

GEOSCIENCE RESEARCH PAPER WRITING AID

HOW TO WRITE AN EXCEPTIONAL RESEARCH PAPER IN THE GEOSCIENCES

The following guidelines are designed to help you research and produce a geoscience research paper that is well written, of high quality, correctly cited, and with good analytical content. These guidelines are not exhaustive, and you are urged to consult any of the myriad writing and research aids, such as Turabian's "A Manual for Writers" or the "Chicago Manual of Style."

Some Basic Guidelines:

With almost everything you write, there are some basic guidelines that you should follow:

- (1) **THINK** about the purpose and the context of the research paper you are producing.
- (2) **STATE** clearly and concisely what it is that you plan to achieve.
- (3) **INCLUDE** only relevant material.
- (4) **STRIVE** for consistency of expression throughout the paper.
- (5) Make sure you are **ACCURATE** in all of your statements and in the analysis and presentation of data.
- (6) **PRESENT** your information in a logical and effective order.
- (7) **CONVEY** your message as simply and clearly as possible.
- (8) Make sure that your paper is both **COHERENT** and **COMPLETE**.
- (9) **DO NOT** draw conclusions that are not clearly based on your evidence.
- (10) **NEVER** assume that one draft will "do the job." Count on producing at least two drafts before producing the final copy.
- (11) **ALWAYS** proofread and make any needed corrections before submitting the paper.

Think about the Purpose of the Paper:

Your purpose may be any one or more of several possibilities:

- (1) To show that you understand certain terms, concepts, or theories.
- (2) To show that you can do independent research.
- (3) To apply a specific theory or model to new material or data.
- (4) To provide new information.
- (5) To demonstrate your knowledge and understanding of a topic or text.
- (6) To show that you can think critically and/or creatively.
- (7) To report the results of a test that you have performed.
- (8) To demonstrate that you can apply a particular research methodology.

How most Professors Grade your Paper:

Among the key elements that most professors consider when evaluating and grading your work are the following:

- (1) Is there a clear statement of purpose, thesis statement, or research question?
- (2) Is your research placed within a broad context provided by a review of the relevant literature?
- (3) Is your research or analysis accurate?
- (4) Is your research complete and thorough?
- (5) Does your research demonstrate imaginative development?
- (6) Is your paper organized in a logical fashion?
- (7) Do you demonstrate clarity of expression?
- (8) Is the paper free of grammar and spelling errors (have you used spellcheck)?
- (9) Have you developed a meaningful conclusion to the research?
- (10) Have you linked your conclusions back to the broader purpose of the research?
- (11) Do you have the appropriate citation of sources throughout the text and on all graphics and tabular materials?
- (12) Are your references and bibliography complete, correctly presented, and in the appropriate style?
- (13) Did you proof read the paper before submission?

*** Go through this checklist BEFORE you submit a paper to your professor and make sure you keep a paper and/or disk copy of your paper in your files.

NEXT, here are detailed explanations and examples of the key elements to consider in putting together an outstanding research paper:

KEY ELEMENTS

Good research papers should be designed around a basic presentation framework containing four key elements:

*** 1. An Introduction containing the broad spatial and geoscience context for the paper set out at the global, regional, and national levels. You should provide a broad context for your study that fits into the accepted theories or concepts that drive the specific sub-discipline for which you are writing the paper. This introductory section is much like a "so what" statement that establishes a legitimate reason for conducting the research. Follow this by setting out a clearly stated research question, statement, or hypothesis. Avoid developing research questions that can be answered with a simple yes or no response. Construct a research question that lends itself to rigorous analysis in order to reach a conclusion. If you are developing a research hypothesis (i.e. null and alternative), make sure it is testable in a quantitative fashion. The Introduction should close with a brief "road map" of what the paper is going to present and in what order. This section should be no more than 1 to 2 pages in length.

Example: Your paper is about the impact of NAFTA on Mexico. You should begin by explaining the broad-scale or general context of economic and political integration.

Then narrow down to the medium scale to place your topic in perspective; i.e. regional economic alliances between groups of states are seen as crucial to economic development in the coming decades. Next, state your research question, statement, or hypothesis. For example: Has NAFTA created regional inequalities within Mexico and, if so, where are these inequalities evident? An example of this question stated as a testable hypothesis is: NULL Hypothesis = There is no significant difference in development among the various regions of Mexico. The ALTERNATE hypothesis would be: There are significant differences among the various levels of development in the regions of Mexico. Caution: do not simply state a research question that could be answered with a simple yes or no response. Try and develop a thesis statement that allows for detailed and rigorous analysis of a specific problem or issue.

Finally, describe the plan of action for your paper. For example: First I provide a brief historical background to economic relationships between Mexico and the United States. Then I analyze regional data to illustrate the concept of regional geographic inequalities. The paper concludes with a summary of key issues suggested by the research, some proposals, comments, and opinions about future directions or actions, and suggestions for future research possibilities.

***** 2. A Framework for Analysis section that provides a broad context for the work to be presented in the third section. This is the appropriate place to provide a historical background to the issue under research. You should also provide a brief but thorough literature review in this section. Who has written about this topic? What did they have to say? Do you agree with the conclusions or data presented? Is there a gap in the research that you hope to fill or address with your research?**

***** 3. This section should be the "heart" of your research paper and contains the analysis of your research. Here you present your argument or case to support your thesis statement, research question, or hypothesis. Use quantitative analysis, where appropriate, and include maps, graphics, and tabular material to illustrate your key points. CAUTION!! Maps should not be included just to "fill" or "pretty up" the paper. Maps are analytical tools and should be used specifically to illustrate a key point or to provide a graphic reference to a key spatial pattern or concept. All non-text material should be directly referenced in the paper and should be placed as close as possible to the text where first mentioned.**

Example: The value of Mexico's currency against the U.S. dollar has collapsed precipitously over the past decade (Table 1).

***** The Table containing these data should be placed at the top of the first page following its parenthetical reference.**

***** 4. The final section of the paper should summarize the results of your research and offer some concluding remarks. Restate your hypothesis, statement, or question: i.e. This paper examined the role of the NAFTA in creating regional inequalities in Mexico. My research indicates that etc. Offer some opinions or comments about the likely future related to the issue under investigation. Point out some suggestions for future research. It's always a good idea in this part to point out some of the analytical weaknesses in your own research and to offer suggestions to improve the methodology. Link your conclusions back to the bigger issue or context outlined in the beginning of your paper.**

PRESENTATION PROBLEMS:

Many good research papers fail to achieve their potential because of the student's failure to address five important presentation issues: (1) Presentation Format; (2) Syntax and Spelling; (3) Adequate Research and Citation; (4) Plagiarism; and (5) Geographic or Spatial Component.

***** (1) Presentation Format:**

Each professor normally will indicate the type of presentation format preferred for a particular course. In general, all papers should be typed, double spaced (about 0.33" from one line to the following line), have 1" margins all around, and be printed in a clear, readable font style. The preferred font size usually is Courier or Times New Roman 12 cpi. Headings and subheadings should be used to indicate the major sections of the paper. You can center or left justify these headings, with one line space above and below the heading. The first line of each paragraph should be indented five spaces, and there should be no line spaces left between paragraphs (except when introducing a heading or sub-heading). Some professors prefer a ragged right justification (as in this paragraph), while others accept full justification of both margins. Consult your professor on this issue.

A cover page setting out the title of the paper, the name of the course, and the name of the paper's author should be provided for all research papers. Consult with your professor for specific requirements on this issue.

***** (2) Syntax and Grammar:**

There is nothing more frustrating than reading a research paper plagued with spelling and syntax errors! Every student has campus access to word processing. Before you print out a final draft copy of your paper, **USE THE SPELL CHECK AND THE GRAMMATIK programs!!!** In a computerized environment, spelling errors and major syntax errors are totally unacceptable.

Read over your paper carefully **BEFORE** you print out the final copy. Have a friend or relative read the paper back to you so you can listen to how it sounds. Watch out for simple grammar problems such as "its and it's," "their and there," "were and where," and subject-verb agreement errors. Avoid common mistakes, such as "Australia is a democratic country and their government....." This is **WRONG!** Countries are "it," not "she" or "he" or "their." The correct sentence would read "Australia is a democratic country and its government"

If you are unsure about any grammar or spelling issue, consult a writing aid, visit the Writing Center in Cherry Hall, or ask your professor for help. Remember, it's not only important what you say, but how you say it! The key to a successful paper is to **EDIT, EDIT, EDIT!!!**

***** (3) Adequate Research and Citation:**

Quality of Research:

A well written and researched paper should draw from accepted academic sources. What are academic sources? Primarily, these are books written by academics and other experts as well as professional journal articles. Geography, for example, has dozens of academic journals where geographers publish their research (*Geographical Review, Professional Geographer, Annals of the AAG, Transactions, Journal of Transport Geography, etc.*). You should endeavor to consult these journals in your research as they contain a rich and varied collection of articles. Academic journal articles are those

published in accepted professional journals, usually 10-15 pages in length, with a detailed bibliography, and are usually peer reviewed by other academics and professionals. Check with your professor if you are unsure about a particular journal source. Articles that are NOT considered academic in nature are those published in media magazines (*Time*, *Newsweek*, *Beijing Review*, *Oil and Gas Journal*, *Economist*, etc.) that are often anonymous in nature, short in length, and with no cited bibliography. Other NON-JOURNAL sources include statistical abstracts, encyclopedias, reference books, Atlases, etc. Although these are valid and very useful sources, and should be used in your work, they do not fit the definition of "academic journal articles" for the purpose of a research paper. Be extremely careful about material read and downloaded from the Internet or any world-wide web source. Most academic journal articles are not available on the web. If you find material on the Web, it must meet the criteria outlined above to qualify as a legitimate academic journal article. ALL material downloaded from the Web and used in a paper should be checked against other reputable sources. DO NOT try and submit prepackaged research papers downloaded from the Web! You will be caught, you will receive an "F" for the course, and you will be charged with fraud!

Citation:

Your research paper will contain material gained from a variety of academic and non-academic sources. All sources must be clearly and correctly attributed in the text (see plagiarism in section 4) and listed in a bibliography or works cited section at the end of your paper. Many different types of citation styles exist. Most geographers use the parenthetical or Harvard reference style (see a current issue of *Geographical Review* or the *Annals of the Association of American Geographers* for examples of this style). Example: World cities are connected by hierarchies of transport networks (Keeling 1995). Or: Brian Turton (1992:67) observed recently that "a problem-oriented approach is often used."

If you use a source with multiple authors (three or more), cite as follows in the text -- (Keeling et al. 1995) -- but provide the full name of all the authors in the bibliography (i.e. Keeling, D., Hoffman, W., and Trapasso, M. (1995) Useless meetings I have attended. *Journal of High-Pressure Research* 75(4):25-30.

*** If citing material from the Internet, provide the full description of the http address (i.e. <http://www.wku.edu>) in the bibliography, along with the author's name (if there is one), the location of the material cited, the year of publication, and the page number or name.

Here are some examples of how to cite materials in the bibliography section of your paper.

Single-author book:

Keeling, D.J. (1996) *Buenos Aires: Global Dreams, Local Crises*. London and New York: John Wiley and Sons.

Multiple-author book:

Clinton, W.J., and Carter, J.E. (1995) *Crises I Have Caused*. Washington, DC: Republican Press.

Journal Article:

Trapasso, L.M. (1995) Water resource systems developed centuries B.C., Part II: The Dujianyan water works in the Peoples Republic of China. *Proceedings of the Geography Section of the KAS* 95:19-21.

Newspaper Article with no author:

New York Times (1996) Death to the left-wing Liberals, November 27, Section D, 15.

Consult a good writing manual or your professor for further assistance with citation styles and formats.

***** (4) Plagiarism:**

Plagiarism is a serious problem that is not very well understood by most students. Simply stated, plagiarism is the act of passing someone else's work off as your own or using someone's research without proper citation. Direct plagiarism occurs when a passage is quoted verbatim (word for word). Indirect plagiarism occurs when the student paraphrases the original work without giving credit to the original author. Paraphrasing means to substitute certain words and to alter some sentences while repeating all the main ideas. Even though the original work was not copied verbatim, the ideas and substance have been copied.

The general rule here is that if something is considered very general knowledge it does not need citation. For example, "China today has over 1 billion inhabitants and it is a very crowded country." Most people know this so you don't need citation. However, if you have more specific data, such as "China had 1.31 billion inhabitants in 2001," you will need a citation because this level of specificity is not common knowledge. However, if you use ANY piece of material from a published (or, in certain circumstances, unpublished) source, you **MUST** provide proper citation. The rules on how to avoid plagiarism can be quite confusing. Consult your professor or a good writing guide on tips to avoid this serious problem. Basically, you should have a citation in every paragraph where you have used material from a published source, including the Internet. Moreover, **EVERY** map, table, graphic, or picture that you include from whatever source (even if it's your own material) must have a proper caption and a full citation (i.e. Source: Photograph by the author). **DO NOT** fill up the paper with lines of direct quotes from material. Put the material in your own words and cite the original source. If you have more than four lines of direct quotation on any one page in your paper, you probably have too much direct quotation. If in doubt about this, talk to your professor! Finally, every direct quote used in a research paper should be cited with the author's last name, date of publication, and **PAGE NUMBER** from the original source (i.e. Keeling 1997:105).

Acts of intentional plagiarism will result in an automatic "F" for the paper and for the course, along with appropriate action from the University Academic Complaint Committee. In extreme cases, students have been expelled from the university for plagiarism. Learn the rules **NOW!! DO NOT PLAGIARIZE.**

***** (5) Geographic or Spatial Component of the Research Paper:**

Finally, we come to the very heart of many geoscience research paper problems --- the failure to include a geographic or spatial component in the paper. Having a geographic component does not mean throwing some map in at the end of the research paper!

The discipline of geography is concerned with human-environment relationships. Your research should be addressing some aspect of these relationships -- an analysis of cultural patterns on the landscape, stream-flow processes in a drainage basin, the geo-political implications of national policy, cultural diffusion patterns, transport network changes, etc., etc., etc.

Ask yourself at the beginning of the research project what the geographic or spatial component of your paper is going to be. What spatial pattern or process are your

investigating? How has it changed? How might it change as the result of some action or process?

Also important to this concept is the "SO WHAT?" question. You must have a good rationale for conducting the research. Why are you researching this topic or issue? Adding to the body of knowledge about a topic, exploring new methodological approaches to a problem or issue, evaluating policy implications for a specific problem, or helping us to understand more fully the complexity of human-environment relationships all are solid rationales for conducting research.

Finally, and above all, you should enjoy your research. Choose issues or problems that really motivate you and challenge you geographically and intellectually. Don't opt for the already hashed-over approach that will bore you to distraction. Address the serious and challenging issues--the reward and satisfaction will be much higher in the long run.

**** Feel free to discuss any of these issues with any Geoscience faculty member. We are here to help you achieve your full potential.

To return to the Information page, just click on: [INFORMATION](#).

This page last updated on 6/4/02.

To email a professor for help on a geoscience paper, just click on: [HELP ME](#)