URSP 601 - Research Methods (Quantitative) March 3, 2009

Lecture 5: Tips for Writing Professional Documents

Instructor:Nikhil Kaza

This document lists some pointers about writing about numbers. As with any rules, you should know when they are not applicable. In general, these policies would do you well to make your report accessible. However, neither my first language is English, nor am I a writing instructor. Most of these are shamelessly cribbed from other sources including Miller's book on *Chicago Guide to Writing about Numbers*, Tufte's books on *Envisioning Information* and *Visual Display of Quantitative Information*, Ed Feser's lectures, Lew Hopkins' advice. So use caution in attribution. Comments, suggestions are welcome.

1 Organisation

1.1 State your findings early

If you can't convince your reader that your report is important to read in the first couple of paragraphs then you cannot sustain interest.

1.2 Avoid headers and footers

Footers and headers have their place, but not in short reports. Use them sparingly.

1.3 Choose appropriate format

Use memo format for appropriate audience. If you are writing a memo, make it short (less than 5 pages). If you are writing a short report or a long report include an executive summary. If you are writing an academic paper, make sure you follow the structure of academic papers.

1.4 Justifying text

Unless you are typesetting your document, use only left justify. You should know Kerning and Tracking to do full justification (left and right). Break your words with hyphens at the end of the line only when absolutely necessary. If you are left justifying you do not need any hyphenation to break words.

1.5 Avoid technical explanations

Unless you are writing a report about techniques avoid technical jargon and explanations in the main body of the text. If you are writing a short report or a memo, use notes (sparingly). If you are writing a long report, use appendices.

1.6 Choose appropriate citation techniques

Use footnotes to supply citations to sources for memos and report briefs. Bibliographies or Works Cited lists are appropriate for longer reports and academic papers. Cite only the works that are referenced in the text. Do not use extraneous citations. All tables, figures which are not your own should be cited and sourced. If you are using same data source for a few paragraphs, cite it early and move on; e.g."This section uses data from QCEW from BLS and REIS from BEA ..." No need to cite them with every sentence. However, all tables and figures should have citations.

1.7 Number your pages

Number your pages. Number your sections, if you are referring to them.

1.8 Margins

One inch margins on all four sides. For short reports, which you are presumably stapling in the left top corner, there is no need for larger margin on the left. If you are indeed expecting the report to be bound and printed double sided use appropriate left margins for the odd and even pages.

1.9 Authorship

Own your report. Identify the authors, contact information, date etc. An organisation or a committee does not write a report. It is written by individuals. Also make sure that distinctions are made between organisation's position and your own positions.

2 Style

2.1 Font

Use a consistent font style throughout the report. Learn how to set up styles in MS Word as opposed to trying to format each of the section headings, titles, figure captions etc. separately. Do not use font size less than 10 pt. Sans Serif fonts were appropriate for an age when printing was primitive or for online documents. If you are writing a document that is meant to be read as a paper document (this includes electronic pdfs) use Serif fonts.

2.2 Headings

Use title case for headings and report titles. Make sure you do not capitalise secondary words. Make sure this style is consistent throughout the report. Make sure your headings efficiently convey the gist of the paragraphs below. E.g. instead of "Population projections" as a heading, try a short title that conveys findings, e.g., "Region expected to double its population in a decade." Avoid long headings that span multiple lines.

2.3 Sentence construction

Avoid awkward sentence construction. Even when your sentences are not grammatically incorrect, if they are hard to read it fails to communicate. In other words, do not write like me. Also use

direct sentences. Avoid passive voice. E.g. Instead of "The BEA data show that farm employment is very small," write "Farm employment is very small." Or instead of "It is known that fertility rate declined between ..." write "Fertility rate declined ..."

2.4 Data ARE plural

2.5 Avoid jargon

Jargon has its place, but if your professional documents are read by wide audience avoid it.

2.6 Use abbreviations appropriately

Define your abbreviations the first time it occurs in the document, e.g. Bureau of Economic Analysis (BEA), and then use the abbreviation in the rest of the document.

2.7 Spacing

Double line spacing was appropriate for fixed width typewriter fonts. Use it sparingly. Single line spacing works for the most part. Space paragraphs with 1.5 times the line spacing. Use double space after a full stop or a colon if you are not typesetting your document. Also, single space after semi-colon.

2.8 Avoid giving places agency

Below is a direct quote[1].

> In discussing economic and demographic trends for neighborhoods, cities and regions, avoid implying that places have "agency. E.g.: "El Paso shifted its population mix in response to major changes in Federal immigration policy. In this case, El Paso as a collective, is being treated as an actor when it is actually simply a place with a collection of actors (people, households, businesses, organizations) who are reacting to the federal policy change in various ways. It would be more accurate to say that "El Pasos population mix shifted in response... There may be cases when implying the place is an actor makes sense, for instance when you are discussing a community-wide strategy or policy.

2.9 Write out numbers appropriately

Usually numbers below ten need to be written out in letters. Unless they are rates, percentages and other 'data'. E.g. "There are nine counties in the MSA" and " The counties in the MSA grew, on average, by 4 percent." Do not use numerals when starting out sentences or itemised lists (bullet points, numbered lists etc.). Spell them out. Also spell out percent as % is distracting to the eye.

[1] Feser, E. 2006. *Professional Writing by the Numbers for Planners and Policy Analysts* Version 4.0, Unpublished manuscript.

2.10 Use punctuation marks

Colons, semi-colons, dashes are under-used. Use them. Know appropriate capitalisations and spacing after them.

2.11 Notes

Unlike the roman numeral defaults in MS Word, arabic numerals are better for notes. Use footnotes more than endnotes. Also, know the style of the report. Each journal or each organisation may have a different style to maintain 'brand identity'. Use it. However, this does not negate § 1.9.

2.12 URL

Follow Chicago Manual of Style guide about citing URLs. Always use date of access. e.g. Lanken, D. 1996. When the Earth Moves. *Canadian Geographic*. pp:66-73. http://uuu.uuuu.uuu/. (Accessed on January 24, 2005). Always cite the original URL not the search engine link or the database link for articles. Also know that webpages and websites are fickle. They are present one day and gone the next.

2.13 Discuss findings

You should not describe the tables and figures. You should describe trends and patterns and use tables as supporting evidence. e.g. Do not write "Figure 1 shows employment in manufacturing is declining." Instead use "Manufacturing employment is declining even though the output has stayed constant over the last 30 years (See figure 1).

2.14 Checklists

Kevin Krizek (University of Colorado) has a checklist that is useful, mostly for academic papers. However, there are some useful tips for other professional writing. Use it. http://carbon.cudenver.edu/~kkrizek/pdfs/checklist.pdf. In particular, check your possessives. Other lists, similar to this one is at http://carbon.cudenver.edu/~kkrizek/pdfs/writingrules.pdf.

3 Writing about Numbers

3.1 Always provide comparisons

Do not just report numbers. It is hard to assess their significance without comparisons. If China grew by 9 percent in the last decade, is it better than the world average or worse? Is it better than the previous decades or worse?

3.2 Large numbers are hard to comprehend

In line with § 3.1 numbers over million are hard to comprehend for most people. Provide some context for these.

3.3 Precision

Avoid too precise numbers when it is not warranted. In general, you should not need to report more than two decimal places. If you have large numbers report to the nearest thousand in most cases. It is not really important to know that population of Maryland is 5,296,486 in 2000, it suffices to know that it is 5.3 million. This is true even for tables and graphs.

3.4 Include tables and figures that are referenced in the text

Freestanding tables and figures are superfluous. Get rid of them unless you are publishing data. The point of a report is to provide information not data. Know the difference. The references can be brief such as "(see figure 4) ."

3.5 Emphasise significant findings

There is no reason to report that "...in 1993 and 1996 the average annual growth in the county is one percentage point higher than national growth." You can just say, "The county closely followed the national average growth of 4 percent except for two years in the 1990s ." Presumably you are not going to talk about what happened in 1993 and 96 that is a significant departure from the trend and therefore interesting and pertinent. Also note statistical significance is not substantive significance. Know the difference.

3.6 Percentage points

Difference in two percentages is percentage points. Percent difference is still a percentage. e.g. If your county grew by 4 percent and neighbouring county by 5 percent then the difference is 1 percentage point. However, if a county and the neighbouring county has 20,000 and 35,000 people respectively, then the neighbouring county is 75 percent larger.

3.7 Compare apples to apples

Make sure you are comparing the quantities that are comparable. Different definitions, different data collection methods all influence this. Also, it is particularly true for income. Comparing 1919 USD to 1999 USD shows a spurious dramatic raise in personal income. Adjust them to current or some base year USD.

4 Exhibits

4.1 Stand alone exhibits

Even though you should not include exhibits that are not referred to in the text, I should be able to read the exhibit without referring to the text. They should stand alone.

4.2 Avoid grid lines

Avoid grid lines to distinguish columns and rows from each other in a table. Separate headings from data with a grid line. In a graph, avoid grid lines. They are chart junk.

4.3 No 3D graphics

3D graphs are useless. They don't convey information any better than 2D in most cases. Avoid them.

4.4 Bar charts are better than pies

Bar charts have more information in them than pies and are easier to read.

4.5 Trends

Line graphs represent trends well but not necessarily so in all the cases. See if small multiples can display trend better. Also choose different line styles as well as different colours for different data series in the same graph. If your projector and or printer does not show the true colours you want, then you wont be spending too much time trying to figure out which line represents what.

4.6 Legends

Maps should have legends. Graphs do not necessarily have to have legends if you indicate what each data series is. Also make sure the legend reads when it is printed, projected etc.

4.7 Decimal justify columns

Never left justify or center data columns. Make sure decimals are aligned. Better still, make sure that the number of significant digits after the decimal in all the rows in a column are the same.

4.8 Use hierarchical headings

Below is another direct quote from Feser (2006)

> A good way to make tables more efficient is to use hierarchical labeling of columns. In the table below, employment and payroll data for Illinois were available in 2003. But national and regional data were available only for 2001. The table efficiently reports the 2003 Illinois numbers along with national and Midwest growth rates for 1990-2001 and location quotients for 2001. A note at the bottom of the table should clarify how the Midwest is defined as well as what the reference area is for the location quotient.

	Employment							Payroll	
			Percent Growth			Location Quotient			
Sector	2003	Per Estab	IL '90-'03	MW '90-'01	US '90-'01	2001	Change '90-'01	Mil$	Average Wage

4.9 Number and place exhibits correctly

The first table you refer to should be Table 1 and second one Table 2. Otherwise there is no reason why you can't switch the tables. You can always refer to Table 1 after you have referred to Table 2. Same goes for figures. Also place them close to (not necessarily right next to) the text that discusses the exhibit first.

4.10 Number formats

Use $44,500 not $44500. Also, there is almost no need to use decimals in reporting income. Also use % in each cell that reports percentage. Always use a zero before a decimal if there are no significant digits. e.g. "0.5" not ".5". This is true for both text and exhibits.

4.11 Make your graphs dense

The more information you can present in a graph, the better it is. There is no reason to present 10 graphs when you can present them in one.

4.12 Order your tables

Order the data in your tables by some theme. It could be hierarchical categories or rank ordering based on certain variable. Indent appropriately if you are choosing hierarchical categories. You may choose to highlight a few cells that are pertinent to your text, but do so sparingly.

4.13 Descriptive Categories

Column headings and row titles should be descriptive to make the tables stand alone. This is particularly true when you are using statistical software which abbreviates every variable. Make sure your readers are not scratching their heads about "LNPCI_00". Instead write out "Log of Per-capita Income in 2000". If you think this is too long to be a heading, just say "Per-capita Income" and use a footnote to say that it is on a log scale.

4.14 Make maps readable

All maps should have legend. Choose your colours carefully. Use programs like ColorBrewer (by Cynthia Brewer at Penn State) to help guide you. Invest in learning cartographic techniques. Never miss out the north arrow. Use a number scale only when you know that size of the map is going to be fixed. It is almost always better to use a scale bar which maintains proportions when the image is resized.

4.15 Titles for axes of the charts

All axis have titles, unless the X-axis is time. Even in such cases, it may be a good default. Make sure that the tics are appropriately spaced. Report Units. A graph has four sides, of which only two are usually used. Try and use as many of them. If you use two Y-axes make sure that the each of the axis corresponds (e.g. by color or pattern) to the data. Think about how you would represent an income trend, rate of change of income over time both in the same graph.

4.16 Bar charts

When you are using clustered bar charts, make sure you think carefully about what categories go in the X-axis and what categories go into the legend. See pg. 139 of Miller's book.

4.17 Appropriate use of scatter plots and line graphs

Do not use line graphs when the X-axis is a categorical variable. Scatter plots (or better still bars) are appropriate. When the X-axis is ordinal variable, make sure that, they are appropriately spaced according to the size. i.e. group of income level ($\leq$20K, 20K-50K, 50K-200K) are of different sizes. See pg. 165 of Miller's book.

4.18 X axis is independent variable

Do not make illustrations like an economist. If quantity of a good demanded is dependent on the price then price is on the X-axis and quantity is on the Y-axis. Not the other way round. Traditions are useful, sometimes.

4.19 Never put exhibits at the end of the document

This is particularly annoying. This practise is reserved for document production, not for published versions.