials and Methods, Results and Discussions*, and *Conclusion* (Ayers, 2008; Kanoksilapatham, 2007). Information found in the four components are summarised in Table 17.1. As the *Abstract* is short, only key steps of each component are abstracted from the report. To help in deciding what key steps to extract from the report for each component, suggestions are given in Table 17.1.

There are generally two types of abstracts: descriptive and informative. A *descriptive abstract* describes the work being abstracted and is usually short, less than 150 words. A descriptive abstract indicates the type of information found in the report and includes the keywords found in it. It may include the objective and method of the research. A descriptive abstract does not provide results or conclusions nor evaluate the research.

Table 17.1 Components of an *Abstract* and their relevant tenses

Component	*Description*	Tenses
1	Introduction	
	A. Research background	Simple past or present perfect
	B. Research problem	Simple past or present perfect
	C. Research purpose	Simple past or present
2	Methods	
	A. State data collection instruments	Simple past and past perfect
	B. Identify experimental variables	
	C. State experimental steps taken	
	D. State data analysis processes	
3	Results and Discussion[a]	
	A. Present main findings	Simple past
	B. Comment on findings as an explanation or generalisation with comparison with prior findings, or support from theories	Simple present and present perfect
4	Conclusion	
	A. State theoretical/research contributions of the study	Simple present
	B. State contributions to practice—real-world advice and/or applications	

[a] Kanoksilapatham (2013) combined discussion and conclusion parts together.

Informative abstracts, on the other hand, present the purpose, method, results, conclusions of the research and recommendations. It explains all the main arguments, important results and evidence in the report. Thus, you should aim to write an informative abstract for the final report or thesis. A sample informative abstract annotated with a content analysis is shown in Writing Guidelines 17.1 while another version of the same abstract which has been modified as a descriptive abstract is shown in Writing Guidelines 17.2.

Though the study's purpose and methods are described, the descriptive abstract does not give information about its results. Instead, it only indicates that results were reported in the paper. This is in contrast with the informative abstract version which states the principal finding and provides an explanation for it.

SOME KEY LANGUAGE FEATURES IN AN ABSTRACT

Verb tenses

Verb tense should also vary according to the rhetorical content. In stating the research background and research niche in Component 1 (Introduction), the simple past tense is used if you are describing research which took place in the field, while the present perfect tense is used to refer to research that

Writing Guidelines 17.1 Content analysis of modified informative version of Kek's (2014) abstract

Final year report informative abstract titled "Permeability of Compacted Soils" by Kek (2014)

More than two-thirds of Singapore's land area is covered with residual soils **(1A)**. Residual soils are often compacted and used for engineering construction works due to its favourable engineering properties **(1A)**. Compacted soils are by nature unsaturated **(1A)**. Unlike saturated soils, permeability of unsaturated soils is a function of void ratio and degree of saturation **(1A)**.

The objectives of this project were to investigate the effects on soil fabric on permeability and to evaluate the direct and indirect methods used to measure permeability **(1C)**. In this project, both saturated and unsaturated coefficients of permeability of compacted residual soils were measured at the same relative compaction on the standard and modified Proctor compaction curves **(2A & 2B)**. A flexible-wall permeameter was used to measure the saturated and unsaturated coefficients of permeability of the soil specimens directly while the minidisk infiltrometer and a permeability function (ACUPIM/W) based on the drying soil-water characteristic curve were used for the indirect methods **(2A)**.

Differences in the saturated and unsaturated coefficients of permeability were observed for the specimens at the dry and wet of optimum of the compaction curves **(3A)**. However, the differences in permeability could not be attributed solely to the soil fabric due to differences in the specimen void ratios after saturation **(3B)**. Measured coefficients of permeability obtained from the flexible-wall permeameter and mini disk infiltrometer were consistent with values obtained from ACUPIM/W **(3B)**. Suggestions for further improvement of the flexible-wall permeameter are also included in this report **(4B)**.

[a] bracketed term at the end of each sentence indicates a step e.g., **(1B)** indicates step B of Component 1, **(2D)** indicates step D of Component 2 etc. as shown in Writing Guidelines 17.1.

Writing Guidelines 17.2 Content analysis of modified descriptive version of Kek's (2014) abstract

Modified descriptive version of final year report abstract titled "Permeability of Compacted Soils" by Kek (2014)

The objectives of this project were to investigate the effects on soil fabric on permeability and to evaluate the direct and indirect methods used to measure permeability **(1C)**. In this project, both saturated and unsaturated coefficients of permeability of compacted residual soils were measured at the same relative compaction on the standard and modified Proctor compaction curves **(2A & 2B)**. A flexible-wall permeameter was used to measure the saturated and unsaturated coefficients of permeability of the soil specimens directly while the minidisk infiltrometer and a permeability function (ACUPIM/W) based on the drying soil-water characteristic curve were used for the indirect methods **(2A)**.

Comparative results between the saturated and unsaturated coefficients of permeability were reported for the specimens at the dry and wet of optimum of the compaction curves **(3A)**. A discussion of the results ensued **(3B)**. Suggestions for further improvement of the flexible-wall permeameter are also included in this report **(4B)**.

[a] bracketed term at the end of each sentence indicates a step e.g., **(1B)** indicates step B of Component 1, **(2D)** indicates step D of Component 2 etc. as shown in Table 17.1.

has been actively conducted over recent years or research that has not been investigated up to the present study. When describing the importance or centrality of the research issue which is the focus of the study, the simple present tense and present perfect tense are most appropriate. In stating the research objective in Component 1 (*Introduction*), the simple past tense is used if you are stating your research aim as goals that have been completed. However, if you are writing it as a statement on what has yet to be revealed in the report or thesis, the simple present tense is used.

The simple past tense and past perfect tense are used in Component 2 (*Methods*). Presenting main findings in Component 3 (*Results and Discussion*) is in simple past tense but comments on the results are usually in simple present tense or present perfect tense. In Component 4 (*Conclusion*), simple present tense is used because it implies the currency of the research report's contributions to the research field it is situated in.

For more information on grammar in a report, see *Chapter 10—Grammar, punctuation and word usage guide.*

Evaluative language

Factual language should be used in stating the introduction, method and findings. However, the discussion of findings in Component 3 (*Results and Discussion*) could be expressed cautiously or confidently, depending on the empirical strength of the claims. Statements in Component 4 (*Conclusion*) are usually expressed with some caution, especially practical implications and applications as the author is aware of the tentativeness of his claims.

SOME CONSIDERATIONS IN WRITING AN ABSTRACT

A well-written abstract is very important as a reader uses it to judge if he or she should read the full report/article. Some conference organisers use the strength of the abstract to decide on the mode of presentation of the paper at the conference. An excellent abstract will be recommended for oral presentation while a good abstract will be recommended for poster presentation. Needless to say, a poor abstract will be recommended to the bin! An excellent abstract is almost invariably an informative abstract. An excellent abstract should also be concise providing sufficient information and containing no unnecessary information. The following is a checklist on writing an excellent abstract:

CHECKLIST FOR WRITING AN ABSTRACT

Introduction

- ☐ Why is the work done?
- ☐ What are the specific problems that motivate the work?
- ☐ What is the objective of the work?

Methods

- ☐ What was the methodology?
- ☐ What was investigated?
- ☐ What was done?
- ☐ How was it done?
- ☐ How was the analysis done?

Results and Discussion

- ☐ When the experiment was completed, was the hypothesis proved or disproved?
- ☐ What are the key results?
- ☐ What were the challenges in the experiment?
- ☐ Were there any corroborative results?
- ☐ What were the supporting theories?
- ☐ What were the limitations?

Conclusion

- ☐ What was the impact or implications of the work?
- ☐ What does it mean for others?
- ☐ Were the findings transferable?

PARTS OF FRONT MATTER

Front matter, otherwise known as prefatory parts of a report or thesis, typically consists of the following:

- Cover page
- Title page
- Abstract
- Acknowledgments
- Table of Contents
- List of Tables
- List of Figures
- List of Symbols

The *Cover Page* is the first page or cover of a hardbound report or thesis reflecting the title of your research project, your full official name, your university's name and, finally, the year in which your report or thesis is submitted or approved.

The *Title Page* comes after the cover page and shows the research project title, your full official name, a brief description of the nature of the research

report such as 'A thesis submitted in (partial) fulfilment of the requirements for the Degree of (degree title), (your university's name) and the year of submission/approval'.

The *Abstract* follows the *Title Page*. The *Table of Contents* which follows is usually organised as two columns: the first column shows the names of the front matter, for example abstract, main parts (chapter/section names and sub-section headings) and supplementary parts (e.g. references, appendices); the second column shows the corresponding page numbers for the various prefatory parts and chapters. Note that front matter is paginated in lowercase Roman numerals (e.g. i, ii, iii, iv, v, vi) while the rest of the report is paginated in Arabic numerals (e.g. 1, 2, 3, 4, 5, 6). Note that numbering of pages starts from the first page of the Introduction to your report.

Acknowledgments comes before the *Table of Contents* and indicates your recognition of significant contributions of individuals and/or organisations towards your data collection and/or report writing. For example, you should acknowledge the contributions of your supervisor who has guided and advised you throughout the research process.

If you have tables in your report or thesis, you should include a *List of Tables*. This is oganised as three columns: the first column shows the numbering of tables in order of appearance; the second column shows the table captions or brief content descriptions; and the third column shows the page numbers which indicate where the tables appear in your report or thesis. Similarly, if you use figures in your report or thesis, you should have a *List of Figures* on the following page which is organised as three columns: the first shows the numbering of figures in order of appearance; the second column shows the figure captions or brief content descriptions; and the third column shows the page numbers which indicate where the figures appear in your report or thesis.

If you use technical or mathematical symbols, you can indicate them in a glossary of terms called a *List of Symbols*. This is usually organised as two columns: the first column shows the symbols while the second column states the explanations of the symbols.

See *Chapter 22—How to create a good layout* for more information on the layout of front matter.

CHECKLIST FOR AN ABSTRACT AND FRONT MATTER

Does your abstract include

- ☐ Information about your introduction, methods, results, discussion and conclusion of your study?

Does your front matter include:

- ☐ A cover page and title page stating your project title, your name, a brief description of the report as partial or fulfilment of a degree programme and university affiliation?
- ☐ An acknowledgment page?
- ☐ A table of contents detailing the prefatory parts, main parts and supplementary parts of your report and their page numbers?
- ☐ A list of tables and a list of figures if you have included tables and figures in your report?
- ☐ A list of symbols if you have included technical or mathematical symbols in your report?

INTERESTING FACTS

Particle physicists Berry, Brunner, and Popescu from H. W. Wills Physics Laboratory and Shukla from the Indian Institute of Technology discovered that neutrinos travel faster than the speed of light, contravening the speed limit proposed by Albert Einstein. Their finding was later shown to be erroneous, but not before the publication of their 2011 paper titled 'Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?' Their abstract consists of only two words constructed as a response to their research question/title: 'Probably not.'

According to Kanoksilapatham (2013) who analysed a corpus of 60 abstracts of civil engineering research articles, research background is found in 36 out of 60 abstracts (60%) as the opening line of the abstract. This is followed by research purpose, which is found in 41 abstracts (68.33%). The methodology component, which consists of information on the data collection instruments, experimental variables and experimental steps, is the most frequent abstract component, occurring in 56 abstracts (93.33%). The results component is the next most frequent component—it is found in 55 abstracts (91.66%). The discussion component which Kanoksilapatham combined with the conclusion component is used in 40 abstracts (66.67%).

REFERENCES

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