

HOW TO READ TECHNICAL RESEARCH ARTICLES AND REPORTS

PREFACE: WHY BOTHER?

As an educated planner, from time to time you may be expected to read and evaluate technical research articles and reports. Even though you may not always understand all the details of such technical writing, with careful reading you can learn a great deal from it. For example, you may be able to answer questions such as:

- Does this research contain results that are relevant to my own work?
- Are the conclusions from this research believable?
- Would I want to recommend a policy based on the results of this research?

This handout lays out a set of steps that will help you to understand as much of a complex article as possible, through as efficient and painless a process as possible. Depending on your purpose in reading a particular article or report, you may want to put more or less effort into these steps. For example, if you are skimming many articles to identify those you will later read in more detail, you may limit yourself to Step 1a. Alternatively, if you plan to make an important policy decision based on a research article, you may wish to complete all three steps.

As you work through the series of questions below, you should write out answers *in your own language*, to make sure you understand what you read.

STEP 1: EVALUATE THE CONTENT OF THE ARTICLE

Questions to answer

By the time you have finished reading the article, your goal is to answer as many of the following questions as possible:

1. What was the research question that the author wanted to answer?
2. What is the importance of this question? (I.e., why should you or the planning profession in general care?)
3. What is the policy or research *context* in which the author is writing? (Usually research attempts to fill in a piece of a larger debate—to confirm an existing hypothesis, to disprove conventional wisdom, to confirm earlier results by using an improved method, etc.)
4. What general method did the author use to answer the question? (Surveys, interviews, modeling, etc.)

5. More specifically, what are the details of the methods used? (I.e., what are the dependent and independent variables, what kinds of equations are used, etc.)
6. To the best of your understanding, are the methods used reasonable and appropriate to the research question?
7. What were the author's results (or "findings") from the data analysis? Do these findings make intuitive sense to you? (This doesn't necessarily mean they are right or wrong, but it's always a useful question to ask.)
8. How does the author *explain* these findings? Do the explanations make sense to you?
9. What policy conclusions does the author draw from the findings? Do these conclusions flow logically from the data?

How to do it¹

Step 1a: Figure out what research the authors did, why they did it, and what they learned.

To do this, briefly answer questions 1, 2, 3, 4, and 6 above (i.e., identify the main research question, the larger context in which the research fits, the general methodological approach, and the key findings from the research). Usually you can answer these questions by reading the:

- Abstract or executive summary
- Introduction
- Conclusions
- Sometimes you will also want to read the "literature review" or equivalent section.

Step 1b: Try to understand the concept(s) behind the methodology in more detail

Once you complete Step 1a and understand the point of the article, reading the technical methodological sections to answer questions 5 and 6 will be much easier. Even if you are unable to understand all the material, you will be prepared to try to understand *why* the author chose this particular method and see if you spot any possible or likely problems with the methods.

First, try to understand the *purpose* of each "technical" part of the paper, even if you don't understand the details.

- For each equation, ask yourself "What relationship does this equation represent?" and "Why is this equation relevant to the research method"? Keep in mind that equations by definition show how different variables relate to each other (e.g., the relationship between service frequency and transit ridership must be that ridership increases as

¹ This section of the paper borrows heavily from a process suggested to me in March 2005 by Professor Alice Jones of Eastern Kentucky University.

services frequency increases). Note that you may not have to worry about reading the equation itself to answer this question; a good author explains these concepts in the text that comes just before or after the equation.

- For each figure (graph, map, table), the author will usually explain in the text what information or conclusion it shows. Often the figures will be a relationship of some sort, as with equations.

Next, even if you do not understand the details of the methodology, you should try to assess whether there are likely weaknesses in the approach. Questions to ask yourself are:

- Are the assumptions reasonable? Most technical studies in planning rely on many assumptions, including assumptions about such things as human behavior, long-term economic trends, or population trends. If you think one or more assumptions are *not* reasonable, this casts doubt on the reliability of the research, regardless of how good were the methods used.
- Is the source of data reasonable? (E.g., is the data likely to represent real human behavior? Is the data collected in an appropriate context? Is the data set large enough to draw reasonable conclusions?)

Step 1c: Assess the explanation of the findings and policy implications

Now that you understand the research question and have at least a sense of whether or not the methodology is reasonable, you should return to the discussion of findings and policy implications to answer questions 6, 7, and 8.

STEP 2: EVALUATE THE CREDIBILITY OF THE PUBLISHER/PUBLICATION

Especially if you feel unable to fully judge the content of an article yourself, it can be helpful to evaluate whether or not the publisher or publication is likely to be credible.

Questions to answer

1. Who published the article or report?
2. Is the publisher likely to have a particular bias on the matter, given its mission, membership, or ownership?
3. Does the publisher have a reputation for impartiality or for bias?
4. Does the publisher often publish research on this topic? (I.e., do they have expertise in the subject matter?)

How to do it

To find out more about the publication/publisher, try all or some combination of the following:

- If the research is published in a periodical, determine whether or not the periodical is peer-reviewed. (For help on how to figure this out, see <http://www.library.cornell.edu/olinuris/ref/research/skill20.html>.)
- If the research is published in a periodical, look at the table of contents for other issues to gauge what kind of research the publishers specialize in.
- If the research is published by an organization, search the web to learn more about the organization's mission, policy positions, membership, sources of financial support, other publications, and reputation.

STEP 3: EVALUATE THE CREDIBILITY OF THE AUTHOR(S)

Especially when you are unable to fully judge the content of an article yourself, it can be helpful to evaluate whether or not the author is likely to be credible on the subject. In general, credible authors are ones with (1) relatively little obvious bias on the subject, as well as (2) some expertise in the area of research. Although neither of these factors *guarantees* reliable research—at times novice researchers produce ground-breaking work, while experienced ones can produce work of little quality—a search on the author can turn up useful information that will either confirm the quality of the research or else raise serious questions about it.

Questions to answer

1. Does the author have a reputation for either impartiality or for bias on this issue?
2. Does the author work for an organization that has a reputation for either impartiality or for bias on this issue?
3. Was the research funded by an organization that has a reputation for impartiality or for bias on this issue?
4. Can you find evidence that the author has expertise in the subject area? (I.e., has the author written other articles on this topic? Does the literature review section of the article show that the author is aware of current work in the field?)

How to do it

To find out more about the author, try all or some combination of the following:

- Do an internet search on the author's name to see if you find either the author's personal webpage or commentary from other people about the author's reputation.
- Search for other writings by the author, using both the catalogue of a large university library (I recommend the University of California's "melvyl" system) and relevant electronic databases (e.g., TRIS, Expanded Academic ASAP, or ScienceDirect.com).
- In some cases you might even want to search an electronic newspaper database like NewsBank or Lexis/Nexis.