

Research Approaches for Environmental Problem Solving

Course Objectives

By the end of this course, students should have the following:

1. A literature review on a possible dissertation research topic.
2. Criteria useful in evaluating whether or any particular question might make a suitable research question for dissertation project.
3. One or more peer reviewed research questions that resulted from the literature review process.
4. Preliminary ideas about research methods that may be useful in answering the research question(s) in 2 above.
5. Ideas about a faculty member who might be a suitable principal adviser.
6. An understanding of the possible paths through the Ph.D. process in IPER, including the process of creating a research committee, developing a research proposal for use in a Ph. D. qualifying exam, and alternative forms of a Ph.D. dissertation.
7. New or enhanced practical skills related to:
 - critical thinking,
 - the concept of validity and the evaluation of evidence,
 - ways of getting structured feedback from peers,
 - the preparation of posters and abstracts,
 - the use of bibliographic software EndNote,
 - effective oral presentation techniques, and
 - the IRB process.

Throughout the course at various intervals, students will make presentations of their literature review work to date and/or their possible dissertation subjects in one minute, two minutes, and five minutes.

Course Schedule

Week One

April 2-- Introduction

Introduction to the course

Students make presentations that respond to the following:

How and why I selected my directed study topic and faculty adviser for the directed study.

Following the presentations by individual students, students can think about the following:

How does my process compare with processes used by others?

Is there anything to be learned from this comparison of approaches?

This first class will also introduce typical elements of a Ph D research proposal. Such proposals come in many lengths and forms. Elements of a Ph D proposal would generally include the following (not necessarily in this order or with these headings):

- Title and table of contents
- Abstract
- Background/ Introduction
- Literature review
- Research question(s)/hypotheses (in some contexts); indication of where research fits in broader literature
- Research Design/Methodology
- Data Analysis Plans
- IRB process and ethical concerns (if applicable)
- Significance of the proposed work—indicate why it is an interdisciplinary research project suitable for an IPER student if that is not self evident
- Logistics – time frame, budget, health and safety concerns
- References Cited
- Appendix – e.g., interview questionnaires, measures of validity for variables.

Readings:

The first chapter from Krathwohl and Smith answers the question: what is a Ph.D. dissertation research proposal? The second chapter details the many functions of the dissertation proposal. The several pages from Locke, Spirduso and Silverman cover similar material, but from a different perspective.

Krathwohl, D.K. and N.L. Smith, 2005, *How to Prepare a Dissertation Proposal*, Syracuse University Press, Chapter 1.

Locke, L. F., Spirduso, W.W., and S. J. Silverman, 2007, *Proposals that Work*, fifth edition, Sage publications, Thousand Oaks California, pp. 1 – 9.

For examples of research proposal descriptions given by university departments, see:

University of Auckland, Faculty of Statistics, New Zealand

<http://www.stat.auckland.ac.nz/grad/doc/phd-proposal-guidelines.pdf>

De Montfort University, Department of Marketing, Leicester, UK

http://www.dmu.ac.uk/research/Guide_Res_proposal.jsp

University of Surrey, Medical School, U.K.

http://portal.surrey.ac.uk/portal/page?_pageid=756,1236967&_dad=portal&_schema=PORTAL

Geology Program, Oregon State University

<http://www.geo.oregonstate.edu/documents/graduate/GeologyProposalGuidelines.pdf>

Week Two

April 7 -- Literature reviews

The many functions of a literature review. What makes a good literature review within a Ph D research proposal?

A key purpose of the literature review for first and second year IPER students is for identifying gaps in the literature and explaining an how and why the proposed research can fill a gap in the literature. More generally, a literature review provides a basis for explaining how the proposed research fits into the broader literature.

In conversations with third and fourth year IPER students about their experience with literature reviews, here is what they said were the big challenges:

- The key issue is what to include and what to leave out. What are the boundaries of the review?
- A standard search technique is to use Google scholar and then search the bibliographies of frequently cited papers to lead to other key papers.
- It is a good idea to use EndNote right from the start.

Readings for this session concern the conduct of literature reviews.

Locke, L.F., Spiriduso, W.W. and S.S. Silverman, 2007, *Proposals that Work*, 5th edition, Sage, Thousand Oaks , CA. pp. 63-73.

Krathwohl, D.K. and N.L. Smith, 2005, *How to Prepare a Dissertation Proposal*, Syracuse University Press, pp. 49-64 and 71-72.

A useful tutorial on conducting literature reviews is available at the website of the American University Library:

http://www.library.american.edu/Help/tutorials/lit_review/index.html

We will read and evaluate the sample literature review on that website later in the course.

Pointers for thinking critically about information sources are given at a Cornell University Library webpage:

<http://www.library.cornell.edu/olinuris/ref/research/skill26.htm> ,

Tips on conducting a literature review are given at the website of the University of Melbourne:

<http://www.lib.unimelb.edu.au/postgrad/litreview/criticalreading.html>

April 9 – Research Ethics and the IRB Process

Skills: class presentation and Q & A regarding the IRB Process

Note that Kristin Frazier (kristin.frazier@stanford.edu) is available to answer any questions in advance that IPER 330 students may have regarding the IRB process. Another key person who can help with IRB procedures is Lauri Kanerva (lauri.kanerva@stanford.edu)

Reading:

The chapter from Locke, Spiriduso, and Silverman does not focus on the IRB process. Instead it covers the broad subject of ethics and research, with a focus on issues surrounding human subjects.

Locke, L.F., Spiriduso, W.W. and S.S. Silverman, 2007, *Proposals that Work*, 5th edition, Sage, Thousand Oaks , CA. pp. chapter 2.

Assignment 1 -- Reading list to be submitted on April 9.

This assignment asks you to develop and submit a preliminary reading list for the subject of your literature review. The subject should be an area of research that you want to explore in terms of its suitability for your dissertation.

Week Three

April 14 — Rudolf and McGee Grant Proposals and Literature reviews (continued)

Proposal writing as it pertains to the Rudolf (IPER) and McGee (SES) summer research grants, both due in late April. IRB process in the context of these proposals.

Alternative forms of literature reviews. Students will review, critique and discuss a sample of literature reviews taken from the published literature. What was effective and what was not helpful?

Reece, G., 2002, "Critical Thinking and Transferability: A Review of the Literature," unpublished manuscript. Available at the website of American University Library: http://www.library.american.edu/Help/tutorials/lit_review/critical_thinking.pdf

Hilary Schaffer's IPER Ph D Proposal—Literature Review Section and/or
Michael Hooper's IPER Ph D Proposal—Literature Review Section

Literature review based on directed study by IPER student Adam Millard-Ball

Optional reviews taken from social sciences with an interdisciplinary perspective:

Caniglia, B.S. and J. Carmin, 2005. "Scholarship on Social Movement Organizations: Classic Views and Emerging Trends." *Mobilization* 10(2): 201-212.

Lele, S., 1991, Sustainable Development: A Critical Review, *World Development*, 19(6):607-621.

April 16 -- Advanced EndNote tutorial

Skills: Class presentation by an expert on EndNote, software that can help you search online databases, organize your references, and create bibliographies. Class will be held at Lane Medical Library – computer classroom (location to be announced). The instructor for the workshop will be either Kimberly Schwartz kim.schwartz@stanford.edu or Chris Stave cstave@stanford.edu of the Lane Library staff.

Assignment 2 – Annotated bibliography to be submitted on April 21

This assignment will help you demonstrate critical evaluation skills and understanding of research articles. Specify your proposed research area and complete a literature search for 10 relevant peer-reviewed journal articles. Complete an annotated bibliography, where the articles are organized logically with respect to a possible research question. This annotated bibliography can provide the starting point for your literature review. Use EndNote in the context of this exercise.

The assignment also allows you to gain some experience in preparing an annotated bibliography. Here are a few good sources to help prepare an annotated bibliography:

UC Santa Cruz <http://library.ucsc.edu/ref/howto/annotated.html>

Cornell University <http://www.library.cornell.edu/olinuris/ref/research/skill28.htm>

Purdue <http://owl.english.purdue.edu/owl/resource/614/01/>

There are many other, similar urls available. Finally, here is a full blown illustration of an annotated bibliography—the subject is health literacy:

http://www.hsph.harvard.edu/healthliteracy/literature/lit_informed.html

Week Four– Peer reviews of progress with literature reviews

April 21 and 23

Bring to class on April 21, 2-3 pages from a section of your literature review (but no more than 600 words). This week students will get practice with techniques for obtaining structured feedback on their written work from peers based on one of the many approaches from the book by Peter Elbow and Pat Belanoff, *Sharing and Responding*, 3rd edition, McGraw Hill, NY, 2000).

Readings for this week consist of pp. 7-11 from the Elbow and Belanoff book; these pages describe the many alternative types of feedback that a student can request from classmates when it is his or her turn to share written work. Each student picks the form of feedback that they will find most helpful to their own individual writing process and tells the class just prior to his or her time to read their work. If none of the many suggestions on the pages 7-11 are desirable, then the student can make up something. But, in deciding on what to ask for, consideration must be given to the time available per student.

When you come to class next week, the procedure will be as follows. On Monday, Presentations will be by Amy, Rochelle and Rodrigo (in that – alphabetical --order) on Monday and then Sara, Marilyn, Nikit (in that order, with Sara first because she must leave promptly at 2:15) on Wed. Please be prompt in coming to class as we have much to do.

Each student will have no more than 600 words (absolute maximum) of prose. This should take about 3-4 minutes to read aloud. Each student will first announce the type of feedback that would be helpful, and then read his or her work aloud once. At that point, the class members will be given a hard copy of the prose (not before). This means that each student should bring 7 extra copies of the prose to hand out in class after the first reading. Do not email your writing in advance of class.

Then a student who is not presenting on that day will re-read the same piece aloud to the group. Each student can pick who is to read their material subject to the constraint that everyone gets to read on each day. During the second reading, class members will be able to read along on the hard copy. We will then pause for a few minutes so that class members will be able to write some notes to themselves.

At that point, each student in the class will offer two minutes (maximum) of reaction of the type that the writer has requested. The writer will simply sit quietly and absorb what is offered. That

process will take 10 minutes or so, and then we will move along to the next student who is presenting that day.

Of course, if students want to continued sharing responses with each other outside of class, that is certainly something that students can decide upon via email or in some other way.

Assignment 2 – Annotated bibliography to be submitted on April 21

Here are a few good sources on the subject of preparing annotated bibliographies:

UC Santa Cruz <http://library.ucsc.edu/ref/howto/annotated.html>

Cornell University <http://www.library.cornell.edu/olinuris/ref/research/skill28.htm>

Purdue <http://owl.english.purdue.edu/owl/resource/614/01/>

There are many other, similar urls available.

Students may wonder about the form of the annotated bibliography. Since this document is intended for your future use, the form is whatever you would find most useful. However, there are standard forms, and an illustration is given at the following url—the subject is health literacy.

http://www.hsph.harvard.edu/healthliteracy/literature/lit_informed.html

Assignment 3 – Portions of the literature review in draft form – to be distributed in class when students make their presentations this week (see instructions for the April 21 and 23 sessions above)

This assignment allows you to gain experience in organizing and assimilating relevant information. The draft will be subject to review by your classmates.

Week Five:

April 28– Research questions

The research question is viewed by many as the driver of a good research project and an essential part of a Ph D research proposal. The readings reinforce this point and they help in delineating research questions by suggesting criteria for what constitutes a good one.

Readings:

The readings are taken from several different authors in order to allow students to appreciate the many points of view around what it takes to come up with a research question that is suitable for a Ph.D. dissertation.

Krathwohl, D.K. and N.L. Smith, 2005, *How to Prepare a Dissertation Proposal*, Syracuse University Press, Chapter 3.

Locke, L. F., Spirduso, W.W., and S. J. Silverman, 2007, *Proposals that Work*, fifth edition, Sage publications, Thousand Oaks California, pp. 9-19

Maxwell, J.A., 1996, *Qualitative Research Design, An Interactive Approach*, Sage Publications, Thousand Oaks, California, Chapter 4.

King, G., R.O. Keohane, and S. Verba, 1994, *Designing Social Inquiry*, OPrinceton University Press, Princeton, NJ., pp. 14-19.

Assignment 3 – Revise the literature review presented last week in draft form and discuss it with the faculty member who is working with you on your directed reading.

The timing of this discussion will vary for individual students. However, I encourage a revision this week because the feedback from last week will be fresh, and, in addition, you will improve your writing by responding to the feedback from your peers.

April 30 – Interdisciplinarity

What is all the fuss about interdisciplinarity? Is interdisciplinarity more than a new buzzword? Does depth in two fields of inquiry mean little depth in either? How has the subject of interdisciplinarity been received in the university context? How has the subject been received in the world of refereed journals? IPER student, Rebeca Hwang, will participate in this discussion. (Rebeca's participation to be confirmed.)

Readings for this session consist of a series of essays from a thoughtful online “virtual” seminar conducted in 2003, and the above questions were widely discussed. All of the papers, as well as subsequent discussions of the papers, are available at <http://www.interdisciplines.org/interdisciplinarity/papers/>.

Given the constraints on time, please read, in this order, the articles by Dan Sperber and Ian Hacking. Then skim the article by Christophe Heinz and Gloria Origgi in order to identify one other reading from the virtual seminar that you would be interested in looking at. In reading this article make note of some points raised that were not covered in the other readings for today, and come to class prepared to summarize those new points.

Assignment 4 – Submit two lists of references from different disciplines in your literature review. Each list should have five or more items. The exercise is to demonstrate that you have at least five items in your literature from sources associated with each of two disciplines. Are the subjects being researched in the context of your literature review interdisciplinary in nature?

Week Six

May 5 – Navigating the IPER Ph D Process *up to and including* the qualifying exam (participants to be confirmed)

A panel of IPER students will give ten minute presentations giving snapshots of their experience in moving through the first two and one half years, culminating with the completion of the qualifying exam. The topics discussed will include navigating the IPER “Big Picture” session, selecting fields of inquiry, finding advisors, delineating a research question, writing a proposal for the Ph D qualifying exam, and forming a committee. Following the presentations, there will be time for Q & A.

Moderator and presenter: Hilary Schaffer

Other presenters: Three IPER students who have taken their exams recently

May 7 – Oral presentation skills workshop

A guest from CTL or the Technical Communications program will talk to the class about oral presentation skills and offer opportunities one-on-one tutoring. Topics to be covered will include (but not be limited to):

Thinking about your audience

Structure/organization

Delivery – voice, stance and gestures

Composition of visual aids, including (but not limited to) Power Points

Dealing with nervousness

Week Seven:

May 12– What does an IPER Ph D dissertation look like?

As preparation for the assignment associated with this session, read

Dunleavy, P., 2003, *Authoring a Ph.D.*, Palgrave Macmillan, New York, pp. 9-16.

Each student will review copies of the abstracts and tables of contents for the dissertations of five IPER graduate. In addition, each student will be assigned to skim one of the five dissertations and then report back to the class in response to a series of questions that will be given out in advance.

May 14 -- Navigating the Ph D Process in IPER *after* the qualifying exam (participants to be confirmed)

A panel of IPER students in their final year (or recent graduates still at Stanford doing a postdoc) will give ten minute presentations giving snapshots of their experience in moving through the period after the qualifying exam. The topics discussed will include doing fieldwork or experiments, relationships with advisors after the qualifying exam, the “multiple paper model” vs

a traditional dissertation format, writing and “backing up” the dissertation, the final dissertation defense exam, and pathways after the Ph D. Following the presentations, there will be time for Q & A.

Moderator: Hilary Schaffer

Presenters: three recent IPER grads (or almost grads)

Week Eight:

May 19 – IPER faculty discuss the research proposal (faculty member to be determined)

Professor Rob Dunbar, who co-chairs the Woods Institute for the Environment Committee that evaluates research proposals a few years ago, talks to the class about the characteristics of strong proposals and why some proposals that she has reviewed were less than persuasive, in the sense that they did not receive funding.

Readings: Redacted versions of proposals to be discussed by Professor Dunbar.

May 21 – Research questions

This session will be devoted to having students in the class present and get feedback on one or more research questions that have emerged from their literature review processes. These discussions will be based on the assignment below. Other students in the class should come prepared to discuss how they would evaluate the research questions presented by others using criteria that they individually find useful in determining a good research question.

Assignment-- Based on the literature review, what are issues at the forefront of the research area? What potential research questions are suggested as a result of the literature review? In 300 words or less, present one or more research questions and indicate why you find the questions both significant and researchable. Come prepared to read your response to this assignment to the class.

Week Nine

This week’s sessions will give students the opportunity to practice their oral presentation skills, and it will be based on the literature reviews.

May 26 and 28-- Oral presentations of literature reviews

Students will make formal presentations of their literature review results to date using Power Point or other visual aids they find suitable. Presenters will need to be precise because formal presentation will be limited to 15 minutes with 15 minutes for discussion. This is a typical set of time constraints for presentations at professional meetings.

Week Ten

June 2–Preparing for the professional conference: abstracts

IPER students are encouraged to make presentations at professional meetings, and these take one of two forms: posters or formal presentations. One typically applies to participate in the conference and is asked to send an abstract, which needs to be approved. During this session, students will be asked to read 200 word abstracts of their literature reviews aloud and get feedback from their peers.

Assignment -- prepare a 200 word abstract of the literature review.

Readings: suitable readings on the preparation of abstracts.

June 4–Preparing for the professional conference: posters

What are the characteristics of a good poster? What resources are available at Stanford, to assist students in the preparation of posters? This class will be devoted to discussion of these questions as well as a sample of posters that have been used by IPER students at conferences.