UNIVERSITY OF RHODE ISLAND

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A Brief Guide to Report Writing

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Abstract

The basic goals of technical report or article writing are considered, and practical suggestions given. A report template is suggested, along with descriptions of the different sections' contents, as they occur.

[The Abstract is a very short (one or two paragraph) prospectus of what the report contains. Sometimes one or two key results of the work described by the report are also given in the abstract.]

1 Introduction

Writing is a learned skill. While there may be a rare person who was born with the ability to write with ease and always produces smooth prose in one draft, most of us are not so lucky. It is a struggle, but it can be also be very gratifying to produce a document that explains ideas and results clearly. Reports are the primary method used to transfer knowledge from the lab or designer to other researchers or the user. A report is the final link in the chain; if a good report is not produced, in many respects one might as well not have done the work in the first place.

This paper describes some of the basic components or sections of a technical report, and what is likely to go in them. Section 2 discusses the background of report writing, and what some of the key difficulties are. Section 3 presents the techniques used by this work to show how reports are constructed. In Section 4 we describe required and optional report components, and what they are likely to contain. Section 5 gives some tips on style, content and approach. The report is summarized in Section 6.

[It is tempting to skimp on the Abstract, Introduction and Summary sections. But don't: many readers look at the Title, then Abstract, then Introduction and Summary to decide if they should spend the time to read more of your report.

A report has three regions: beginning, body and end. The Introduction comprises the beginning, the Conclusions the end region, and the sections in between are the body, where the meat of the report is.]

2 The Problem

The primary goal of a report is to educate the reader about the results of your work. "Results" can be research findings or new ideas (e.g., research articles or papers, theses), inventions (e.g., patent disclosures), documentation of a machine and its operation (e.g., user's

manual), etc. Regardless of the type of report, the problem is to explain your work to the reader in as concise and clear a fashion as possible; one should also strive to keep the reader awake with an engaging style of presentation.

[This section gives the motivation for the report: why did you do all that?]

3 Methodology

We employ a two-prong approach in this report. First, it contains a description of the components or sections of reports in general. Second, this entire report is constructed itself as an EXAMPLE of a nicely structured and written document (I hope :-)). You should feel free to modify this structure in your own works to fit your particular circumstances.

We also include a section of tips on style for technical English that we have found helpful, in the hope that one or two of them may help you with your writing.

[This part describes how you went about solving the problem; not the solution itself, but how you produced the solution.]

4 Sections of a Technical Report or Article

I have found, as have others, that the best way to get a new idea across is the Navy way: *Tell 'em what you're gonna tell 'em, tell 'em, tell 'em what you told 'em.* Redundancy has its place, if not many places.

A typical number of main sections of a report is about 5-6, as follows:

Abstract: Briefly says what's in the report.

Introduction: In a paragraph or two, describes the problem addressed and the approach the clever authors have taken to solve the problem. The measurements and other results are summarized in one or two sentences (just the high points). Also gives a one paragraph outline of the rest of the report.

Background: Section 2 begins the meat or *body* of the report. It discusses the problem in depth.

For a design report, this section describes the goals of the design and the constraints placed on it.

For a science research article, the hypothesis to be tested is given and discussed here.

This is also the most common place to review what has been done by others before you on the problem or related issues. This includes a review of the other literature on the subject, WITH citations. Some authors, however, prefer to put the background or "related work" at the end of the body, in a section just before the conclusions. It's up to the author, and the circumstances of a particular report.

Methodology: It is important to establish in the reader's mind confidence in your work. This is partially achieved by relating to the reader your scientific or design technique. For a science article this includes the experiment's design, and explicitly how the hypothesis is to be tested. For a design report, it includes the design techniques followed, and what steps were taken to ensure the adequacy of the result (e.g., how the performance is measured).

Results: This section presents the summary data, such as graphs, and drawings, such as high-level block diagrams, of your experiment or design. The detailed experiment or design data is NOT placed here, but rather in an appendix, or left out, with a mechanism put in place to give the reader access to it. These days, the latter is commonly done by putting the information in a technical report (which has no length constraints), and putting that on the Web.

The results and their implications are discussed, such as whether or not the hypothesis was proven, or whether or not the design met the design goals and specifications. Sometimes the analysis of the results is placed in a separate section, to distinguish between fact (the data) and implications or interpretations (analysis of the data).

This is the last part of the body of the report.

Summary or Conclusions: Very briefly, the problem addressed is restated, and the contributions of the work presented therein are reviewed. Sometimes suggestions are given for future work.

This is the end part of the report.

Appendices: Detailed data or schematics are placed here, room permitting.

References or Bibliography: The references for the papers or other works cited[1] in the report are put here, in a compact form (often highly specified and constrained).

[This and the next sections are our "Results" section(s). Such a section describes your solution, data and analysis. This is where you lay out your case for the report's position.]

5 English

The over-arching rule is to have pity on the poor reader; she or he has not been where you've been or seen what you've seen. He or she also has no time to read anything; if your masterpiece is a quagmire, they're likely to give up and move on to a more (seemingly) worthy document.

Another KEY point is to <u>know your audience</u>. Don't write a 100-page tome on geology for a Kindergarten class on rocks.

Don't be afraid to edit your own writing. Very few people write one draft. One author suggested: "If you are really fond of a passage you have written, throw it out, it's probably junk." It often takes several attempts to create a good sentence.

A rule of thumb: "When in doubt, leave it out." If you're not sure how relevant a sentence, word, paragraph, etc. is to the discussion, how can you convince the reader it is? If you leave it in, you may just confuse the poor slob.

[1]This is a somewhat arbitrary citation[1]. By the way, use footnotes sparingly, if at all.

Use the active voice. It comes across much better, as well as helping to engage the reader. *[Another "Results" section.]*

6 Summary and Conclusions

It is difficult to write well-structured, compelling and interesting technical documents. By nature they tend to be dry. However, there are things that can be done to make reading technical documents an intellectually rewarding experience. Follow the Navy way of repeating the crux of the argument several times to get it across. Further structure your document to strengthen your argument: in the body of the report firmly establish the problem you are seeking to solve, demonstrate that your approach to a solution is sound, describe your solution clearly and concisely, and present and analyze data that supports the correctness and efficacy of your solution. Then enjoy the accolades.

This report has recorded what I've said verbally to my students for years; now they have something to look at and study, as well, hopefully improving the quality of the student reports submitted. I'll be able to spend less lecture time on this subject, and more on explaining the technical material of the course, which should also help the students.

[Here you summarize the problem, your solution, and the contribution of the report.]

A Raw Data

data

[That is, "data".]

References

[1] A. K. Uht. The Integrated Computer Engineering Design (ICED) Curriculum. In *4th Annual Workshop on Comp. Arch. Educ., at HPCA-4*. IEEE, Jan. 1998.

[The references establish your knowledge of the field, and that you know whereof you speak.]