Master's Dissertation Guidelines and Best Practices

Eloise Marais

UCL

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Disclaimers:

Consult the Thesis Handbook and examples on Moodle for formatting rules

These slides are a general guide of best practices and are based on common errors/issues I've encountered when marking dissertations.

This guide is not exhaustive!

Writing Style

Each paragraph should be self-contained and begin with a sentence that tells the reader what the paragraph is about.

Start sentences with the subject. "*London is an ideal city to study long-term trends in air quality, due to air quality policies targeting vehicles and abundant data*" is much easier to comprehend and creates a greater sense of immediacy and urgency than "*Due to air quality policies targeting vehicles in London and abundance data, the city is ideal for studying long-term trends in air quality*".

Avoid unnecessary acronyms. If unavoidable, ensure these are spelled out on first use.

Use consistent nomenclature and symbols throughout the paper so that the reader can follow along.

Write everything in your own words rather than directly quoting the literature. This demonstrates your skill in interpreting, comprehending and recontextualizing information.

Don't use translation tools and other software to construct sentences. These are terrible at doing so and it's obvious when these are being used. You are a better judge than these tools, even if English is not your first language!

Leave a space between numbers of units: 22 μg m^{-3} is correct; 22μgm^{-3} is not.

Thesis Components

Abstract

Introduction

Methods

Results

Discussion

Conclusion

References

Appendix

<u>NOTE</u>: Titles can be more creative than this, like "Description of Datasets" instead of "Methods"

Abstract

Write the abstract once all or most of the thesis is written.

If time allows, leave it for a day or 2 and it with fresh eyes to edit and improve it.

Must be succinct (each word should pack a punch).

A good abstract answers these 4 key questions:

1. **What is the question?** What questions are you seeking to answer? What specific ideas are being tested in the study?

2. **What was done?** How were the questions answered? What methods were used?

3. **What are the results?** What observations and data are presented? What are the conclusions? What is the evidence for the conclusions?

4. **Why is it important?** Why is the answer to the scientific question meaningful? How general or transferable are the findings?

In your own time: Look for these elements in abstracts in references relevant to your study

Introduction

Convince the reader that your topic is important/essential/timely

Convince the reader that there's a knowledge gap that you will address by the end of the thesis

Provide lots of appropriate references to show you are knowledgeable of the relevant literature on the topic

Be concise and don't stray from the topic. This doesn't have to be an exhaustive literature review, but must provide the reader with the information they need to follow along.

Possible layout option:
Paragraph 1:   Describe the problem/issue
Paragraphs 2-4: Provide background information relevant to the problem/issue and to
                provide information reader needs to follow along
Paragraph 5:   Brief description of the study aims, something like "This study will …"

Methods

Include a clear description of all details of your approach needed for your work to be reproducible.

Make sure equations or chemical formulae are neat and clear and presented in numerical order. Typical format for an equation is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad (1),$$

where each variable (x, a, b, c) is defined in the text and none are assumed to be known by the reader.

Cite all datasets used. Either give the citation if one is given by the data provider or include the website URL and the date that you last accessed the website to acquire the data.

If previous studies have provided detailed descriptions of the derivation of any of the datasets or model output you use, reference these and just give a brief clear description of how the data was derived.

If you made use of Python to process and analyse data (beyond plotting/visualizing the data) include the code as an Appendix after adding the name and email of the main software developer (if not already given) and including your name, email and the date you last edited the code.

Results

Ensure the results are written logically. One result should flow logically to the next.

<u>Figures</u>:

- Provide a detailed figure caption below the figure. All features in the figure must be described in the figure caption (colours, units, lines, symbols, axes etc.)
- Label figures in numerical order and refer to these in the text in numerical order too
- Ensure all figures shown are referred to in the text (no floating figures)
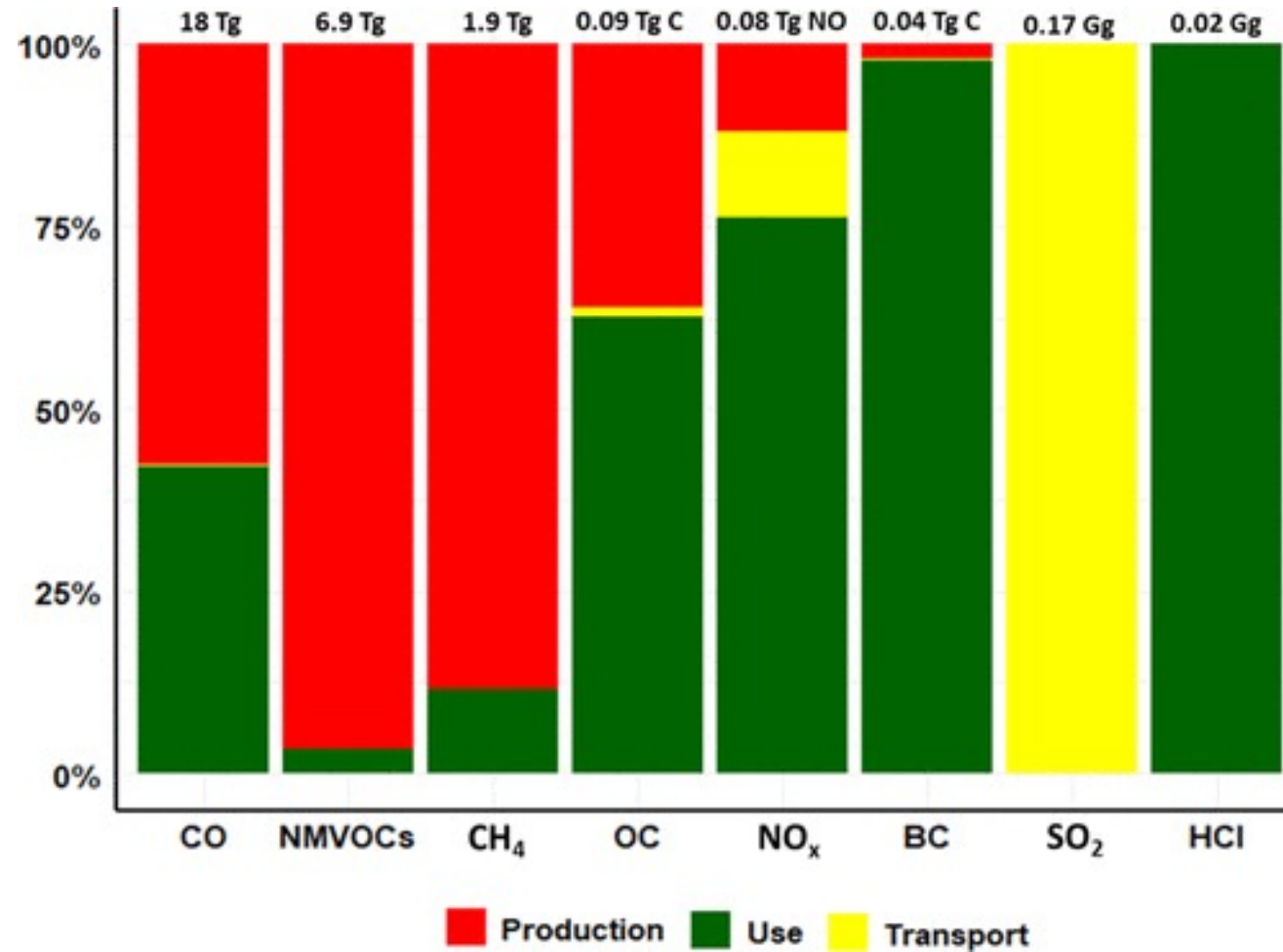
<u>Tables:</u>

- Figures are much better than tables to illustrate data/results
- If you must use a table, place the table header above the table
- Number each table and show in numerical order
- As with figures, all tables shown must be referred to in the text.
- Try keep the table header concise and use table footnotes for additional details

Figure Example

No y-axis label in this example, as it's obvious

Figure 1. Contribution of charcoal activities to emitted pollutants in 2014. Total emissions are given for each pollutant. Colors distinguish emissions for charcoal production (red), use (green), and transport (yellow).

Table Example

Taken from Marais et al. (2014): https://www.sciencedirect.com/science/article/pii/S1352231014007481

Table 1. Satellite datasets used in this work.

Species	Instrument	Product[a]	Reference
CO	AIRS[b]	NASA v5 L2	McMillan et al. (2011)
NO_2	OMI	ESA TEMIS v2 L2	Boersma et al. (2007)
CH_4	SCIAMACHY[c]	SRON/JPL v5.5	Frankenberg et al. (2011)
HCHO	OMI	NASA v2 L3	Kurosu (2008)
CHOCHO	GOME-2	Research product	Lerot et al. (2010)
Fire Counts	MODIS	NASA v5 L3	Giglio et al. (2003)
O_3	TES[d]	v005	Bowman et al. (2006)

[a] v = version; L = level.
[b] Only daytime data are used as these have higher quality than nighttime data (Kopacz et al., 2010). A 10% downward correction is applied to correct for positive bias (Yurganov et al., 2008, 2010; Warner et al., 2010; McMillan et al., 2011).
[c] Data are for land only and include a bias correction dependent on water vapor (Wecht et al., 2014).
[d] Reprocessed to a fixed a priori profile for West Africa and filtered for data quality following Zhang et al. (2010).

Discussion

Opportunity to demonstrate the implications of or provide a more in-depth interpretation of your results (Examples relevant to your topics include (i) Climate change or air quality implications Ens of black carbon in Poland, (ii) Health implications of NO_2 concentrations exceeding air quality standards in London, (iii) The future of ammonia abundance in the UK due to projected increases in the frequency of heatwaves with global warming).

Can be supported by additional figures and/or tables.

Conclusion

Summarize the main take-home messages of your thesis. What do you want the reader to take away/remember from the study?

References

Be meticulous. Ensure that in-text citations and the reference list are formatted correctly and that each reference list entry includes sufficient details for the examiner to source the reference.

Detailed guidance: https://libguides.ioe.ac.uk/harvard, including how to cite scientific datasets: https://libguides.ioe.ac.uk/c.php?g=482485&p=3299845

There are also reference managers like EndNote available to automate referencing