



TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

THESIS WRITING GUIDE

TAMPERE UNIVERSITY OF TECHNOLOGY
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PREFACE

This document is a comprehensive guide to writing a thesis at Tampere University of Technology. Although this guide is primarily intended for students writing their master's thesis, it can also serve as a general guide to preparing other written reports. This guide is intended for international students only. Finnish students use a Thesis Writing Guide written in Finnish.

The course 'KIE-3376 Technical Writing in English' is recommended to students preparing their master's thesis in English. In addition to this guide, the faculties have their own instructions for writing master's theses. This document is based on literature and the thesis guidelines of different degree programmes.

The chapters Thesis structure, Thesis layout and References contain instructions and recommendations for preparing scientific papers. See the chapter Writing Process for more general writing tips.

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1. INTRODUCTION

Students at Tampere University of Technology prepare a master's thesis before they can be awarded the degree of Master of Science in Technology or Architecture. Students can also use applicable sections of this guide when preparing other written reports.

Students prepare a master's thesis at a later stage of their studies to earn a master's degree. The extent of the master's thesis is 30 credits or, if you are studying according to the old one-cycle degree system, 20 credits. By preparing a master's thesis, students demonstrate their conversance with their major subject and the ability to conduct independent research. The thesis must be a self-contained report that other professionals in the field can understand without additional materials. Master's theses are generally prepared individually, but they may also be prepared in a group, in which case the independent contribution of each author must be demonstrated. The faculty council appoints at least one examiner for the thesis. The examiner must be professor or doctor representing the field of the candidate's major subject or, for special reasons, a teacher appointed by the faculty council.

Students must also take a proficiency test relating to the master's thesis. The proficiency test is an essay-type paper that demonstrates the candidate's conversance with the topic of the thesis. Proficiency tests are primarily evaluated by the thesis supervisor. They are graded on a Pass/Fail basis.

2. THESIS STRUCTURE

All master's theses include the following sections.

- Title page
- Abstract
- Preface
- Table of contents
- List of symbols and abbreviations
- 1. Introduction
- 2. Theoretical background
- 3. Research methods and materials
- 4. Results
- 5. Discussion of the results
- 6. Conclusions
- References
- Appendices

The titles of chapters 1-6 are provided as examples only and students are recommended to use titles that best describe the actual content. You can add more chapters and sub-chapters to your thesis, if necessary. You can also start each chapter with a brief introduction, but then you must write such an introduction in the same style to all the chapters.

The above-mentioned structure is best suited for reporting the results of experimental research. The structure and content of your thesis may differ from the ones presented above, if you are preparing, for example, a literature review or a design-oriented thesis. In such case, you should consult the examiner of your thesis for advice on the thesis structure before starting the writing process.

2.1. Thesis title

The thesis title should be brief, clear, accurate and catch the attention of the reader. Avoid unnecessary abbreviations, company names and brand names. For information retrieval purposes, the title should contain keywords that best describe your thesis.

2.2. Title page

The title page features the University logo, the author's name, the thesis title and type (master's thesis), name(s) of the examiner(s) and the date. The date is the day when the faculty council approved the topic of your thesis and the examiners. A template for the title page is available in Appendix 1.

2.3. Abstract

The abstract is a distillation of your thesis: a self-contained, concise description of the significance and content of your research. A template for writing an abstract is available in Appendix 2.

The abstract describes your main research objectives, materials, key methods and results, conclusions and recommendations for further research. The abstract must be understandable even to people who are not familiar with the topic. Avoid charts and tables, unless they are necessary for the reader to understand the content. Abstracts never contain information that is not mentioned in the main body of the thesis. Abstracts contain no references or quotations.

The following bibliographical information is placed on top of the page:

NAME OF THE UNIVERSITY

Degree programme

LAST NAME, FIRST NAME: Thesis title

Master's thesis, number of pages, number of appended pages

Month and year of thesis completion (the month when the faculty council approved the thesis)

Major subject: candidate's major subject

Examiner(s): title and name

Keywords: list of the keywords that best describe the thesis

The actual abstract follows the bibliographical information. The abstract and bibliographical information must fit on one page. The abstract is written using single line spacing and the same font as in the main body of the thesis. The abstract is divided into paragraphs but no headings are used.

2.4. Preface

The preface contains general information about the thesis process. The preface must include a statement indicating the relative contributions of the thesis supervisor and possible other collaborators (instructions, advice and so on). If the research was undertaken by a group, the preface must detail the student's contribution to the research and the writing process. Acknowledgements to those who contributed to the thesis are generally presented in the preface. It is not appropriate to criticize anyone in the preface. The maximum length of the preface is one page. Add the date, after which you have not made any revisions to the text, your signature (in the case of bound copies), your name in block letters and, if you want to, your address and other contact information at the end of the preface.

2.5. Table of contents

The table of contents includes all the numbered headings of the thesis, except the headings that precede the table of contents, such as the Preface, and the table of contents

itself. The table of contents must be identical to the headings and subheadings in the body of the thesis. For more information, please see the chapter Thesis Layout.

2.6. List of symbols and abbreviations

All the notations, symbols, units, abbreviations and terms used in the thesis are defined in this chapter. Mathematical and other symbols are defined first, followed by letter symbols. The symbols are presented in alphabetical order. Units that are in accordance with the SI system are not listed. Despite this list, any abbreviations and symbols are defined when they appear in the body of the thesis for the first time. After this you can presume that the reader knows them. If your thesis contains a lot of pictures or tables, you can list them on separate pages after these symbols and abbreviations. Depending on the nature of your thesis, this chapter may not be required. If your thesis only includes abbreviations, notations or terms, give this chapter an appropriate heading. An example of this chapter in a thesis that contains no abbreviations is available in Appendix 4.

2.7. Introduction

An effective introduction arouses the reader's interest, establishes the topic and prepares the reader for the content that follows. The introduction outlines the purpose and objectives of the research and defines the topic and content of the thesis. You must also specify the research problems and questions that your thesis attempts to resolve in the introduction. In addition, you must briefly describe your research methods and how you are planning to achieve your objectives.

The introduction should contain short references to earlier or contemporary research in your field to demonstrate that your work builds on earlier research. Earlier research results are described in more detail in the chapter Theoretical background/Starting point, but placing your thesis in a theoretical context helps the reader understand the purpose and relevance of your research. If the thesis is part of a larger project, the author's contribution to the project must be clearly stated.

Based on the introduction, the reader forms an overview of what to expect. This is why the introduction should briefly describe the content and structure of your thesis and specify how the different chapters are connected to each other. However, the purpose of the introduction is to outline your research methods and results and not to describe them in detail. Do not present any conclusions or recommendations for further research in the introduction.

2.8. Theoretical background or Starting point

This chapter presents the technical, theoretical and other background information that is necessary in order for the reader to understand the solutions and methods described later

on in the thesis. The content of this chapter depends of your research field and the type of research.

The theoretical section presents a thorough literature review and provides a theoretical framework for your research. It is important that all the concepts are carefully defined, so that the reader knows what you are referring to. The theoretical section must form a coherent whole with the entire thesis. Do not include any inessential information that is not directly related to your thesis in this section. You can assume that your reader is an expert in the field of engineering but has no specialized knowledge of the topic that you are discussing. Thus, it is not necessary to present very basic information concerning your field in the thesis.

In addition to theoretical information, the background information may include, among others, a description of the existing products of the company that commissioned your thesis, the system to be replaced, the standards to be followed, the internal practices of the company and other parts of the project. If your thesis is part of a more large-scale project, this must be stated in the background information. This information must be presented in such detail as is necessary for you to explain your solutions and for the reader to form an overall picture of the research.

The final structure and headings (including the main heading) of this chapter are determined based on the content of your thesis. You can also divide this chapter into a number of subchapters.

2.9. Research method and materials

The purpose of this chapter is to provide the reader with a clear understanding of the research methods that you used to arrive at your results. This helps the reader assess the reliability of your findings. You can start by presenting alternative research methods and giving your reasons for choosing one method over the others. You must present your research materials in detail, so that there can be no confusion as to their origin and nature.

Describe your research methods so carefully that other researchers in your field could reproduce your study based on the information. For example, the mathematical basis of any new results must be presented in such detail that the readers can follow your train of thought without making long calculations of their own. A brief reference is enough if the research method you are referring to is generally known within your field; more unusual methods, particularly ones that you have developed yourself, must be described in more detail. There must always be a clear connection between the theoretical background and your research methods and materials. You can use more than one chapter to discuss the research methods and materials, if necessary. The final structure and headings of the chapter are determined based on the content of your thesis.

2.10. Results and discussion

Your research results and their significance are presented in this chapter. It may be useful to divide this chapter into several subchapters and give them headings that best describe the content.

The Results chapter discusses your most important results, possible sources of error, deviations from the expected results and the reliability of your research. The results must be described briefly and accurately. You can use figures and tables to illustrate your findings. The key message of any figures or tables must also be stated in writing in the body text. You can present additional information in appendices, if necessary. The Results chapter must be self-contained, meaning that the reader must be able to understand the results without reading the rest of the thesis in detail.

In the Discussion part, you compare your results to previous studies in the same field, which you described in the theoretical background. You also need to assess whether the results correspond to your objectives and whether you succeeded in answering the previously defined research questions. Remember to especially emphasize new or otherwise significant knowledge produced by your research. In addition, you need to reflect on the scientific and practical importance of your results.

2.11. Conclusions

This is one of the most important chapters in the entire thesis. Many readers flip through the thesis and only read the introduction and conclusions. Do not rely on your results to speak for themselves: you must provide clear grounds that demonstrate the merits of your research. Instead of repeating individual research results in this chapter, sum up the main results and discuss their importance.

Based on your research results, suggest concrete measures that should be taken, give recommendations for the practical application of your results and assess if there are potential limitations to their use. Your recommendations may be intended for the company that commissioned your thesis or to your research field and society as a whole. You should also assess the need for further research as well as the quality of your thesis.

2.12. References

The bibliography verifies the research that you cited in your thesis and enables the reader to form an overview of the theoretical and empirical context of your research and find further sources of related information. The bibliography must include all the bibliographical data needed to identify and locate the publication. Only the publications referred to in the body of the thesis are listed in the bibliography.

There are several different conventions for creating a bibliography and making in-text references. However, the bibliography must always include all the key bibliographical data concerning the publication, regardless of the reference style that you are using. Make sure you follow the same style consistently throughout your thesis. Unpublished

and verbal information sources are listed separately. For more information on references and bibliographies, please see the chapter References.

2.13. Appendices

Your thesis may include appendices that contain materials that are necessary for the thesis as a whole, but do not constitute a core part of the thesis or cannot be included in the body text because of their awkward size or format. All appendices must be referred to in the body text. Before appending any materials, consider if they are important and what they should contain.

You can append to your thesis, for example, lengthy mathematical derivations, an important algorithm implemented in a programming language, example inputs and outputs, an extract of a standard relating to your thesis, user manual, empirical knowledge produced while preparing the thesis, results of a survey, lists, pictures, drawings, maps, complex charts (conceptual schema, circuit diagrams, structure charts) and so on. Detailed reports concerning measurements and other experiments should generally be presented in an appendix.

3. THESIS LAYOUT

Keep the layout of your thesis neat and presentable and pay attention to your writing style in order to portray a professional image. Scientific writing standards apply to theses. Use standard technical vocabulary, standard symbols and a neutral writing style. Abbreviations are not used (such as etc. and e.g.) but written in their full form (except *ibid.*)

The minimum length of chapters and subchapters is two paragraphs (unlike in this guide) and you need to consider the balance of chapters. If you use subchapters, there must be at least two of them. Paragraphs must always consist of more than one sentence.

3.1. Covers

Master's theses are bound in hard, black covers. The front cover must display the logo of Tampere University of Technology, the word 'Master's thesis' and the author's name. The spine must display the author's name and the year.

3.2. Page layout and font

Master's theses are written with a single-column layout on one- or two-sided A4 sheets (210 mm x 297 mm). If the total number of pages is less than 80, the thesis must be printed on one-sided sheets. The width of the binding margin is 4.0 cm, the outer margin is 2.0 cm, and the top and bottom margins are 2.5 cm (see Figure 3.1.). Page numbers start from the Introduction. The pages preceding the Introduction, apart from the title page, are numbered with Roman numerals.

3.4. Table of contents

The table of contents always appears on separate pages. Word processing software usually includes a function to create and update tables of contents. The table of contents is titled 'Contents', but this heading is not included in the actual table of contents.

3.5. Figures

The figures included in a thesis may be, among others, drawings, photographs, charts and maps. You can also present lists, algorithms and programming code as figures. You must refer to all the figures in the body text and the reference should appear on the same page as the actual figure. All figures must be explained in the body text: what are readers supposed to notice when looking at the figure and what is the figure explaining?

Figures must be drawn up following the standard drawing methods (for example, those concerning circuit diagrams) and they must be used consistently throughout the thesis. You are not allowed to copy drawings prepared by someone else without the consent of the original creator and publisher. When citing a figure, it is often enough to refer to the source. (L 8.7.1961/404)

You can present a great deal of information in a concise format by inserting a well-constructed figure into your thesis. The size of the figure should generally not exceed half a page. Theses may not contain several full-page figures one after the other. You can place figures in appendices, if necessary.

Figures that are created using software may need further editing. Unnecessary elements must be removed, line widths need to be adjusted and text locations defined. An example of an edited and unedited diagram is presented in Figure 3.2.

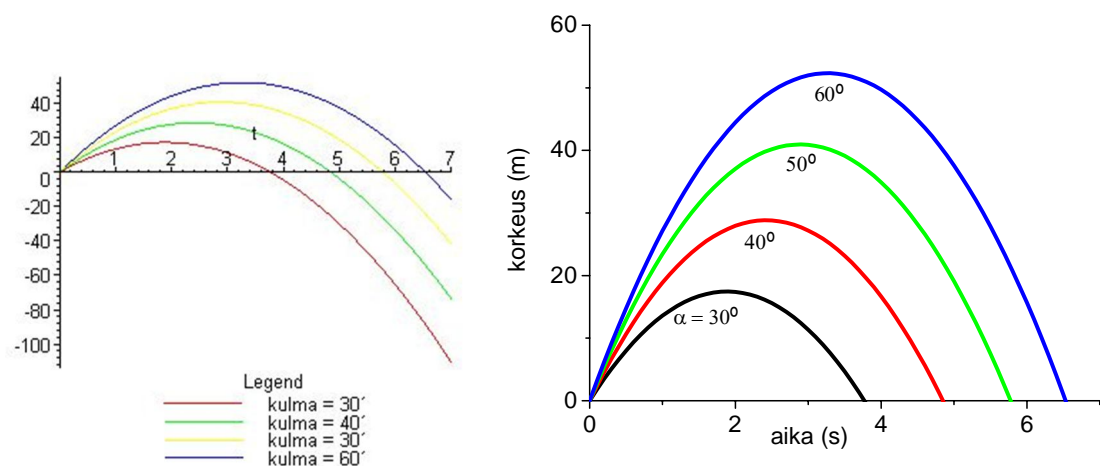


Figure 3.2. Drawings should be edited before publication. The diagram on the right is an edited version of the one of the left.

Any text included in the figures must be readable. The recommended minimum font is 10 pt. You can also use coloured images and photographs in your thesis, but any text should appear black. If it is technically possible, the texts must be written in the same language as the rest of the thesis. If the diagram structure is based on a rectangular system of coordinates, the variables, units and scales are presented in the horizontal and vertical axes. Figures and tables must always be preceded and followed by text: do not place a figure or table in the beginning or end of a chapter. Figures and tables are consecutively numbered (just like in this guide) throughout the thesis so that figures and tables follow separate numbering systems. The figure/table and caption are either justified or aligned to the left. The caption is placed under the figure. The font type and size of the caption are the same as those of the body text, but the caption is written in italics and with single spacing.

3.6. Tables

Tables are inserted into the body text or placed in appendices. Tables are consecutively numbered and captioned, as presented in Table 3.1. The caption is placed above the table. Possible variables, abbreviations or symbols that appear in the table are defined in the body text.

Table 3.1. Example of evaporation conditions in a thin film structure.

Sub- stance	Thickness (nm)	Correction coefficient	Pressure (mbar)	Tempera- ture ($^{\circ}\text{C}$)	Current (mA)	Speed (nm/s)
SiO₂	181,0	1,10	$3,0 \cdot 10^{-5}$	90,6	20–23	0,2
TiO₂	122,1	1,55	$1,5 \cdot 10^{-4}$	91,1	100–93	0,1

You must refer to all the tables in the body text, even if their relevance to the thesis seems obvious. You should also discuss the content of the tables in the body text to ensure that readers understand their relevance.

Table columns are titled and the tables display the variables and units. The font size of any text that appears in a table should be at least 10 pt. The font type may differ from that of the body text.

3.7. Lists

Excessive use of lists should be avoided in formal writing. You can avoid long lists by using figures and placing information in appendices. If you have to use lists, please remember the following points:

- All the items in a list must be written in the same format: do not mix complete sentences and sentence fragments in the same list.

- Punctuation follows the same formatting as the body text, but commas are not used to separate list items.

A list can also consist of one sentence as shown below:

The person responsible for locking the doors must ensure that

- stairway doors are closed
- lifts are locked and
- the photocopier is switched off.

Lists must always be connected to the body text presented above it. Do not place lists in the beginning or end of a chapter.

3.8. Mathematical writing

The purpose of mathematical writing is to express concepts briefly and unambiguously. Readers may misinterpret your meaning or have trouble following your train of thought, if mathematical information is presented illogically.

If your thesis contains a lot of mathematical writing, you should start by reading, for example, Nicholas Higham's *Handbook of Writing for the Mathematical Sciences*. It is available at the TUT Library.

Some basic guidelines for clear, consistent and understandable mathematical writing are presented below.

3.8.1. Basic guidelines

When you are writing technical text, you are usually striving to describe logical chains of cause and effect. For example, if the topic of your thesis is how to build a machine or an appliance, you are explaining the thinking process that you followed when planning and building the machine. Mathematical concepts are needed to emphasize the key ideas of the text: verbal expressions are translated into unambiguous mathematical expressions.

Let's look at a simple example: elementary school textbooks present Newton's Second Law in the following way:

$$F = ma. \tag{1}$$

This is an equation that states that force equals mass times acceleration. Reversely, acceleration equals force divided by mass, or $a=F/m$.

However, Newton's main invention is not this equation (1) but the modern concept of mass. However, if you look at the equation (1), it gives no indication that the key idea behind it is the concept of mass. Since mathematicians strive for complete clarity and unambiguity, a more precise method for presenting Newton's law would be:

$$F: a \in V \rightarrow ma \in V, m \in R, \tag{2}$$

Since this is quite a complex way of putting it, we usually use a practical writing style that is more accurate than (1) and not as complex as (2). One alternative is:

$$F(a) = ma, \tag{3}$$

In this example, a is italicized to show that it is a variable. The symbol for mass (m) is not italicized in example (3), because in classical physics mass is constant.

The context determines what kind of mathematical notations, such as (1), (2) or (3), you should use in your thesis. The rule of thumb is that if (1) equals a casual T shirt and (2) equals a tailcoat, don't choose (1) if you're going to the public examination of your dissertation. A style of mathematical writing that fits the context shows that you have taken your intended audience into consideration. This is why (3) is usually a good compromise between (1) and (2).

3.8.2. Practical tips

As most people feel that, for example, the equation (2) in the previous subchapter is overly complex and thereby difficult to understand, you may have to make compromises between logical clarity and understandability. Some common conventions that you should follow when writing your thesis are listed below.

Use well-known concepts and symbols

Use generally known and well defined concepts and standard conventions/symbols for representing them. Avoid using concepts and notations that you have invented yourself. New concepts should be defined when they appear in the text for the first time.

Distinguish operators, functions and variables from each other

Variables are generally presented in italics, whereas functions and operators are not:

$$\sin(2x+y), \quad \text{grad } T, \quad \text{div } B, \quad \lim (x^2-1)/(x+1).$$

This convention helps the reader distinguish, for example, the variables s , i and n from the trigonometric function \sin .

Various conventions are used to distinguish vectors from operators (matrices), such as:

- a) Operator appears in boldface: $\mathbf{L}u = v.$
- b) Operator appears in boldface, vectors are underlined: $\mathbf{L}\underline{u} = \underline{v}.$
- c) Operator appears in boldface capital letters, vectors appear in boldface lower case letters, and the scalar appears in regular font: $\mathbf{L}u = av.$

Distinguish functions from their values

Functions and their values should be distinguished in mathematical writing. For example, f is a mapping (for example from set X to set Y) and $f(x)$ is the value of the function f evaluated at argument value x .

Starting a new sentence

Do not start a sentence with a mathematical symbol. You can usually avoid this problem by adding a word, such as the name of the symbol, before the symbol. For example, avoid sentences like this:

.... a denotes acceleration.

Instead, write something like:

.... The variable a denotes acceleration.

Written representation of mathematical ideas

Even if your text contains a lot of symbols, equations and formulas, you should not let them replace written text. Your text must be grammatically correct, with verbs in each sentence. One common mistake is to replace the verb with the symbol "=", such as:

The force $F = ma$.

You could say the same thing in a grammatically correct sentence as follows:

The force F satisfies the equation $F = ma$.

Mathematical formulas follow conventional punctuation rules (commas are used to separate sentences and full stops to end sentences) in master's theses.

3.9. Programmes and algorithms

If you include programming codes or algorithms in your thesis, present them using monospaced font, such as Courier, Typewriter or their variation. You can also use Arial.

If the length of the code or algorithm is less than ten lines, you can present it similarly to formulas (see chapter 3.8.1. Basic guidelines), if you refer to the code/algorithm later on in the text:

```
{
    cout << "Pay attention.." << endl;
    cout << "..or else!" << endl;
    return EXIT_SUCCESS;
}
```

If the length of the code/algorithm is more than ten lines but less than a whole page, you should present it according to the figure Programme 3.1. The caption is either programme or algorithm. The numbering follows the same conventions as figures. Codes and algorithms that exceed one page in length are presented in appendices.

Identifiers, such as variables and class names, are written in *italics* in the body text and just like any other words in programme codes. They must be written in the same way as in the programme. Reserved words are presented in **boldface** in programme codes but not in the body text. The semicolon used in the programme is placed at the end of the line only, if the code is divided into several lines.

```

void jarjesta( Kirjainpari taulukko[], int koko )
{
    // Järjestetään taulukko siten, että jokaisella kierroksella
    // valitaan alkio, joka kuuluu taulukon ensimmäiseksi ja siirretään
    // se oikealle paikalleen.
    for( int i = 0; i < koko; ++i )
    {
        // Etsitään pienin eli lähinnä aakkosten alkua oleva
        // kirjan lopputaulukosta
        int pienimmanKohta = i;
        for( int j = i; j < koko; ++j )
        {
            if( taulukko[ j ].korvattava
                < taulukko[ pienimmanKohta ].korvattava )
            {
                pienimmanKohta = j;
            }
        }
        // Vaihdetaan pienin alkio omalle paikalleen
        Kirjainpari tmp = taulukko[ i ];
        taulukko[ i ] = taulukko[ pienimmanKohta ];
        taulukko[ pienimmanKohta ] = tmp;
    }
}

```

Programme 3.1. Example of presenting programming code in a thesis.

3.10. Bibliography

The title of the bibliography is ‘References’. The bibliography is justified and written using the same spacing and font type as the body of the thesis. The bibliography always begins on a new page. The layout must be in accordance with the selected reference method. For examples, please see the chapter References.

4. REFERENCES

Copyright laws and good scientific practice require that any words, ideas or research that are not your own must be clearly cited. Citations and references enable the reader to identify and, if necessary, locate the original sources. Based on the references, the examiner of your thesis forms a general view of the quality and reliability of your thesis and your conversance with the topic. The references show how well you know the most important publications and researchers in your field. Reference styles differ across disciplines: the numerical reference style and name-year style are presented in this chapter.

4.1. Using references in a thesis

University students must learn to utilize and apply previously produced scientific knowledge in their own work. Scientific communication is mainly based on written text. Researchers use a variety of channels to bring their results available to the scientific community so their findings can be reviewed and assessed. Other researchers can utilize their results in their own projects. Research results are discussed within the scientific community and they go through a process whereby individual facts turn into knowledge. When you are writing your thesis, you connect your research with previous research in the field by referring to publications written by others. You use knowledge produced by others to justify your own results and compare different research results.

When you use information available on the Internet, you are responsible for assessing the quality and reliability of the material. You must always seriously consider whether to use online materials or not. You can assess the quality of online materials by considering, for example, the following points: author, publisher, sources used in the publication, updates, reliability, credibility, accuracy, authenticity and sustainability of the service.

4.2. Reference systems

The reference system consists of in-text references and the bibliography. In-text references, which are placed within the body of the text, refer to the bibliography at the end of the thesis. The bibliography provides more detailed information on the source of information. In-text references are brief, but they must contain enough information to enable the reader to link the reference to the correct source listed in the bibliography.

All the references are listed in the bibliography at the end of the thesis. Regardless of the reference style you are using, bibliographic entries always contain basic information on the publication that enables the reader to locate the original source.

Depending on the type of the publication, the reference contains the following basic information:

- author(s), editor(s)
- title
- edition, section
- name of the journal, volume, year, number or conference
- editors of the entire work, name of the entire work
- place of publication, publisher
- date of publication
- serial title and number
- total number of pages or the pages where the publication is found in the journal or compilation

If your source is an electronic publication, you must also state the type of media (such as online document or electronic journal), edition or version, the date when the source was updated, the date when the source was accessed online as well as availability and web address.

4.2.1. In-text reference

In-text references are placed within the body of the text as close to the actual citation as possible. The form of the reference depends of the reference style, but in-text references are always placed in square brackets or parenthesis. The place where the reference is inserted tells the reader the extent of the citation. You can indicate the start of a citation by starting the sentence with, for example, the phrase *According to Smith* and indicate the end of the citation by placing the in-text reference at the end of it. The reference is placed within the sentence before the full stop, if the citation only applies to the one sentence in question. If the cited section is longer than one sentence, the reference is placed at the end of the final sentence after the full stop. If the cited section is an entire paragraph, the reference is placed at the end of the final sentence after the full stop. The reference includes the page number, if you are only referring to a specific page in the publication. If the reference concerns an entire volume, the page number can be left out.

In-text reference to a single source, when the information is presented in one sentence in the thesis

Numerical reference system

Weber claims that ... [1]. (entire book)

... in their study Cattaneo et al. [1, p. 23] present a new... (one sentence or paragraph)

Name-year system

...according to the presented theory (Weber 2001)...

...Weber (2001, p. 230) has stated that according to the presented theory...

In-text reference to a single source when the information is presented in several sentences in the thesis

Numerical reference system

...The largest potential for reducing fine particle emission lie in wood burning and traffic. The restrictions imposed on traffic emissions play a considerable role in reducing fine particle emissions. [4.] Carbon-dioxide emissions trading...

Name-year system

...The largest potential for reducing fine particle emission lie in wood burning and traffic. The restrictions imposed on traffic emissions play a considerable role in reducing fine particle emissions. (Ohlström et al. 2005.) Carbon-dioxide emissions trading...

In-text reference to several sources

If you are referring to a number of sources at the same time, all the sources are collected in one reference.

In the numerical reference system, the sources are separated by a semicolon and listed according to the reference number.

...as stated in related literature [1; 3; 5]...

In the name-year system, the sources are separated by a semicolon and listed in chronological order.

...as stated in related literature (Smith & Braun 1994; Weber 2001; Cattaneo et al. 2004)...

Reference to a secondary source

You should always strive to use original sources instead of secondary sources that cite the results of others. If you have to use a secondary source, the reference must clearly indicate that the information comes from a secondary source. In the following example the original source is the book *Shleinen, B., Slaback, E.A. Jr. & Birsky, B.K. (eds). Handbook of health physics and radiological health*. The author is, however, using the book *Pöllänen, R. (ed.). Säteily ympäristössä* as a secondary source in which the original table is translated into Finnish. Both sources are listed in the bibliography and the citation is presented in the body of the thesis as follows:

Numerical reference system

The mass attenuation constant 1.0 MeV for photon in aluminium is 0.0615 cm²/g [1, see 2].

According to Shleinen et al. [1], as cited in Pöllänen [2], the mass attenuation constant 1.0 MeV for photon in aluminium is 0,0615 cm²/g.

Name-year system

The mass attenuation constant 1.0 MeV for photon in aluminium is 0.0615 cm²/g (Shleinen et al. 1998, cited in Pöllänen 2003).

According to Shleinen et al. (1998) the mass attenuation constant 1.0 MeV for a photon in aluminium is 0.0615 cm²/g (see Pöllänen 2003).

Direct quotation

Sometimes it is best to use a direct quotation and cite the exact words of another author or source. Use quotation marks to indicate that these are someone else’s words.

Numerical reference system

”One of the requirements for the ethical acceptability and reliability of scholarly work is that the research has been performed in accordance with good scientific practice.” [1, p. 3.]

Name-year system

”One of the requirements for the ethical acceptability and reliability of scholarly work is that the research has been performed in accordance with good scientific practice.” (National Advisory Board on Ethics 2002, p. 3.)

Reference to a figure

If a table or figure is cited from another volume, the in-text reference is placed in the heading of the table or figure. The full reference is listed in the bibliography.

Numerical reference system

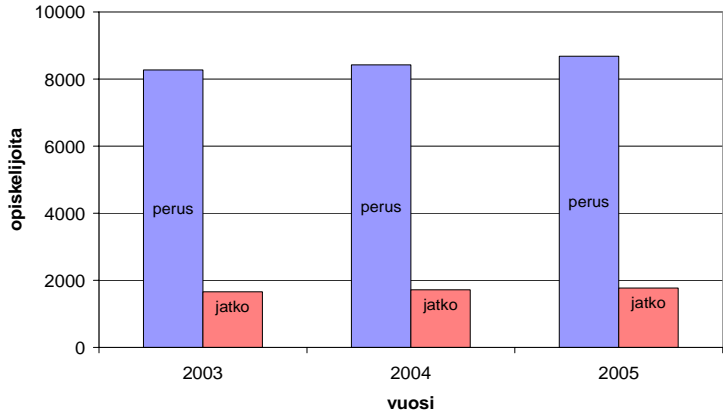


Figure 4.1. Number of attending students at Tampere University of Technology in 2003-2005 [2].

Name-year system

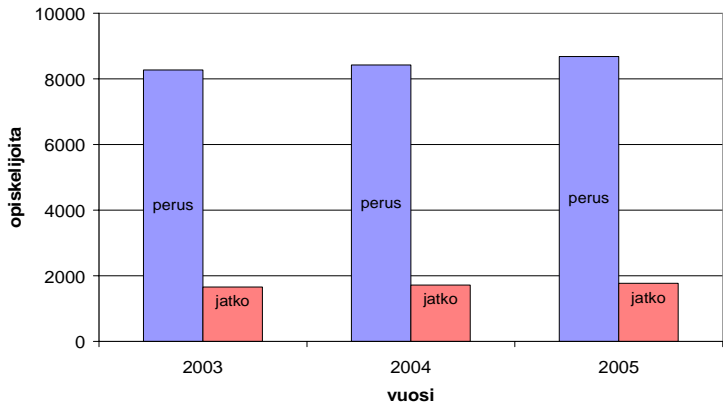


Figure 4.2. Number of attending students at Tampere University of Technology in 2003-2005 (Tampere University of Technology 2006).

Special cases of in-text referencing when using the name-year system

If the author has produced several publications in the same year, you should differentiate them by adding a lower case letter directly after the year of publication.

...according to the proposed theory (Weber 2001a)...

If the publication has two authors, both must be mentioned in the in-text reference.

...according to the proposed theory (Smith & Braun 1994)...

If the publication has more than two authors, you only mention the first author and replace the others with the abbreviation et al. When you refer to the source for the first time, you can also mention all the authors. All the authors are always listed in the bibliography.

...Cattaneo et al. (2004) argue that...

If no author responsible for the publication is mentioned, a sufficient number of words from the beginning of the title are marked as the source so that the reader can find the corresponding entry in the bibliography.

...according to the manual (Raw Materials Manual 2002) the corrosion resistance of aluminium...

...according to the standard (SFS 5342 1992), references are used to...

4.2.2. Bibliographical entries

The following describes how you should write bibliography entries that refer to commonly used information sources (books, articles in scientific and professional journals or compilation works, conference proceedings, reports, theses, interviews, tables, appendices, lists, instructions and standards) in your thesis, either according to the numerical reference system or the name-year system. If an online resource is identical with a printed publication, you can compile the reference according to the printed publication.

Unlike in in-text references, the bibliographical entries at the end of your thesis must list all the authors. If the author responsible for the publication is not known, the reference starts with the publication title. The previously used abbreviation Anon (anonymous) is no longer used. The information is provided in the language in which the publication is written (please note that in this guide all the bibliographical entries have been translated into English so that international students can understand the content). The names of journals are usually written in an unabbreviated form, but some referencing systems require the use of abbreviations. You can verify the spelling of journal titles from the ISI Journal Citation Report or ULRICH's International Periodicals Directory that you can access through the dLib portal of the TUT Library.

Patents, regulations and electronic publications are referred to in the same style in the numerical reference system and the name-year system.

*Common referencing styles***Reference****Example****Patent**

Country and patent number. Patent name. Patent holder, Domicile. (Inventor). Application number, submission date. (Publication date). Number of pages.

Pat. FI 115074. Method for measuring particle distribution. Dekati Oy, Tampere. (Keskinen, J., Moisio, M., Marjamäki, M., Virtanen, A. & Ristimäki, J.). Application number FI 20011668, 20.8.2001. (28.2.2005). 19 p.

Electronic publications

Author(s). Title [type of media]. Edition. Place of publication, Publisher. Date of publication, Date when updated [date when the publication was accessed online]. Availability and web address.

IBM Almaden Research Center Nanoscale Science [WWW]. [accessed on 22.5.2005]. Available at: https://www.almaden.ibm.com/st/nanoscale_science/index.shtml.

*Numerical reference system***Reference****Example****Book**

Author(s). Title. Edition or volume, if several. Place of publication Year of publication, Publisher. Total number of pages.

Weber, M.J. Handbook of lasers. Boca Raton 2001, CRC Press. 300 p.

Book, in case no responsible author is known

Title. Edition or volume, if several. Place of publication Year of publication, Publisher. Total number of pages.

Raw Materials Manual 5. Aluminiums. Helsinki 2002, Federation of Metal Industries MET. 250 p.

Article in a scientific journal

Author(s). Title. Name of journal Volume(Year of publication)Issue, Pages where the article is found.

Cattaneo, S., Vuorimaa, E., Lemmetyinen, H. & Kauranen, M. Advantages of polarized two-beam second-harmonic generation in precise characterization of thin films. Journal of chemical physics 120(2004)19, pp. 9245-9252.

Article in a professional journal

Author(s). Title. Name of journal Volume(Year of publication)Issue, Pages where the article is found.

Kaunisto, T. Safety of Domestic Water Systems Improves. Water management 44(2003)6, p. 7-9.

Article in a journal, in case no responsible author is known

Title. Name of journal Volume(Year of publication)Issue, Pages where the article is found.

Injection molding. Plastics technology 51(2005)9, pp. 13-16.

Article in a compilation work

Author(s). Title. In: Editor(s) of the entire compilation. Name of the compilation. Edition or volume, if several. Place of publication Year of publication, Publisher. Pages where the article is found.

Li, W., Pessa, M., Jouhti, T., Peng, C.S. & Pavelescu, E.-M. GaInNAs quantum well lasers. In: Nalwa, H.S. (ed.). Encyclopedia of nanoscience and nanotechnology. Vol. 3. California, USA 2004, American Scientific Publishers. pp. 719-730.

Conference paper

Author(s). Title. Name, place and date of the conference. Place of publication Year of publication, Publisher. Pages where the article is found.

Wai-ling Ho-Ching, F., Mankoff, J. & Landay, J.A. Can you see what I hear?: the design and evaluation of a peripheral sound display for the deaf. Proceedings of the SIGCHI conference on human factors in computing systems, Ft. Lauderdale, Florida, USA, April 5-10, 2003. New York, NY 2003, ACM Press. pp. 161-168.

Report

Author(s). Title. Place of publication Year of publication, Publisher, Name of series Issue. Number of pages.

Ohlström, M., Tsupari, E., Lehtilä, A. & Raunemaa, T. Fine particle emissions in Finland. Impact of limiting greenhouse gas emissions. Espoo 2005, VTT Research notes 2300. 91 p. + appendices. 1 p.

Standard

Letters and numbers identifying the standard. Title. Place of publication Year of publication, Publisher. Number of pages.

SFS-ISO 1000+A1. SI units and recommendations for the use of their multiples and of certain other units. Helsinki 1999, Finnish Standards Association. 43 p.

Interview

Interviewee's name. Interviewee's title, Director, Dan. CEO, Company Ltd. Helsinki. Interview Interviewee's organization. Location. Nature and date of the event. Comments.

25.5.2005.

Unpublished source (*such as internal memorandums, lecture handouts, private correspondence, presentations*), there is no responsible author in the example below, so the reference starts with the title.

Author(s). Title. Place Date or Year, Organization. Type of publication. Total number of pages.

Reference systems applied to master's thesis at Tampere University of Technology. Tampere 2005, Tampere University of Technology Library. Unpublished report. 5 p.

Thesis

Author(s). Title. Thesis type. Place of publication Year of publication. University/higher education institution, name of the unit, faculty, department or degree programme, Name of series Issue. Total number of pages.

Puhakka, A. Weakest congruences, fairness and compositional process-algebraic verification. Dissertation. Tampere 2004. Tampere University of Technology. Publication - Tampere University of Technology. Publication 468. 176 p.

Article in an electronic journal

Author(s). Title. Name of journal [type of media]. Edition. Volume(Year of publication)Issue, Pages where the article is found. Date when updated [date when the article was accessed]. Availability and web address.

Davies, J., Duke, A. & Sure, Y. OntoShare - an ontology-based knowledge sharing system for virtual communities of practice. Journal of universal computer science JUCS [electronic journal]. 10(2004)3, pp. 262-283 [accessed on 23.8.2005]. Available at: <http://www.jucs.org>.

Table

Name of table. In: Editor(s) of the entire work. Name of entire work. Edition or volume, if several. Place of publication Year of publication, Publisher. Pages, where the table is or the total number of pages in the table.

Physical constants of inorganic compounds. In: Lide, D.R. (ed.). CRC handbook of chemistry and physics. 85th ed. Boca Raton 2005, CRC Press. 96 p.

List (*Below is an example of referring to a list that is available online. If the list is printed, leave out the type of media, the date when the list was updated and accessed online as well as the web address.*)

Name of the list [type of media]. Place of publication Year of publication, Publisher Date when updated [date when the list was accessed online] Number of pages. Availability and web address.

International Chemical Safety Cards ICSCs [database]. Geneva 2002, International Programme on Chemical Safety IPCS. [accessed on 18.11.2005] 1459 cards. Available at: <http://kappa.ttl.fi/kemikaalikortit/index.php?page=info.html>.

Appendix

Name and number of the appendix. In: Natural radionuclides and their characteristics. Appendix 1.
 Author(s) or editor(s) of the entire work. In: Pöllänen, R. (ed.). Radiation in the Environment. Helsinki 2003, Radiation and Nuclear Safety Authority. Radiation and nuclear safety 2. p. 374-376.
 Name of the entire work. Edition of volume, if several. Place of publication Year of publication, Publisher. Name of series
 Number. Pages where the appendix is found, or the total number of pages in the appendix.

Guidelines and instructions

Identifier and number of the instructions. RT-10834. 2004. Lightweight Concrete Blocks. Brickwork tools. Helsinki 2004, Building Information foundation. 4 p.
 Name of the publication. Place of publication Year of publication, Publisher. Number of pages.

Name-year system**Reference****Example****Book**

Author(s). Year of publication. Title. Weber, M.J. 2001. Handbook of lasers. Boca Raton, CRC Press. 300 p.
 Edition or volume, if several. Place of publication, Publisher. Total number of pages.

Book, in case no responsible author is known

Title. Year of publication. Edition or volume, if several. Place of publication, Publisher. Total number of pages.
 Raw Materials Manual 5. Aluminiums. 2002. Helsinki, Federation of Metal Industries MET. 250 p.

Article in a scientific journal

Author(s). Year of publication. Title. Cattaneo, S., Vuorimaa, E., Lemmetyinen, H. & Kauranen, M. 2004. Advantages of polarized two-beam second-harmonic generation in precise characterization of thin films. Journal of chemical physics 120, 19, pp. 9245-9252.
 Name of journal Volume, Issue, Pages where the article is found.

Article in a professional journal

Author(s). Year of publication. Title. Kaunisto, T. 2003. Security of Domestic Water Systems Improves. Water management 44, 6, p. 7-9.
 Name of journal Volume, Issue, Pages where the article is found.

Article in a journal (no responsible author is known)

Title. Year of publication. Name of the journal Volume, Issue, Pages where the article is found. Injection molding. 2005. Plastics technology 51, 9, pp. 13-16.

Article in a compilation work

Author(s). Year of publication. Title. In: Li, W., Pessa, M., Jouhti, T., Peng, C.S. & Pavelescu, E.-M. 2004. GaInNAs quantum well lasers. In: Nalwa, H.S. (ed.). Encyclopedia of nanoscience and nanotechnology. Vol. 3. California, USA, American Scientific Publishers. pp. 719-730.
 Editor(s) of the entire work. Name of the entire work. Edition or volume, if several. Place of publication, Publisher. Pages, where the article is found.

Conference paper

Author(s). Year of publication. Title. Name, place and date of the conference. Place of publication, Publisher. Pages where the article is found.

Wai-ling Ho-Ching, F., Mankoff, J. & Landay, J.A. 2003. Can you see what I hear?: the design and evaluation of a peripheral sound display for the deaf. Proceedings of the SIGCHI conference on human factors in computing systems, Ft. Lauderdale, Florida, USA, April 5-10, 2003. New York, NY, ACM Press. pp. 161-168.

Report

Author(s). Year of publication. Title. Place of publication, Name of series Issue. Number of pages.

Ohlström, M., Tsupari, E., Lehtilä, A. & Raunemaa, T. 2005. Fine particles emissions in Finland. Impact of limiting greenhouse gas emissions. Espoo, VTT Research notes 2300. 91 p. + appendices. 1 p.

Standard

Identifier and number of the standard. Year of publication. Name of the standard. Place of publication, Publisher. Number of pages.

SFS-ISO 1000+A1. 1999. SI units and recommendations for the use of their multiples and of certain other units. Helsinki, Finnish Standards Association. 43 p.

Interview

Interviewee's name. Year. Interviewee's title, Interviewee's organization. Location. Nature and date of the event. Comments.

Director, Dan. 2005. CEO, Company Ltd. Helsinki. Interview 25.5.2005.

Unpublished sources (*such as internal memorandums, lecture handouts, private correspondence, presentations*), there is no responsible author in the example below, so the reference starts with the title.

Author(s). Title. Date or year. Place, Organization. Type of publication. Total number of pages.

Referencing style at Tampere University of Technology. 2005. Tampere, Library of Tampere University of Technology. Unpublished report. 5 p.

Thesis

Author(s). Year of publication. Title. Thesis type. Place of publication. University/other higher education institution, name of the unit, faculty, department or degree programme, Publication series Issue. Total number of pages.

Puhakka, A. 2004. Weakest congruences, fairness and compositional process-algebraic verification. Dissertation. Tampere. Tampere University of Technology. Publication - Tampere University of Technology. Publication 468. 176 p.

Article in an electronic journal

Author(s). Year of publication. Title. Name of the journal [type of media]. Edition. Volume, Issue, Pages where the article is found. Date when updated [date when the article was accessed online]. Availability and web address.

Davies, J., Duke, A. & Sure, Y. 2004. OntoShare - an ontology-based knowledge sharing system for virtual communities of practice. Journal of universal computer science JUCS [electronic journal]. 10, 3, pp. 262-283 [accessed on 23.8.2005]. Available at: <http://www.jucs.org>.

Table

Name of table. Year of publication. In: Editor(s) of the entire work. Name of the entire work. Edition of volume, if several. Place of publication, Publisher. Pages where the table is found, or the total number of pages in the table.

Physical constants of inorganic compounds. 2005. In: Lide, D.R. (ed.). CRC handbook of chemistry and physics. 85th ed. Boca Raton, CRC Press. 96 p.

List (Below is an example of referring to a list that is available online. If the list is printed, leave out the type of media, the date when the list was updated and accessed online as well as the web address.)

Name of the list. Year of publication International Chemical Safety Cards ICSCs. 2002 [data-base]. Geneva, International Programme on Chemical Safety
[Type of media]. Place of publication base].
Year of publication, Publisher Date when IPCS [accessed on 18.11.2005] 1459 cards. Available at:
updated [date when the list was accessed http://kappa.ttl.fi/kemikaali-kortit/index.php?page=info.html.
online] Number of pages. Availability and
web address.

Guidelines and instructions

Identifier and number of the instructions. RT-10834. 2004. Lightweight Concrete Blocks. Brickwork
Year of publication. Name of publication. tools, help file. Helsinki, Building Information Foundation. 4
Place of publication, Publisher. Number p.
of pages.

Appendix

Name and number of the appendix. Year Natural radionuclides and their characteristics. Appendix 1.
of publication. In: Author(s) or editor(s) 2003. In: Pöllänen, R. (ed.). Radiation in the Environment.
or the entire work. Name of the entire Helsinki, Radiation and Nuclear Safety Authority. Radiation
work. Edition or volume, if several. Place and nuclear safety 2. pp. 374-376.
of publication, Publisher. Name of series
Issue. Pages where the appendix is found,
or the total number of pages in the appendix.

4.2.3. Bibliography according to the numerical reference system

The references are listed in the bibliography in the order in which they appear in the body text. Another alternative is to alphabetize the references according to the author's name or name of the organization (in the case of corporate authors) and assign numbers to them in this order (alphabetic number system). If the author has not been mentioned, the references are alphabetized according to the publication title.

- [1] Weber, M.J. Handbook of lasers. Boca Raton 2001, CRC Press. 300 p.
- [2] Cattaneo, S., Vuorimaa, E., Lemmetyinen, H. & Kauranen, M. Advantages of polarized two-beam second-harmonic generation in precise characterization of thin films. Journal of chemical physics 120(2004)19, pp. 9245-9252.
- [3] Wai-ling Ho-Ching, F., Mankoff, J. & Landay, J.A. Can you see what I hear?:the design and evaluation of a peripheral sound display for the deaf. Proceedings of the SIGCHI conference on human factors in computing systems, Ft. Lauderdale, Florida, USA, April 5-10, 2003. New York, NY 2003, ACM Press. pp. 161-168.

4.2.4. Bibliography according to the name-year system

The references are listed in the bibliography in alphabetical order according to the author's last name, name of the organization or the publication title, if the author has not been mentioned.

- Cattaneo, S., Vuorimaa, E., Lemmetyinen, H. & Kauranen, M. 2004. Advantages of polarized two-beam second-harmonic generation in precise characterization of thin films. Journal of chemical physics 120, 19, pp. 9245-9252.

Wai-ling Ho-Ching, F., Mankoff, J. & Landay, J.A. 2003. Can you see what I hear?: the design and evaluation of a peripheral sound display for the deaf. Proceedings of the SIGCHI conference on human factors in computing systems, Ft. Lauderdale, Florida, USA, April 5-10, 2003. New York, NY, ACM Press. pp. 161-168.

Weber, M.J. 2001. Handbook of lasers. Boca Raton, CRC Press. 300 p.

5. WRITING PROCESS

Writing is a process that takes time to develop and improve upon. This chapter offers you practical advice on getting started, getting organised and splitting the work into more manageable pieces. Sources of further information are listed in Appendix 5.

5.1. Getting started

When you are preparing a thesis, the parts when you conduct the actual research and report your results are intricately connected. Once you have selected your topic, prepare a detailed plan and start collecting relevant research material. You should start collecting materials through the dLib portal of the TUT Library. The portal offers access to a variety of electronic resources: dictionaries, handbooks, electronic books, electronic journals and scientific databases. You can save information on the materials you find into the RefWorks system and use the system to produce the references and bibliography.

Make sure you know why the company or other party who commissioned your thesis is interested in the research topic. You should read all the previous research materials that the company or department has prepared on the topic. You can find information on the research undertaken by departments on their websites as well as the University's research information system TUT Portfolio, where you can find information on relevant literature and keywords and phrases for searching further literature. Previous studies and research form the basis for your own work, but you should read them with a critical eye and strive to create something new.

The writing process starts when you prepare your research plan. In practice, your research plan will change and become more precise over time. Take consistent notes and connect them to the material that you have produced and found in the literature.

Your research plan and notes will make the work easier for you, but once you start writing the actual thesis, you need to write from the reader's perspective in order to effectively communicate your ideas. It is important that you write grammatically correct text clearly and understandably. Even before you start writing, you need to know your purpose for writing: think about what kinds of issues you want to discuss and emphasize? How should you formulate your message to get your points across? Who will be your readers? You should also remember that your thesis serves to demonstrate your level of knowledge and learning. This is why all thesis writers are recommended to ask for feedback throughout the entire thesis process.

5.2. Stages of the writing process

Putting your thesis on paper is an important part of the entire thesis process. As very few writers are able to produce polished text straight away, you need to make time for the writing process. Writing should be seen as a process that evolves over time. Even if you have to rewrite or delete parts of the text, your efforts are not wasted. The more thorough your groundwork is, the more effective your thesis will be. (Hirsjärvi et al. 2005, pp. 32-33.)

The writing process can be roughly divided into three stages: prewriting, drafting and revising/editing. In practice, writing is a fluid process and writers move back and forth between these stages. The prewriting stage is when you brainstorm, generate ideas, make plans, think about the topic and title of your thesis, read literature, discuss the topic with others, make notes and select research materials. You should prepare a preliminary table of contents or plan the structure of your thesis at this stage. (ibid.)

During the drafting stage you write your ideas on paper. You should start the actual writing process as early as possible, because writing will help you organize your thoughts and stimulate ideas. Instead of starting at the beginning of your thesis, you can start by first writing a chapter that seems easy. You can, for example, start by creating an outline (list or notes of all the points you need to cover) of each chapter. Related techniques are described in further detail in the following subchapters. (ibid.)

In the revising/editing stage you go back to the rough draft and rewrite it several times by adding, deleting and modifying the text. It is a good idea to ask someone else to read your text and give feedback. The objective is a coherent, well-constructed, logical and grammatically correct text. Review the text to ensure that the purpose and point of view of your research are clearly presented, the information is organized logically and coherently, all the chapters and headings are necessary and in the right place, all claims and opinions are sufficiently justified and the reference style is appropriate. Proofread your thesis for grammatical errors and make sure that the thesis format is in accordance with the requirements. Use language and writing guides for further reference. (ibid.)

5.3. Kick-starting the writing process

A good working plan and a detailed schedule will help you complete the work within a reasonable amount of time. Divide the work into manageable chunks, so you will not feel overwhelmed by the task ahead and find it hard to start the writing process. When you are planning the outline of your thesis, you should set yourself deadlines for completing each chapter. Agreeing on the deadlines with someone else may help you stay on schedule. Finding a regular writing rhythm may also help; there is no point in waiting for inspiration. You can even force yourself to start writing, if necessary, and gradually the writing will stimulate further ideas and you will see yourself becoming more

enthusiastic. After you have completed a chapter or a piece of text, wait a while before returning to it and reviewing the text with fresh eyes.

Writing is not easy. Examples of methods that can help you get started are presented below. You can, for example, make a list of points relating to the topic. You can divide the points into different categories and start writing on one of them. One good method is to try free writing, also known as stream-of-consciousness writing, whereby you write whatever comes to your head about the topic without regard to spelling or grammar. Then you select one of the points that you raised and continue from there. You can use concept or mind maps to outline the topic of your thesis. They are diagrams used to represent words, ideas or concepts linked to and arranged around a keyword or idea. A relationship diagram is more structured: it is used to outline cause-and-effect relationships, context, time and interrelationships between concepts. The so-called ‘six W’s and the H’ of journalism – what, who, where, when, why and how – can also help you get started. If writing scientific text feels difficult at first, you can try writing like you would to a friend who already knows something about the topic but wants to hear more. Read relevant literature to set the mood. You can also stop writing in mid-sentence: you may find it easier to continue the next day, if you do not have to start by staring at a blank page. (Hirsjärvi et al. 2005, 49-52.)

Sometimes writers experience a temporary period when they are unable to continue a piece of writing. Writer’s block is perfectly normal. A short break of a few hours or a day may do the trick. Writer’s block may often be the result of striving for perfection. You should remember that your thesis is not your life’s work and set yourself goals that are ambitious but realistic. In the early stages of the writing process you can write without concern for conventions: you will revise the text later on.

Below are some general tips for writing:

- Learn by example from the writings of others but do not feel bound by them.
- Write down all references and bibliographical information as you go along.
- Use dictionaries, even if you are writing in your mother tongue.
- Keep your writing style consistent throughout the thesis.
- Avoid the linguistic pitfalls of professional jargon. Do not write ‘capacitance’ when you mean a capacitor.
- Avoid wordiness and circumlocutions and use direct expressions. For example, write ‘The circuit board was designed in collaboration with the customer company’ instead of ‘The planning of the circuit board was accomplished in collaboration with the customer company’.

REFERENCES

Hirsjärvi, S., Remes, P. & Sajavaara, P. 2005. Tutki ja kirjoita. 11th edition. Helsinki, Tammi. 436 p.

Iisa, K., Piehl, A. & Oittinen, H. 2003. Kielenhuollon käsikirja. 2nd edition. Helsinki, Yrityskirjat Oy. 357 p.

L 8.7.1961/404. Copyright law (in Finnish).

SFS 4175. 1998. Numeroiden ja merkkien kirjoittaminen. Helsinki, Finnish Standards Association SFS. 23 p.

Tampere University of Technology. 2006. Opiskelijamäärät 2005, 2004 ja 2003. [WWW]. [Accessed on 22.2.2006]. Available at: <https://www.tut.fi/tutka/index.cfm?MainSel=285&Sel=5753&Show=5215&siteid=1>.

APPENDIX 1: TITLE PAGE



TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

STEVE STUDENT
EVALUATION OF USER-CENTEREDNESS IN THE IMPLEMEN-
TATION OF ENTERPRISE RESOURCE PLANNING SYSTEMS
Master's thesis

Replace the faculty council with
the departmental meeting, if the
topic of the thesis was approved
at a departmental meeting.

Examiner: Professor Gina Genius
Examiner and topic approved by the
Faculty Council of the Faculty of
Computing and Electrical Engineer-
ing on 1 March 2011.

APPENDIX 2: ABSTRACT

TAMPERE UNIVERSITY OF TECHNOLOGY

Degree Programme in Information Technology

STUDENT, STEVE: Evaluation of User-Centeredness in the Implementation of Enterprise Resource Planning Systems

Master of Science Thesis, 77 pages, 4 Appendix pages

February 2006

Major subject: Software engineering

Examiner: Professor Gina Genius

Keywords: Enterprise Resource Planning, implementation model, implementation, usability, user-centred design process, change management

The implementation of an Enterprise Resource Planning (ERP) system is one the most important phases in a company's ERP project since failure at this stage might have serious consequences, such as bankruptcy. This thesis examines the implementation models of ERP systems and the basis on which implementations are carried out in the customer company by the ERP system contractor. The main goal is to clarify how user-centred implementation is performed and find ways to make the implementation process more effective and successful.

The thesis is divided into two parts. In the literature study part, issues related to ERP implementations are explored. Usability, user-centeredness and change management are all considered. In the interview research part, four ERP system implementation models are investigated and compared with ISO 13407 standard of Human-centred design processes for interactive systems. Each ERP system implementation model studied here has been examined using an actual customer case with its supplier to provide a practical dimension to the theoretical approach.

The study indicates that the researched ERP implementation models and the user-centred design process are closely related. Users are taken into account in the implementation, and the goals of the definition phase are to define the business processes of the company and the requirements for the system by the users and organization. In the definition phase, multi-disciplinary design teams are employed to redesign the business processes of the company and to combine these processes with the implemented ERP system to create a single working entity. The results of this study suggest that, by considering user-centeredness at the implementation stage, the process is accelerated and acceptance of the system is enhanced. At the same time, the system becomes more effective to use and the business goals and benefits expected are achieved more successfully.

APPENDIX 3: TERMS AND DEFINITIONS

ERP project	The entire procurement process of the ERP system from the point of view of the customer company.
ERP system	Enterprise Resource Planning System that integrates all the functionalities within the company.
Configuration	Setting the parameters of the system by using, for example, a configuration table.
Customization	The system is tailored to suit the needs of each customer.
Implementation model	Step-by-step operational instructions governing the implementation of the system, either the implementation project or the entire ERP project.
Implementation project	Part of the ERP project. The implementation covers all the stages from selecting the system to implementing the system. The supplier of the ERP system is involved in the implementation process.

APPENDIX 4: FURTHER INFORMATION

Writing instructions

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