

Technical report writing guidelines

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plan

1. Introduction to technical writing

Purpose of technical writing and what is important to know before starting.

2. Planning a technical report

Stages and typical report structure.

3. Guidance on technical writing

Writing style, conventions, illustrations, references and good practices.

4. How readers pursue a technical report

introduction to technical writing

Technical writing is an exercise on effective communication of technical information, e.g., the design of a system and how it is implemented, or how results are obtained what significance they hold.

It must be simple (even simpler than other writing forms) but it is not easy.

The keywords are: relevance, rigour, clarity, organization and consistence.

the writing process

Know your audience

Technical reports can be read by people with different levels of knowledge and interests, e.g., supervisors, colleagues or senior managers.

Managing the contents, length, structure and style depend on the intended readers.

*Tip: use **appendices** to present details that may interest to only specific readers (e.g., someone that will repeat your work)*

But no reader wants irrelevant content...

the writing process

Break down the writing process into stages: planning, drafting and revision.

1. Planning

Record everything (meeting notes, draft designs, bibliographic notes, measurements, etc.) in a notebook (or the electronic equivalent) and make this a routine habit.

Share information with supervisors and team members.

Play around with the organization of the report: it is not necessarily evident in which order some things should appear.

Start organizing references as soon as possible.

the writing process

2. Drafting

Get the bulk of the report written down without worrying too much about style and artistic impression.

You can give full attention to language (Portuguese / English) once the content has been committed to paper.

Reports do not have to be drafted sequentially: it is often easier to write introductory material after writing the content which it is heading.

3. Revision

This is an iterative process to improve clarity, balance and readability.

Ideally, a final draft should be finished and re-read one week after.

Ask a friend to read your draft and make helpful comments.

Your supervisor needs time to read your final draft and you need time to process their comments. You must **provide 2-3 weeks for these two final tasks!**

report structure (example)

Before text

Cover page

Title page

Dedicatory (optional)

Epigraph (optional)

Keywords and abstract

Acknowledgements (optional)

Table of contents

Other lists: figures, tables, acronyms, etc.

Text (chapters)

Introduction

State of the art / background theory

Conceptual modelling / theoretical analysis

Procedure / implementation

Results and discussion

Conclusion

After text

References

Appendices (optional)

Annexes (optional)

report structure

Cover page

Report title, authors, university, department and date (year).

The title is very important!

Avoid long titles and do not use abbreviations or acronyms.

Title page

Title and status:

“Relatório de Projeto em Informática da Licenciatura em Engenharia Informática da Universidade de Aveiro, realizado por <autor 1>, <autor 2> e <autor 3> sob a orientação de <professor>, <cargo, e.g., Professor Auxiliar do Departamento de Engenharia, Eletrónica e Telecomunicações da Universidade de Aveiro>.”

report structure

Keywords

Keywords must help other students, experts, researchers, etc. to find your work.

Give a list of 4-6 keywords:

Keywords may be a single word or several words.

Capitalize the first letter of keywords, e.g., 'Fleet management system'.

Do not use acronyms or abbreviations: use 'Decision support system' instead of 'DSS'.

Keywords should categorize your work as a whole, so focus on major concepts. Add a keyword if the concept covers at least 20% of your project. It is OK to disregard minor aspects of your work.

Ask yourself what your project is about. If you were searching for this topic, what keywords would help you find it.

Adapted from <http://www.k-state.edu/grad/etdr/submit/keywords.html>.

report structure

Abstract (150 - 250 words)

An abstract is a condensed description of the project and should include the key points of the introduction, methods, results and conclusion.

The results may be summarized qualitatively but avoid quantitative summaries.

Do not use acronyms, abbreviations or references.

Readers look at the abstract first: do your best to make a good impression.

Use words carefully to capture reader interest and make an effort to show that the subject (problem) covered by your work is important.

report structure

Introduction

The introduction serves to help the reader understand:

Why the work was performed.

What was performed.

The most interesting results.

The organisation:

Start the introductory paragraph by presenting what is generally known about the subject. Then move step by step through more detailed information, ending with a description of the problem that is covered in your project.

The next few paragraphs should refer to what has been done before. Refer only to the most relevant works in your literature review. Explain how earlier work relates to your work.

Then present the objective of your work and a general description of the results obtained.

At the end, tell the reader how the report is organized.

report structure

State of the art / background theory

Present detailed information, background knowledge and comparisons about the subject covered in the project based on previous work (e.g., published literature).

Divide this chapter into sections

Refer to outside sources of information.

Conceptual modelling / theoretical analysis

Describe the problem (system), requirements and details about the design procedure.

Describe all the terminology used.

*Keep the contents as general as possible and **avoid details of implementation.***

report structure

Procedure / implementation

Describe the methods used to test the idea or to implement the design presented in previous chapter.

*Provide information so **the work can be replicated**.*

*Provide **diagrams and pictures** to help in understanding the procedure.*

Results and discussion

Organize the results of your work using tables and graphs, if possible.

*Accompany results with a meaningful **discussion**.*

Discuss possible sources of error and how accurate results are.

report structure

Conclusion

It should be a concise description of the project including its purpose and most important results providing specific quantitative information.

Explain what your project has achieved as well as the benefits and the shortcomings of your solution.

*The **reader** should be able to read this chapter on its own.*

Do not use specific terminology, abbreviations or acronyms and do not include figures and references to them.

Suggest future works.

report structure

References

Every sources of information, e.g., books, journal articles, conference papers, technical reports, websites or other internet resources must be cited.

*Keeping **references** accurate and complete **helps demonstrating the quality of the work.***

Be sure that:

Every reference that appears in text must have a citation in the references section.

Every citation in the references section must be used in the text.

Evaluate references** (particularly websites and internet resources) **critically.

Do not consider Wikipedia a credible reference because the information changes over time and authors are not necessarily people with verifiable expertise or credentials.

report structure

Appendices

Supplementary material created by authors, such as, lengthy algorithms, diagrams, detailed results or system configurations.

Typically used to present details that are of interest only to specific readers, e.g., someone who perhaps will repeat your work.

Create numbered appendices rather than putting different items in one appendix.

Annexes

Supplementary material created by third parties, such as regulations or legislation.

All **appendices and annexes must be referred in the body of the report** (chapters) using the corresponding number.

report layout and styling

Consistency is highly important

Define layout and styles and apply them throughout the entire document.

Use always the same spelling (e.g., online / on-line) and language (e.g., traditional / post-reform Portuguese, UK / US English), and use terminology consistently.

Begin chapters in a new odd page and leave generous blank space on the top. Number chapters, sections and subsections (3 levels, at most).

All pages after the table of contents must include a page number:

Use sequential Roman numerals to paginate the table of contents and subsequent lists (figures, tables, acronyms, etc.)

Use sequential Arabic numerals to paginate the text after introduction.

report layout and styling

Illustrations

Tables, graphs and figures help to clarify the contents and can make writing easier, hence, plan illustrations early in the process.

*Be sure that **illustrations are readable** and leave some extra blank space before and after an illustration.*

Illustrations must be numbered and have a caption (use always the same format).

No need to have an illustration title (it has a caption).

*They **must be cited along text** (use always the same format) and placed near their mentions in the text.*

Cite a reference when appropriate.

report layout and styling

There are many referencing styles, e.g.:

ACM (Association of Computing Machinery), APA (American Psychology Association), IEEE (Institute of Electrical and Electronics Engineers), NP 405 (Portuguese)

For a comparison refer to: <http://dal.ca.libguides.com/content.php?pid=860&sid=11818>

Choose one referencing style and apply it consistently

Reference manager tools

Mendeley desktop & Microsoft Word plugin (<https://www.mendeley.com/download-mendeley-desktop/>)

BibTeX & LaTeX

report layout and styling

ACM in-text citation style (http://www.acm.org/publications/latex_style/)

One author: enclose the last name of the author and year of publication, e.g., [Burando 2007].

Two authors: both last names and the year of publication are included, e.g., [Burando and Lee 2007].

More than two authors, include the last name of the first author followed by an "et al.", e.g., [Burando et al. 2007].

Sequential parenthetical citations are enclosed in square brackets and separated by semi-colons, e.g., [Burando 2007; Burando and Lee 2007].

When a citation is part of a sentence, the name of the author is NOT enclosed in brackets, but the year is: "So we see that Burando et al. [2007]..."

report layout and styling

Examples of some of most commonly used ACM reference types

Article in a journal:

Patricia S. Abril and Robert Plant. 2007. The patent holder's dilemma: Buy, sell, or troll? Commun. ACM 50, 1 (Jan. 2007), 36-44. DOI:<http://dx.doi.org/10.1145/1188913.1188915>.

Monograph (book):

David Kosiur. 2001. Understanding Policy-Based Networking (2nd. ed.). Wiley, New York, NY.

Article in a conference proceedings (conference, symposium or workshop):

Sten Andler. 1979. Predicate Path expressions. In Proceedings of the 6th. ACM SIGACT-SIGPLAN symposium on Principles of Programming Languages (POPL). ACM Press, New York, NY, 226-236. DOI:<http://dx.doi.org/10.1145/567752.567774>.

report layout and styling

Examples of some of most commonly used ACM reference types

Doctoral dissertation:

Kenneth L. Clarkson. 1985. Algorithms for Closest-Point Problems (Computational Geometry). Ph.D. Dissertation. Stanford University, Palo Alto, CA.

Master's Thesis:

David A. Anisi. 2003. Optimal Motion Control of a Ground Vehicle. Master thesis. Royal Institute of Technology (KTH), Stockholm, Sweden.

Technical report:

Greg Turk and David Banks. 1996. Image-guided streamline placement. Technical Report I-CA2200. University of California, Santa Barbara, CA. 453-460 pages.
DOI:<http://dx.doi.org/10.1145/237170.237285>.

report layout and styling

Examples of some of most commonly used ACM reference types

Document / WWW resource:

Harry Thornburg. 2001. Introduction to Bayesian Statistics. (March 2001). Retrieved March 2, 2005 from <http://ccrma.stanford.edu/~jos/bayes/bayes.html>.

report layout and styling

Do not assume that the reader has prior knowledge or access to prior reports, textbooks or handouts.

The report must provide **sufficient detail to allow recreating the results of the project.**

Do not provide full historical record of how your work was developed.

Recognize that all of **your technical work builds on the work of others.**

At no point should you attempt to present the work of others as your own (plagiarism).

Reports do not have to be drafted sequentially:

It is often easier to write the introduction after writing the contents towards it is referring.

Abstract can wait until last.

report layout and styling

Write a tentative table of contents as soon as possible.

Remember that the **reader cannot guess what you are ‘thinking’**.

Grammar

The active voice is usually more precise and less wordy than passive voice.

Use the third person although there is still some debate. Do not use ‘we’ in a single author report.

You should normally use the present tense when referring to previously published work (i.e., to express general truths or facts or conclusions supported by research results that are unlikely to change), and to present the results of calculations and statistical analysis.

Use past tense when referring to your work.

report layout and styling

The first sentence in a paragraph states the main point and the remaining sentences present information related to that point.

Write in short, succinct sentences. Write precisely what you want to transmit and no more.

The **text should not be a series of sentences** but should retain a flow and continuity of expression.

Avoid remarks in parenthesis and excessive footnotes.

report layout and styling

Use correct grammar, punctuation and spelling.

Write foreign words in italic.

Avoid unnecessary **jargon** and define terms on first use.

Describe acronyms on first use and include the acronym in parenthesis, e.g., Decision Support Systems (DSS).

Do not use acronyms in abstract and conclusion sections.

Do not be judgemental: “I felt that...”, “The results were great...”.

Ground your statements on references or on experimental work.

Give your report to someone to proofread.

how readers pursue a technical report

The reader will first read the title page and abstract

The conclusion is often the next section to be read.

The introduction is read next. Provide enough information so that the reader can choose which sections are most applicable to their interests.

Then, some or all of the subsequent sections may be read.

conclusion

Be aware that most jobs in technical field require significant amount of technical writing, e.g., technical reports, informal memos, or formal proposals for presentation to customers

➔ developing good technical writing skills can only improve your career status!

references

Ana Carla Madeira and Maria Manuel Abreu. 2007. Comunicar em ciência – como redigir e apresentar trabalhos científicos. Escolar editor.

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