How To Write a (Thesis / Dissertation) Proposal

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M. Nussbaum

1. Know the area
    a. Read, read, read, …
    b. Average 10-15 papers per week
    c. Current Journals: at least read/scan abstracts
    d. Use reference management software! (e.g. ProCite and EndNote)
    e. Use search engines (MedLine, Ergo Abstracts, Psych Info, Compendex, ACM Digital Library, etc.)
    f. Go to the source literature (don't expect textbooks and other secondary sources to be either accurate or complete)
2. Go outside your area
    a. Good source of new/different ideas
    b. Avoids embarrassing overlap (already done by others in another field)
3. Pay attention to methods, analyses, motivations, applications
    a. We did this because …
    b. This work can be applied to …
4. Tree-in; tree-out
    a. Look at paper citations, and who cited particular papers (ISI Citation Index)
    b. Note how others interpreted (or how cited) papers you've already read; they may have a different interpretation
5. Don't get 'paper-locked'
    a. Easy to get overwhelmed and biased by what has already been done
    b. Once familiar with an area, what has and hasn't been done, start working on what you could do
6. Look at proposals and documents generated by your predecessors

At this point, generate some initial ideas. Be creative, flexible, novel. Good idea to test them, if possible.

Jumping ahead, what does a faculty member look for in a proposal?

1. It should be well-written
    a. Organized, with a logical flow
    b. Concise, but also complete
    c. Good grammar
    d. It's usually a good idea to have a colleague read it before giving it to the advisor, especially if they have already submitted their first draft or successfully defended their proposal. Often little errors or small changes will be identified and addressed. They can also be some the best sources of information for "why" or "how".
2. General structure is typically followed, but there is flexibility in the details
    a. Introduction (Background, Motivations, Literature review)
    b. Objective/Purposes/Hypothesis (need not be a separate section, but often is)

    c. Methods
    d. Preliminary Results
3. Introduction
    a. Start broad (e.g. injuries, need for ergonomics, etc.), become increasingly specific
    b. End with a review, and broaden out to discuss potential applications (importance) of the proposed work
    c. Topics to be addressed: what's been done; what hasn't; what is needed and why; indicate your part or contribution (scoping your domain)
    d. Intro should contain some statements of objectives, purposes, and hypothesis. Placement is flexible, though, and these could be in a separate sections between Intro and Methods, or even part of the Methods. Depending on the specifics, not all of these (objective, purposes, and hypotheses) will always been relevant. More important that it be clear and readable.
    e. How long should it be? Long enough to satisfy the above goals. Typically 10-30 pages for an MS, longer for a PhD proposal.
    f. When summarizing existing literature, it is not enough just to describe what authors X, Y, and Z did. Results should be interpreted, in the context of the overall review and study objectives.
    g. In particular, discuss contrasting evidence, possible sources for discrepancies (experimental design, lack of controls, sensitivity of measures, etc.), and the importance of resolving the differences.
4. Objectives/Purposes
    a. Non-quantitative, but specific and clearly filling some hole/need addressed in the Introduction.
    b. The Intro should have motivated and 'scoped' the stated objectives and purposes.
5. Hypotheses
    a. Non-quantitative, but again specific and clear.
    b. There should be obvious connections to the objectives, and clear (though not stated here) indications of how statistical methods would be used to evaluate the hypotheses. In the methods, your statistical tests should make reference to these hypotheses.
    c. Not every statistical test should have an associate hypotheses (otherwise it would be unwieldy); instead, the hypotheses can be general (e.g. there will be an association among several variables; factors A and B will have effects on several measures of performance).
    d. Don't use words like 'significant', save this for the description of statistical methods.
6. Methods
    a. What will be done, how, and why
    b. With respect to how and why, there is typically more than one way to do something, and you must explain (and sometimes justify) your choice.
    c. The methods should have clear connections to the hypotheses.
    d. The Methods tends to be a difficult and sometimes complicated section. In general, proceed from broad to specific, but also ensure that a context is provided before specific details are raised. For example, don't describe specific

experimental treatments before you've even explained the overall approach and the different independent and dependent variables.

e. Note that 'repeated measures' refers to a study design, while within- and between-subjects refers to specific independent measures (or treatments). Crossed and nested factors are synomymous.
f. The reader should be able to understand what you're talking about, given what was provided before (use of a colleague again helps here).
g. Subsections are often used such as: Overview; Subjects; Procedures; Instrumentation; Experimental Design; Data Reduction; Analysis (stats)
h. The specific ordering of the sections in g., should achieve the goals of d. and f.
i. Somewhere (typically in Experimental Design), there should be an explicit statement of the independent and dependent variables (or factors, or measures)

So how do I get there? Unfortunately, this is as much an art as a science, but here are some things to consider:

1. Some General Tips:
    a. Each paragraph proceeds from general to specific.
    b. Some have suggested that reading the first sentence of every paragraph in the document should convey the essential meaning of the whole.
    c. Vary the structure of your sentences and paragraphs.
    d. Use transitions between paragraphs (either the last sentence of the proceeding one or the first sentence of the subsequent one, should tie the two together).
    e. Avoid one-sentence paragraphs (generally at least 3 sentences comprise a paragraph)
    f. Consider optional presentation methods (always using good HF knowledge and practice). Often the same thing can be conveyed by text, graphs, tables, diagrams, etc. Pick what is the most effective, but avoid duplication.
2. Some common mistakes to avoid:
    a. Repetitive sentence structure (The… The… The… or However, … Additionally, … Therefore, …)
    b. Avoid complex words and convoluted sentence constructions, where simpler ones will convey the information (like utilize vs. use; cognizant vs. aware; though personal style always has a role). Eschew obfuscation!
    c. There is no advantage to be gained by making something obscure. The scientific value is not enhanced by complicated words and prose, and to someone that knows the field, you don't sound any more knowledgeable. If you look at some of the best journals, they are typically written in a very dry, boring, direct, and terse style. It tends to be the weaker journals where creative writing flourishes!