

The Format of a Student Research Project in Economics

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Abstract

These notes set out the basic conventions for the format of an undergraduate student research project, with undergraduate students particularly in mind. Some of the detail here will take time to learn. The overall rule is to take a simple design at the start and work with it over many re-drafts in order to communicate your work effectively.

These notes were originally drafted for students undertaking a final year undergraduate research project in economics.

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1 Introduction

These notes set out the basic conventions for the format of an undergraduate student research project. Some of the detail here will take time to learn. The overall rule is to take a simple design at the start and work with it over many re-drafts in order to communicate your work effectively.

These notes were originally drafted for students undertaking a final year undergraduate research project in economics.

2 The format of a research project

Think of the written artifact which will constitute your research project—in short, a document. These notes are about the elements of that document and the logic which can inform your use of them. Typically, your final draft might have the following elements.

- Title page
- Abstract
- Table of contents
- The main text:
 - Sections and section headings
 - Tables
 - Diagrams
 - Mathematics
 - Quotations
 - Citations
- Notes
- Appendices
- Bibliography

The paper you are reading mostly follows such a design, to let you see it in action. Look at other models, above all in the academic journal literature, for what works, but take this design as a reasonable one with which to begin.

2.1 Title page

State the title and your name on this unnumbered page. Label the page with other relevant details, such as the course code and title, your identification number, the examiner's name (it's discourteous to misspell a name, of examiner or mortal) and the date. Reserve acknowledgements for a note elsewhere, and limit your gratitude to those who helped in specific, academic ways. Keep the title page simple and efficient.

2.2 Abstract

Include an abstract (no more than 200 words) on a separate unnumbered page. You will see abstracts in almost every academic journal, and you will quickly appreciate the value of an informative abstract as you survey the journal literature for your own project.

Help the reader to grasp the essentials of your work quickly. Help yourself, by drafting this as soon as you have a topic and working title, and by refining it as you proceed, until the end. Think of the abstract as the answer to the question 'What's your project about?' You might be asked this question by relatives, friends, and in your next job interview. Your tutor will ask this question. So will the examiner. So ask yourself 'What's my project about?' Be tough on your answer, and make it concise. Your final answer is your abstract.

Add some keywords below the abstract, along with two or three *Journal of Economic Literature* (JEL) classification numbers for articles. These codes are listed in each issue of the JEL.

2.3 Table of contents

Providing a table of contents helps the reader, and designing it helps you to write the project. List the main sections of the project, with their page numbers and indicate the contents of other sections such as an appendix. After the main table of contents, include separate lists of tables and diagrams.

Put the table of on pages separate from the main text. Use small Roman numbers i.e., i, ii, iii, iv, . . . , for page numbers in the table of contents, and

restart numbering with the Arabic numeral system i.e., 1, 2, 3, 4, . . . , when you begin the main text.

2.4 The main text

Plan groups of paragraphs, linked by your overall theme. Explore your initial arrangement, and expect to re-arrange as you think and write. Try writing on index cards your assorted quotations, bits of data, fragments from lectures, articles and books, ideas to follow up, themes, hunches, questions. Group the cards in ways that seem to make sense, try five or six groups. Then give these groups names. You have just got your first outline, and your section headings. Like a good general, re-group when things don't first work out.

2.4.1 Sections and section headings

Taking as understood the normal practice of beginning with an introduction and ending with a conclusion section, intermediate sections might cover such topics as:

- A review of relevant literature.
- An account of an important theory and its critiques.
- A discussion of public policy aspects of your topic.
- A description of the methodology you employ.
- Notes on data.
- An elaboration or evaluation of your main argument.

Design around your ideas, not around a rigid format. Your teachers are sometimes reluctant to give you a template to work to, because experience tells them that no particular template will suit all purposes, and part of the process is to struggle a bit. Don't struggle too much. The positive design principle is to start somewhere, and refine as you think.

A project might contain only one of the elements above, or none. You might reconstruct a lively economic debate and take each side in turn, or imagine

students and teacher grappling with a problem, and report the dialogue . A project could be written with an audience other than the examiner in mind; a briefing for the new Minister on our options in Europe, a report on fiscal policy for prospective bond investors, a strategic plan for regional community groups, the testimony of an expert witness in an anti-trust case. Each idea will call for a different design solution to express it efficiently, which may differ from the standard research project format, yet be just as scholarly.

Let your introduction anticipate the order and substance of your project. You can and should let the reader know from the outset where you are going, which leads many writers to draft the introduction last.

If your research does not lead you to dramatic, clear results, say so when you write your concluding section. So-called ‘negative’ results, “the theory is not very helpful here” or “there is no discernible pattern to the historical development of this idea” are results nonetheless. Intelligent research identifies the gaps in our knowledge and the limits to our understanding. It does not pretend that all answers are obvious or all conclusions clear.

Use no more than three levels of sectioning i.e., section, subsections and sub-subsections. Beyond that, you probably have broken up your material too much. If a number of points below the sub-subsection level deserve to be highlighted as a group, use a list, or a set of ‘bullet points’ to break up the text. Section headings do not have to be numbered, as long as each level is visually distinct.

2.4.2 Tables

- As you draft, keep tables on separate pages, and in the final draft, fit them into place in the text. Treat them like paragraphs, so that they appear naturally at a particular place in your overall argument, and are not randomly distributed ornaments.
- Reserve large tables of data of useful background material for an appendix.
- Do not merely re (or worse, photocopy) tables which are readily available to a reader elsewhere. Adapt, amend, add to them, so that the material reflects your specific purpose, and take care to acknowledge your sources. Do this simply, saying for example: ‘This table is adapted from Table 9 in O’Hagan (p. 23 1991)’, or something similar.)

- Use tables to prompt a discussion in a paragraph. If a table is not worth a paragraph, omit it.
- Number your tables in the final draft, give them a short title, specify the sources of your data, and add explanatory notes. The overall effect to aim for is that a table, while fitting into your overall scheme, stands on its own and can be read as a distinct unit.
- If rows and columns in a table are readable without separating lines, leave out the lines.
- Use spreadsheet software, such as MICROSOFT EXCEL, to store the raw data from which you generate your tables.
- Look at how tables in journal articles and books are presented, and follow best practice; not all tables you see are worth the ink, so develop a critical eye for what works.
- Specify the units, if any, of any data in tables (and elsewhere): are the numbers percentages, millions of pounds per capita at constant 1992 prices, are the numbers pure numbers like elasticities and index numbers, are they barrels, bushels, roods, ounces, parsecs, Martian dollars, cabbages, or kings?
- As a rough guide, include no more than seven or eight medium-sized tables in the main text of a 5,000 word project.

The test of a good table in a research project is **not** whether it can be grasped in one look. Newspaper editors and television news producers apply such criteria in the belief that readers and viewers suffer only the tiniest morsels of unchallenging information, and are repelled by anything suggestive of complexity. Sometimes the world is complex, and cannot be grasped in an instant. A good table uses simple design to illuminate the complexity of the data, not to convey an illusory simplicity. A good table invites the reader in, to examine it in detail and explore the data, guided by your discussion. It may raise questions it may even answer questions, and do so better than a rambling paragraph stuffed with disconnected factoids, or a flashy graphic. As ever, general rules are best savoured by means of an example. Take a look at Table 1.

Table 1 could start an exploration of seventy years of independent government in Ireland. There are stories in this table. Look at how government

expenditure has varied from about 17% to over 60% of GNP. We have had a very limited state at some time in the past. Would we really like one in the future? What did we buy with 60% of GNP? Where did it all go? Are we doing well now, because, or despite, a lot of government expenditure? Can you guess when the Irish government owed only 1.5% of GNP as debt? When did it owe 125% of GNP? What happened to get from one number to the other? Who paid the bill? Did everyone pay their share?

The table raises questions, the text would take them as starting point, and maybe offer some answers. Table 1 is unfussily presented without gridlines, with bold face type to allow variable names to stand out. The notes explain the coverage of the data in the table and so their limitations, and tells you the sources. Table 1 avoids unnecessary detail; it would be more accurate to tell you that average Receipts were 27.689% of GNP, rather than the rounded number the table reports, but to an economist the extra precision would be pointlessly precise, no-one has estimates of GNP so good to make extra decimal places meaningful (not for 1923, not for 1992, and not for any year in-between or since.)

Table 1: Example of a Table

Irish Central Government Finances 1923–92 (% of GNP)

	Average	St. Dev.	Max.	Min.
Receipts	27.7	9.2	47.3	16.5
Total Expenditure	32.6	12.5	60.3	17.4
Net of Interest Expenditure	29.3	9.6	50.8	16.7
Deficit	−4.9	4.3	0.2	−16.2
Primary Deficit	−1.5	3.3	7.4	−8.1
National Debt	54.3	31.0	125.0	1.5

Note: The primary deficit is Receipts less Net of Interest Expenditure. The above figures refer to the Central Government only, i.e, they cover the main Exchequer Account and related ‘Extra-Budgetary Funds, but do not cover the expenditures and receipts of local authorities and/or semi-state companies.

Sources: Finance Accounts, Appropriation Accounts 1923–53, National Income and Expenditure, 1953–92

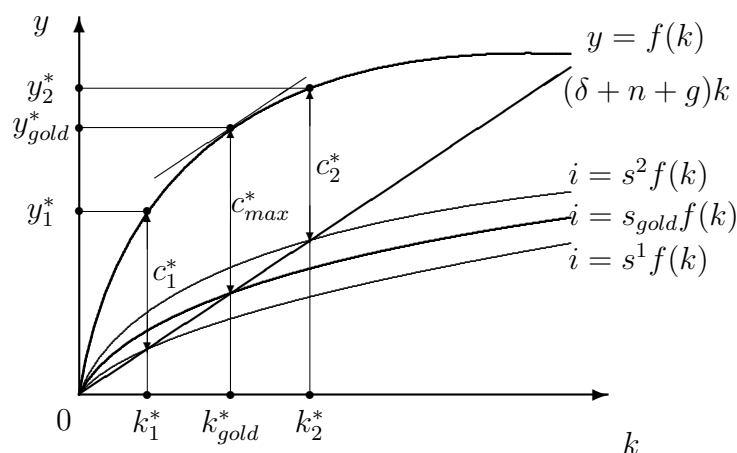


Figure 1: Example of a theoretical diagram: the Golden rule level of capital accumulation in the Solow Growth Model.

2.4.3 Diagrams

Economists tend to use two main types of diagrams: theoretical diagrams (such as Figure 1), and diagrams illustrating some aspect of empirical data. Theoretical diagrams can be difficult to draw well without considerable practice with dedicated software. A carefully hand-drawn theoretical diagram is often acceptable.

Diagrams which illustrate empirical data should not be hand-drawn, but drawn using the features of a spreadsheet programme such as MICROSOFT EXCEL, which offer templates for many types of diagrams e.g., bar charts, pie charts, time series graphs etc. These can be printed out on separate pages and included in an appendix, or if convenient, integrated into the main body of your paper by copying and pasting them from your spreadsheet package to your word processor. You should never have to physically cut and paste diagrams, and it is generally not acceptable for you to photocopy diagrams from other sources and include them in your work.

You might also consider the imaginative use of other types of diagrams, such as, time-lines for accounts of historical developments flow charts to illustrate a process, organisation charts and 'tree' type diagrams for illustrating structures. These are perhaps less commonly seen in economics papers that should be the case, as they can convey a great deal of information very efficiently. Edward Tufte's has packed many ideas on the visual presentation of information into two exceptional books (Tufte 1983, Tufte 1990).

The use of colour, whether for diagrams or more generally, is not necessary for the purposes considered here, and its over-use in often detracts from otherwise good work. The use of colour generally reduces the portability of a document, in that its accurate reproduction depends on the availability of a colour photocopier/printer.

2.4.4 Mathematics

Many economic models are best expressed using some mathematical notation, which presents its own set of issues for the designer of documents. Common sense rules are to clearly explain any mathematical notation you use and follow standard typesetting conventions. These include typesetting most variables in italics e.g., you will generally see x rather than x , when x is a variable¹, which ensures it stands out from the main text, whereas functions such as \sin and the numerals are typeset as normal. Among the specific packages available to help typeset equations are MICROSOFT EQUATION EDITOR (part of the OFFICE package), and the specialised package L^AT_EX, on which this document was produced, which allows one to typeset almost any mathematical expression professionally.² Like this:

$$y_t = \mu_1 + \mu_2\phi_t + \alpha x_t + u_t \quad t = 1, \dots, n \quad (1)$$

$$\text{and } \phi_t = \begin{cases} 0, & \text{if } t \leq [n\tau] \\ 1, & \text{if } t > [n\tau] \end{cases}$$

For most people, printed output of this standard is not necessary, but those who need to typeset a lot of mathematics will find it worthwhile to invest time in learning about specialist software.

In all cases you should number the main equations you use (but not necessarily every step needed to arrive at a particular expression), preferably on the right hand side of the page and you should refer to numbered equations in a consistent manner e.g., Eq. 1, Eq.'s 3–4. Numbering equations can be left to near the final draft of your paper, as numbers will naturally change if

¹Vectors and matrices are often denoted in bold (non-italic) font: \mathbf{x} and \mathbf{X} .

²Both these packages are available on the campus PC network.

you re-arrange the order of equations (although the automatic re-numbering of equations is handled with ease by packages such as L^AT_EX).

2.4.5 Quotations

Direct quotation from the work of others can be used to great effect, for the purpose of critical comment, or as an appeal to the authority of the source, and so on. It can be a difficult matter of judgement when to quote directly and when to paraphrase, but two general rules apply: always acknowledge your sources clearly and avoid at all costs re-writing extended passages from another source. This is pointless, and generally leads to awkward prose. A concise summary or a direct quotation are superior alternatives. The issue of citing the work of others appropriately is dealt with further in the next section and in the later section dealing with the bibliography.

In the case of direct quotation, for short passages of a sentence or two it is usual to include the quotation as part of the structure of a sentence, enclosing it in double quotation marks. One might quote for example the excellent advice of James Buchanan, a Nobel prize-winner in economics, to his graduate students as "...don't get it right, get it written!". For quotations which stretch for a few sentences and/or over a few lines, the convention is to set them apart from the main text by indenting the quotation from both normal margins, and using lower inter-line spacing than the main text (say single rather than one and a half). Such block quotations should not be italicised and should not be enclosed in quotation marks. An example is:

There cannot be any doubt that in Ireland today the balance between public and private economic activity, and the extent to which all life has becomes politicised, no longer correspond at all to the State as the Constitution prescribes it.

(Kingston 1973, p. 307)

2.4.6 Citing the work of others

There are reasonably simple conventions which enable the writer to honestly and efficiently acknowledge their debts to the works of others and to provide sufficient information for the reader to follow up further any material of interest referred to in a paper. These conventions are known as citation

styles, and the style most often used in economics is known as the Harvard style.

This involves referring to sources in your text using the (author year) system. If I wish to indicate that my paper draws on Donald³ McCloskey's famous 1983 article *The Rhetoric of Economics*, I can state this, and use a short citation (McCloskey 1983), rather than the full title and author name, and so on. Those details are listed in the bibliography, at the end of the paper. The exact form of the bibliography is discussed later in this document. Note the absence of commas etc., in the citation.

It may be appropriate to use a citation as a noun in particular sentence, so that I refer to the argument in McCloskey's (1983) paper, whereby the author's name is outside and the year is inside the brackets. This much covers the essentials of citation styles, but there are some variations. The following list is one which you might skim now and consult later as you draft.

- If McCloskey had two articles in 1983 both of which I wish to cite, I would label them as 1983a and 1983b in the bibliography and cite them accordingly in the main paper, as (McCloskey 1983a) and (McCloskey 1983b)
- If I wished to refer in one place to two papers by the same author in different years I would use (McCloskey 1983, 1990) or McCloskey (1983, 1990) or (McCloskey 1983a, 1983b) or McCloskey (1983a, 1983b) as appropriate.
- In the case of more than two authors, all the names are cited in full on the first occurrence in the text and thereafter, the convention is to cite the first author name only and add the Latin phrase *et al.*, meaning 'and others'. For example, I would use (Alesina, Tabellini and Masciandaro 1981) on the first occurrence of such a reference and (Alesina *et al.* 1981) if the need to cite their paper arose again.
- Publications which do not have a named person as author are usually cited as if the organisation which published them were the author: examples would be (World Bank 1982) (OECD 1994). In the case of government publications, one convention is to name the relevant state as author, so that most official publications in Ireland may be cited in the form (Ireland 1997).

³Now *Deirdre* McCloskey. See www.deirdremccloskey.com

- Where one is referring to a particular section of another work, or indeed quoting directly, citing pages numbers is appropriate in the form of (Friedman 1953, p. 7) or (Friedman 1953, p. 30–35) for a range of pages.

Other, more complicated cases can arise, but the distinction noted above between citing a work which is not part of the structure of the sentence (McCloskey 1983) and citing one which is, such as in the example of McCloskey's (1953) paper, is the most important. In case of doubt, try to follow the specific practice adopted in any of the major economic journals, such as the *Journal of Economic Perspectives* or the *European Economic Review*. Journals generally provide instructions on such matters to authors intending to submit articles in each edition, which will cover the sort of cases mentioned above, and some others. You should check that all works cited in your text, and only those works, are included in the bibliography.

In general, one does not use footnotes or endnotes to merely provide citations for material referred to in the text. Notes have a rather different role, to be explained next.

2.5 Notes

Notes should be used sparingly in order to make a point sufficiently important to be part of the paper, but which might break the flow of the argument if included in the main text. A note might for example, refer the reader to alternative arguments and sources, or explain a relatively technical aspect of the main discussion. It is generally a straightforward matter to place such notes at the bottom of the relevant page i.e., footnotes proper, but grouping notes at the end of the paper i.e., endnotes, is equally acceptable and may help to avoid breaking up the layout of your paper.

Footnotes should be numbered consecutively from the start of the paper (most word processors will allow you to insert footnotes and number them automatically). Special footnote marks such as †, ‡, §, etc., are to be avoided, as they are generally used only for special notes at the start of a paper, such as an acknowledgement of help in writing the paper. A simple convention to adopt is that when a footnote is needed at the end of a sentence, it follows the full-stop without intervening spaces.⁴

⁴Like this.

2.6 Appendices

Appendices should be signalled after the concluding section of the paper by a new page. If you have more than one appendix, they can be labelled with capitals and given titles e.g., Appendix A: Data Set, Appendix B: Statistical Methodology etc. Amongst the materials appropriate for an appendix are:

- **Diagrams and tables** (in separate appendices) to which the main text refers. As stated earlier, there is generally no need to distribute tables and diagrams in the main text of a research project in economics, at least not in your first drafts.
- **Detailed data tables** such as the full data set used in a statistical analysis in the paper, or the text of a questionnaire for a survey undertaken by the author. Including these items in the main text would be cumbersome, but to omit them denies the reader useful reference materials (and the writer credit for them).
- **Other reference material** which would be of interest as background to the paper. Any number of possibilities can arise: an account of an episode in economic history might include a chronology of events here, an essay in the history of economic thought could collect brief biographical sketches in an appendix, a public finance project might provide some institutional details e.g., a guide to relevant legislation, a theoretical paper could put the details of mathematical models in an appendix, while a statistical paper might work through the detailed results of computer analysis and/or the econometric theory underlying those results, and so on.
- **A glossary of technical terms.** This makes a paper accessible to a wider audience, without breaking the flow of the main paper by numerous explanatory footnotes.

An appendix should not be used to merely reproduce material conveniently available elsewhere, and in particular it should not consist of photocopies of source material.

2.7 Bibliography

The bibliography should always be the final element in your paper, following either the concluding section of the main paper, or the appendices if you

have them. It should begin on a new page and should have single inter-line spacing.

The purpose of the bibliography is to provide information in an organised manner to enable a reader to find the sources which you have cited. In most cases, one bibliography is appropriate (i.e., one does not generally list books and journals in one place, and official publications elsewhere). This bibliography should be ordered alphabetically, by author name and year of publication, consistent with the Harvard citation style referred to earlier. Note that other disciplines generally apply quite different citation and bibliographical conventions developed to reflect their distinctive research materials e.g., original historical documents from private archives, legal cases and judgements, case studies etc.

The first few examples below of the Harvard style will cover most of types of the bibliographical entries you will encounter in economics. To resolve the more complicated cases which sometimes arise, consult the bibliographies of articles and/or instructions to authors in a major economics journal.

- **Journal articles**

By one author

Barro, Robert J., “Are Government Bonds Net Wealth?,” *Journal of Political Economy*, 1974, 82 (6), 1095–1117.

Note the order and punctuation of the entry: author name then comma, title of paper in double quotation marks and a comma, name of journal (not abbreviated) and a comma, year of publication and a comma, volume number and then the issue number (in brackets) and a comma, then the range of pages and a period. Note also that in all cases the author’s full name, with a middle initial where available, should be used.

- **Journal articles**

By more than one author

Bizer, David S. and Steven N. Durlauf, “Testing the Positive Theory of Government Finance,” *Journal of Monetary Economics*, 1990, 26(3), 123–141.

Bizer, David S., Alberto Alesina, and Steven N. Durlauf, “Testing the Positive Theory of Government Finance,” *Journal of Monetary Economics*, 1990, 26(3), 123–141.

Note that the first author's name is given with surname first, but subsequent author names in the entry are given in the normal order.

One convention in bibliographies is to capitalise all words in the title of a book or article except for connectives like 'and', 'or', 'of' etc., even if this is not exactly how the reference was capitalised originally. This convention has the virtue of generating entries which look consistent, but it is not universally adopted.

- **Books**

By one author

Chubb, Basil, *The Government and Politics of Ireland*, 2 ed., London: Longman, 1982.

Note the order of the entry: author name, title of book, edition of book (where more than one edition has been published), city of publisher (note the colon), name of publisher, year of publication.

Details such as the city of the publisher and the publication date etc. can generally be found on an inside left hand side page at the start of any book, which gives information for copyright and catalogue purposes. The date of copyright is generally the relevant publication date. Some works are reprinted, (i.e., not new editions) well after the original publication date e.g., in a collection of articles or a reprint. In such cases both the original date and the date of the modern edition should be given and distinguished as such. Examples are modern reprints of classic works such as the *Wealth of Nations*, or indeed *Das Kapital*. Note that, as in the previous sentence, when the actual title of a work is quoted in the main text, it can best be highlighted in italics, rather than by using quotation marks.

- **Books**

By more than one author

Buchanan, James M. and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy*, Ann Arbor: University of Michigan Press, 1962.

- **Chapters in books**

When the book is written by one author

Buchanan, James M., "The Related but Distinct Sciences of Economics and Political Economy," in *Liberty, Market and State: Political Economy in the 1980s*, Sussex: Harvester Wheatsheaf, 1986.

- **Chapters in books**

When the book is edited by someone other than the author of the chapter i.e., a collected work

Mirowski, Philip, “Shall I compare thee to a Minkowski-Ricardo-Leontief-Metzler matrix of the Mosak-Hicks type?,” in Arjo Klamer, Donald N. McCloskey, and Robert M. Solow, eds., *The Consequences of Economic Rhetoric*, Cambridge: Cambridge University Press, 1988.

- **Official publications/publications by organisations:**

Constitution Review Group, *Report of the Constitution Review Group*, Dublin: Stationery Office, 1996.

- **Working papers/research series etc.**

Stiglitz, Joseph E., “The Invisible Hand and Modern Welfare Economics”, National Bureau of Economic Research Working Paper No. 3641, March 1991.

As mentioned earlier, where the same author or group of authors have published more than one item in the same year, you should label the publication year by a lower case letter e.g., 1990a, 1990b, 1990c etc.,. It generally does not matter which label is attached to which entry, as long as there is no obvious way of placing the entries in a particular order.

Where there are multiple authors, the alphabetical order of authors in the original source should in general be followed, i.e., a book by ‘Whelan and Browne’ would be listed nearer the end, while a book in which Browne’s name appeared first on the title page and Whelan’s second would appear earlier on the bibliography. The order in which author’s names are presented in the original sometimes reflects the contribution each is considered to have made to the work in question, and this should be respected.

Note that none of the bibliographical entries above use bold or italic fonts, nor do they format author names in capital letters etc. Such formatting is often used, but it is not necessary. The bibliography to this document adopts the more elaborate style as used in the *American Economic Review*, which is just a variation on the Harvard style and which is available as a component of the L^AT_EX software package, but the examples shown above convey the required information equally efficiently.

A good rule is to format all your references in a consistent Harvard style format as you collect them, rather than waiting to the end of the process, by which time this sort of detailed work may suffer because of deadline pressures.

If each entry is a separate paragraph, most word processors have a feature which allows you to sort the complete list alphabetically.

3 Conclusion

Keep these notes as reference material, and when in doubt about the format of your project, ask fellow students, your tutor, and look at best practice in the journal literature.

References

Tufte, Edward R., *The Visual Display of Quantitative Information*,
Cheshire, Conn: Graphics Press, 1983.

— , *Envisioning Information*, Cheshire, Conn: Graphics Press, 1990.