General Assembly

Project Question

Modeling Maternal Mortality Rate: Abortion Access or Books?

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Data Science Part Time Course:  
Fall 2016  
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What socio-economic and public health factors contribute to maternal mortality rates in the 194 World Health Organization (WHO) member countries? The world health organization focuses on direct causes of maternal mortality rate such as access to clinicians and adolescent birthrates. These direct causes are important factors to understand for intervention. However, these are not the only factors that contribute to maternal death globally. In fact, the United States, which has the most expensive health care system in the world [1], has a relatively high maternal mortality rate when compared to other developed nations. Given the complexity of this problem I would like to investigate socio-economic and environmental factors that correlate to, and potentially contribute to, maternal death. I will also investigate known contributing factors as a baseline (i.e. presence of skilled professional at birth).

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You may use the chapter/section, and sub-chapter/section designation system of your choice. You may choose to use no numbers, Arabic numbers (1, 2, 3, etc.), Roman Numerals (I, II, III, etc.) or written numbers (One, Two, Three, etc.). You may choose to list some, all, or none of your subchapter titles in the Table of Contents. You may choose to number your sub-headings, or not to number them. Whatever formatting choices you make, you must carry them out consistently through each chapter/section of your document.

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# Project Question

This is a template document for dissertations, master’s theses or other long manuscripts, including books. This document is specific to one institution, but the vast majority of universities use very similar formats.

The paper guidelines from the University of Washington states that only 8 ½“ by 11” white paper can be used, and 11” x 17” may be used for fold-out pages. Smooth, flat-surfaced paper such as photocopy paper is preferred and only black and white text on white paper will be accepted.

Your thesis or dissertation must be written in English.

## What is the question you hope to answer?

* + Question: What socio-economic and public health factors contribute to maternal mortality rates in the 194 World Health Organization (WHO) member countries?
  + Description: The world health organization focuses on direct causes of maternal mortality rate such as access to clinicians and adolescent birthrates. These direct causes are important factors to understand for intervention. However, these are not the only factors that contribute to maternal death globally. In fact, the United States, which has the most expensive health care system in the world (1), has a relatively high maternal mortality rate when compared to other developed nations. Given the complexity of this problem I would like to investigate socio-economic and environmental factors that correlate to, and potentially contribute to, maternal death. I will also investigate known contributing factors as a baseline (i.e. presence of skilled professional at birth). The following is list of factors that contribute to the overall quality of life and health of women. I hypothesize that these factors will correlate with maternal mortality rate.
    - Presence of skilled healthcare professional
    - Access to contraceptives
    - Access to abortion
    - Age of marriage
    - Adolescent birth rate
    - Education of women
    - Life expectancy
    - Malnutrition
    - Obesity/diabetes
    - Gender development index
    - Human development index
    - Multi-dimensional poverty index

## What data are you planning to use to answer that question?

* + The world health organization has a number of data sets focusing on the maternal mortality rate and several factors that contribute such access to clinicians and adolescent birthrates. The data sets are presented by Country and by year collected. There is an option to download the data in json format. These data sets can be found here:
    - Maternal mortality data by country: <http://apps.who.int/gho/data/node.main.15>
    - Maternal and reproductive health WHO: <http://www.who.int/gho/maternal_health/en/>
    - Maternal and prenatal health links WHO: <http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/en/>
  + The data for a number of the factors found in question 1. are found as part of the United Nations (UN) data sets. Specifically the data sets related to gender are found here:
    - UN Data: <http://data.un.org/browse.aspx?d=ComTrade>
    - API information for UN Data sets can be found here: <http://data.un.org/Host.aspx?Content=API>

## What do you know about the data so far?

The WHO maternal mortality rate data indicates death rates per 100,000 live births for 1990, 2000, and 2015. A quick scan indicates that the data is complete for all of the WHO member states. The data for age of marriage and adolescent birthrates is missing some data and was collected in variable years (2007 – 2012). A number of cleaning activities will be required for each factor studied.

## Why did you choose this topic?

In light of the current political climate in Poland [2] and severe cuts to women’s health funding in a number of U.S. states [3] it is clear that women’s health is not only a developing world problem. The U.S. and specifically Texas have unusually high maternal mortality rates. Population studies indicate that Texas’ high mortality rate is complex and multifaceted [3]. Quantifying the factors that contribute to this problem and developing predictions for interventions could inform the public and encourage policy makers into well-informed action.

# first Project presentation questions

## Questions to answer for the first presentation

* What data have you gathered, and how did you gather it?
* Which areas of the data have you cleaned, and which areas still need cleaning?
* What steps have you taken to explore the data?
* What insights have you gained from your exploration?
* Will you be able to answer your question with this data, or do you need to gather more data (or adjust your question)?
* How might you use modeling to answer your question?

Most universities have strict rules on the style of chapter titles and heading titles. The safest way is to follow this template and to consult with the appropriate parties who certify the formatting of a thesis or dissertation.



Figure 1.1. Increase in the cost of power quality problems in the United States [1].

## Tables and Figures

Figure titles always go below the figure, while table titles always go above the table. This is a convention to be followed. In order to update numbering of all automated entries, click CTRL-A F9. In this template, however, we have added a heading style just for the lists, which includes the list of figures, tables and the bibliography and assigned it a heading within the Table of Contents— this way that it will automatically update. (If you add an Appendix you can also use this style by clicking on “Lists (for TOC)” style in the Home ribbon.)

All figures should be numbered. To create a new figure, copy the existing figure (with the attached caption) and paste it to a new location. The figure template is designed in such a way that the caption stays with the image. Remember that letter and line thickness of each figure should be sufficiently large in order to be clearly legible in a double-column format.

Figure 1.1 is an example figure. In order to cross reference a figure click Insert-Cross Reference-Figure-Only label and number, then select the appropriate figure. This procedure is the same for tables. Also, the caption of the figure is recommended to have indentation on both sides so to distinguish from normal text.

## Equations

The equations should be created using the template below and MathType software. MathType is superior to Word’s built-in equation editor because it allows exporting to LaTeX and is faster.

To cross reference an equation, you must first create a bookmark by highlighting the equation number, clicking Insert-Bookmark, and giving that a unique identifier. All equation identifiers start with “eq”. For example, eqColoumbForce. Pay attention to the font of your variables. It is not ok to have “*V*” in the equation and “V” in text. Auto-numbering of figures and tables that correspond to chapters (e.g. Fig 3.3) is discussed in the next section.

## Chapter Heading

First, you can define the style of headings of a chapter. Right-click on the line of the chapter’s title and choose “Bullets and Numbering,” push “Outline Numbered” tab, to choose different sample styles. You can also “Customize” the style like changing the “Number Format.” For example, you can add “Chapter” in front of the chapter number to make this the format of Heading 1\*.

Next time, when writing a new chapter, just type in the chapter title, then choose “Heading 1”. Your defined style will automatically appear.

Another method of adding “Chapter” in front of each chapter number is to create “Chapter” character in other software, then copy it as a picture in front of the number.

If you make changes to the title format of one chapter, you can update all other chapters’ title format at the same time, instead of redoing them one by one. Just re-click “Heading 1,” a window of “Modify Style” pops up. Check “update the style to reflect recent changes.”

### Include Chapter Number in Figure Caption

To include the chapter number in a figure’s caption, click “Insert-Caption” and choose label “Figure.” Then click “Numbering,” check “include chapter number” and also choose a desired format. Thus, the chapter number will be included.

### Include Chapter Number in Equation Numbering

Normally only one number is assigned to one equation, as mentioned above. To include the chapter number, in front of the **original** equation number click “Insert-Cross reference-Heading-Heading number,” and then check the corresponding chapter. The chapter number will be present. Don’t forget to add a “.” between the chapter number and original equation number.

This is a sample equation [2]:

(1.)

Equation counting does not restart from 1 in a new chapter. To solve this problem, in a new chapter (For example in Chapter 2, please refer to beginning of next chapter), right-click before the **original** equation number, check “Toggle Field Codes,” the code will show up like “SEQ eq \\* MERGEFORMAT,” add “2” after “eq” meaning the second (new) series of equation to “SEQ eq2 \\* MERGEFORMAT,” then right-click “Toggle Field Codes” again, the second equation number in this new chapter will start from 1. For equations in the next chapter, just add “3” after “eq.”

Also, it is very important to define every variable of the equation in the text nearby. If you use a lot of equations, it pays to learn shortcuts in MathType.

## Section and Page Breaks

When writing a thesis, you are often required to use different styles of numbering for different sections. For example, Roman numerals are often used for preliminary pages, and Arabic numerals are used for text. You can achieve these differences by inserting section breaks: Insert-Break-Next Page (Section break types). After that, you can adjust the numbering style freely in each section. If you just want to start writing a new chapter from the next page in the same section (you want to continue the sequential numbering), you can just insert a Page Break.

## Subsections

Please use the following style for the sub-section heading titles.

### Subsection Level 3

This section is just to show you how to make sub-sections. Technically, since no subsection should exist by itself, there should be a following section 1.8.2. However, as this section is an example, a subsequent section is unnecessary. This style is Heading 3, and it will automatically show up in the table of contents, like the other headings.

## Orphan Control

Orphan control is very important in order to pass the review of graduate school. Make sure that no page ends with a heading title (any level), and make sure the figure title and figure are on the same page. The same concept applies for tables and table titles.

# Complete Your Dissertation

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Some professors use *Ph.D. dissertation* and *Ph.D. thesis* interchangeably, while some other professors do not feel comfortable with the wording *Ph.D. thesis*. Use whichever term is preferred by your advisors.

This is a sample equation [2]:

 (2.)

where *t* represents time, *f* represents frequency, *η* represents continuous frequency shift, and *τ* represents continuous time lag. The ambiguity plane *A*(*η,τ*) for a given signal *s(t)* is defined as:

 (2. )

Here, *s*(*t*) represents the signal at time *t*, and *s*(*t*+*τ*) represents the signal at a future time *t*+*τ*, and the *s\**(*t*+*τ*) means the complex conjugate of *s*(*t*+*τ*).

is a sample table.

Table 2.1. A Sample Table Caption

|  |  |  |
| --- | --- | --- |
| Row 1 | Value | Location |
| Row 2 | 1.89 | Y |
| Row 3 | 1.94 | **N** |
| Row 4 | 2.33 | **N** |
| Row 5 | 1.45 | **N** |
| Row 6 | 2.11 | N |

## References

For literature citations, use EndNote software. The citations and references list should conform to the standards of your discipline.

It is very important to keep the consistency of the reference database file in the writing process, especially when you work on multiple computers.

## Conclusions

This template document will be updated as more and more students start to work on Ph.D. dissertations. Please do note that the requirements for MS thesis and Ph.D. dissertation are slightly different. Although this template may also be helpful for writing a MS thesis, it is important to identify the requirement difference and make appropriate changes.

For the Bibliography the easiest solution is to copy over the whole reference section. Programs are available to help with this, EndNote and Reference Manager, and there is also a References tool built into Microsoft Word.

Bibliography

[1] B. Kennedy, *Power Quality Primer,* McGraw-Hill, 2000.

[2] L. Cohen, *Time-Frequency Analysis,* Prentice-Hall, 1995.