

Research Process and Design (07B:206)
Department of Educational Policy and Leadership Studies
Spring 2006
Tuesdays, 3:30-6:00
302 Lindquist Center
Course Website: <http://www.uiowa.edu/~c07b206/>

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Purpose and Objectives

This course is designed to help doctoral students learn the main concepts of quantitative research design. The course should help you both evaluate and carry out research in education and other social sciences. Design, analysis, and interpretation of results will be discussed together. The primary objectives of this course are as follows:

- To understand research concepts and methods and to be able to apply them in analyzing and doing research.
- To evaluate research presented in the popular press and in scholarly journals; i.e., be a good consumer of research.
- To plan your own research, specifically to know how to develop research questions and design a study to answer them.

By the end of this course, I expect that you will have an introductory understanding of the following concepts or research tools:

Scientific Inquiry	Mean, Mode, Standard Deviation, Percentile,
Theory	T-Test, Correlation, Analysis of Variance
Hypothesis	Experimental Design
Scientific Paradigms	Quasi-Experimental Design
Nominal, Ordinal, Interval and Ratio Scales	Ex Post Facto and Correlational Designs
Independent Variable	Control and Sources of Error
Dependent Variable	Partial Correlation and Regression
Control or Confounding Variable	Internal Validity
Variance	External Validity
Statistical Description	Reliability
Statistical Inference	Elements of Sampling Theory and Design
Statistical Significance	Sample Representativeness
	Psychometric Reliability and Validity

Valuing Diversity

It is my belief that the diversity you bring to this class is a valuable resource because varied backgrounds and opinions enhance discussion. Research, including some of my own, suggests that learning is improved by exposure to diversity in the classroom. It is my intent to present materials and activities that utilize and are respectful of diversity: gender, sexual orientation, disability, age, socio-economic status, ethnicity, race, culture, perspective, and other background characteristics. Your suggestions about how to

improve the value of diversity in this course are encouraged and appreciated. Please let me know of ways to improve the effectiveness of the course for you or for other students or student groups.

I also understand that you may celebrate religious holidays that conflict with the class schedule and may have a disability that requires special accommodations. You will not be penalized because of observances of your religious beliefs. Whenever possible, you will be given reasonable time to make up any academic assignment that is missed due to participation in a religious observance. It is your responsibility to inform me as soon as possible of any intended absences for religious observances. If you have a documented disability that is relevant to the work that you will do in this course, please contact me as soon as possible so that appropriate accommodations can be made. Student Disability Services (3101 Burge Hall, 335-1426, <http://www.uiowa.edu/~sds/>) also is available for consultation with students with disabilities.

Academic Honesty

You are expected to abide by the code of academic integrity throughout this course. I encourage you to collaborate with others as you think about, outline, and proofread your work. However, oral and written work must be your own. You must acknowledge any scholars or classmates whose work you quote or refer to in any way. According to the College of Education's Policy on Student Academic Misconduct, examples of plagiarizing or cheating include: presenting someone else's written or spoken words or ideas as one's own; using direct quotes with no quotation marks, paraphrasing without crediting the source or in some other way suggesting someone else's work is one's own; copying all or part of someone else's paper; and knowingly allowing another student to copy one's work or submit one's work as his or her own. In addition, students must not turn in any written work for which they have already received credit in another course. Any sort of academic misconduct is a very serious offense, and may result in a grade reduction and/or other serious penalties. For more information see the University's *Policy on Student Academic Misconduct* available online at:

http://www.uiowa.edu/~coedean/policies/student_ac_misconduct/index.htm .

Concerns

If you have any suggestions or concerns, either positive or negative, about this class, please do not hesitate to see me during my office hours or make an appointment. It is my hope that we will be able to resolve the issue. In the event that we are unsuccessful, College policy suggests that you contact the EPLS department executive officer, Larry Bartlett (N491 Lindquist Center, 335-5307 or 335-5303). He will be able to help you and give further guidance. You also may wish to refer to the college policy on student complaints and dispute resolution. A copy of *Student Complaint Procedures* is available online at

http://www.uiowa.edu/~coedean/policies/student_complaint/index.htm

Dropping the Course

This course is given by the College of Education. This means that class policies on matters such as requirements, grading, and sanctions for academic dishonesty are governed by the College of Education. If you wish to add or drop this course after the official deadline, you must receive the approval of the Dean of the College of Education. Prior to dropping the course, I encourage you to come speak with me. I will do whatever I can to find a solution that will allow you to remain in the course and continue your progress toward degree completion. Additional information on dropping the course and details of the University policy of cross enrollments may be found at

<http://www.uiowa.edu/~provost/deos/crossenroll.doc> .

Readings

Required (available at the bookstore or amazon.com; also on reserve at Main Library)
Jaeger, R.M. (1990). *Statistics: A spectator sport* (2nd edition). Thousand Oaks, CA: Sage.

Recommended

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Other Readings

In addition to the required texts listed above, you will read additional book chapters and articles. All have been placed on electronic reserve (noted with an * in course schedule) at the Psychology Library and can be accessed at <http://libres.lib.uiowa.edu/psych/>.

Additional resources (on reserve at Main Library or amazon.com; required sections on electronic reserve unless otherwise noted)

Allison, P. D. (1998). *Multiple regression: A primer*. Thousand Oaks, CA: Pine Forge Press.

Best, J. W. & Kahn, J. V. (2005). *Research in Education*. Boston, MA: Allyn and Bacon (10th edition).

Fowler, F. J. (2002). *Survey research methods* (3rd edition). Thousand Oaks, CA: Sage.

Gall, M. D., Borg, W. R., & Gall, J. P. (2002). *Educational research: An introduction*. Boston, MA: Allyn and Bacon (7th edition).

Light, R. W., Singer, J. D., & Willett, J. B. (1990). *By design: Planning research on higher education*. Cambridge, MA: Harvard University Press.

McMillan, J. H. & Shumacher, S. (2005). *Research in education: Evidence based inquiry*. Boston, MA: Allyn and Bacon (6th edition).

Williams, F., & Monge, P. (2001). *Reasoning with statistics: How to read quantitative research* (5th edition). Orlando, FL: Harcourt College Publishers.

Wiersma, W. & Jurs, S. G. (2004). *Research methods in education: An introduction*. Boston, MA: Allyn and Bacon (8th edition).

Methods of Instruction and Course Expectations

The course will employ a variety of approaches of instruction and will rely heavily on student participation and discussion. All students will be evaluated on the first two items (class participation and article critique).

1. **Class participation (10%)**—This course is conducted as a lecture/seminar class; therefore, you are expected to attend and to be actively involved in the class. You are expected to participate in class discussions in a manner that demonstrates thoughtful reflection and understanding of the subject matter, as well as respect for your colleagues in the class. To do so, you must complete the readings that are assigned for each session of the class prior to attending that class session. Active participation also means that each participant is willing to listen to other points of view and to change his or her mind. This means you must listen to others, respond thoughtfully, demonstrate an understanding of the issues, and show a willingness to learn and grow.
2. **Article Critique (20%)**—You will select and critique a quantitative research article. I recommend that you select an article that informs your research proposal. I also recommend that you allow me to review your article prior to writing your critique. You may use your notes and readings to assist with the assignment, but you may not consult with other people. I will provide additional information about the critique during the first class. The article critique is due in class on February 23.

3. **Take-home midterm exam (30%)**—The purpose of the essay take-home exam will be to apply and integrate all of the information covered prior to spring break. It is easy to labor over take-home exams for days and even weeks. To avoid this, I want to set realistic expectations for the exam. If you were to take the exam in class, you would have approximately two and a half hours. While I hope you spend a little more time on your exam than that, I believe you should take no more than four or five hours to complete it. I will evaluate your exam with this in mind. For those who need a page number guideline, I expect that you will write no more than ten double-spaced pages (probably more than six pages). You may use your notes and assigned readings to do the assignments, but you may not consult with other people. I will distribute the exam on March 9, and it will be due at the beginning of class on March 23.

4. **Group Research Proposal (40%)** – During the second class meeting, we will divide the class into groups of two (or three, if necessary) according to research interests. You will work together to develop a research proposal that addresses a particular problem and seeks to answer a research question or research questions. Your proposal will include the following components: an explanation of the research problem, a series of research questions and/or hypotheses, a review of the literature, and a thorough description of the method. You **will not collect data** for this project. I expect the proposal will be 15-20 pages, and it will be due on May 4. You will present your proposal to the class on April 27 or May 4. Additional information on the group project will be provided in class.

Note that you will work in pairs to complete several written assignments that will lead to your final research proposal. A portion of your research proposal grade will be based on these assignments. But more important, I believe the feedback you receive from your peers and me will contribute greatly to your learning as well as the grade on your final proposal. Therefore, I encourage you not to neglect these exercises. We will discuss the specifics of these assignments in class.

I know that some are reluctant to work on group projects. I dreaded group work while in graduate school. Yet, in my experience, educational research almost always involves teamwork. A scan of the educational research literature reveals that the majority of the articles have more than one author. Additionally, research suggests that collaborative work enhances student learning. However strong the argument for collaborative work, some of you still may wish to pursue your research proposal on your own. Please contact me prior to class on January 26 if you wish to write your own proposal, and I will make alternate arrangements for you.

→ **Note: All assignments should be turned in on time unless other arrangements are made well in advance of deadlines. I WILL NOT accept any late assignments.**

→ All formal written work should adhere to APA style as described in the Publication Manual of the American Psychological Association (5th Ed.).

Grading

Your final grade for this class will be based upon the following:

Participation.....	10 points
Article Critique.....	20 points
Take-home Midterm.....	30 points
Research proposal.....	40 points

Your final grade will be calculated using the following scale:

92—100 points.....	A
90—91 points.....	A-
88—89 points.....	B+
82—87 points.....	B
80—81 points.....	B-
78—79 points.....	C+
72—77 points.....	C
70—71 points.....	C-....

I *strongly discourage* incomplete grades. I have seen numerous cases where students become overwhelmed trying to wrap-up incomplete grades. However, if it is absolutely necessary for you to take an incomplete, you must arrange it with me prior to April 27th.

Instructor Responsibilities

I have high expectations not only for you but also for myself. You should expect that I will:

- Be prepared for class, read and return your work in a timely manner, and be interested and engaged in your work;
- remember that each of you brings a different background, experience, and perspective to this course;
- learn from you;
- meet with you individually or in groups upon request and be available in person, by telephone, and by e-mail;
- and work hard, have fun, and empower students to develop greater understandings of the topics that are covered in this course.

Course Schedule

I organized the course schedule around the main concepts of quantitative research methods. We proceed generally, considering how to write a research proposal, concepts of quantitative research design, techniques for understanding data, and methods of data collection. In late February, we begin to explore experimental, quasi-experimental, and non-experimental research designs. In the last half of the semester, we discuss more advanced research topics such as sampling theory, hypothesis testing, and inferential statistics.

Week 1, January 19 – Introductions, expectations, and introduction to research

Week 2, January 26 - Framing research, elements of a research proposal, and the introduction section

Creswell – Chapter 1 (p. 3-23), Chapters 3 and 4 (p. 49-85; skim information on mixed and qualitative methods)

* McMillan, J. H. & Shumacher, S. (2005). *Research in education: Evidence based inquiry*.

Boston, MA: Allyn and Bacon (6th edition). Chapters 1 & 2 (p. 2-47) (skim information on qualitative research)

Assignment due: One paragraph describing the research problem you would like to address in your research proposal. Bring 3 copies to class.

Week 3, February 2 – Narrowing your topic and introduction to quantitative research design (Issues of internal and external validity)

Creswell – Chapters 5-8 (p. 87-152; skim information on mixed and qualitative methods)

Jaeger – Chapter 6 (103-132)

*Antonio, A. I., Chang, M. J., Hakuta, K., Kenny, D. A., Levin, S., & Milem, J. F. (2004). Effects of racial diversity on complex thinking in college. *Psychological Science*, 15(8), 507-510.
Read the FAQs from the Racial Diversity Experiment (supporting document for Antonio et al.):
<http://www.stanford.edu/group/diversity/faq.htm>

Week 4, February 9 – Writing the literature review and understanding data (Scales of measurement, measures of central tendency, measures of variability)

Creswell – Chapter 2 (p. 27-48; skim information on mixed and qualitative methods)

Jaeger – Chapters 1-3 (p. 1-59)

Assignment due: Two page research prospectus (group). Bring three copies to class.

Week 5, February 16 – Validity, reliability, and methods of collecting data

Jaeger – Chapter 5 (p. 77-103)

* Best, J. W. & Kahn, J. V. (2005). *Research in Education*. Boston, MA: Allyn and Bacon (10th edition). Chapter 9 (p. 288-345)

Week 6, February 23 – Experimental research design

* Gall, M. D., Borg, W. R., & Gall, J. P. (2002). *Educational research: An introduction*. Boston, MA: Allyn and Bacon (7th edition). Chapter 12 (p. 365-399)

*Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of personality & social psychology*, 69(5), 797-811.

Assignment due: Article review

Week 7, March 2 – Writing the methods section and quasi-experimental design

Creswell – Chapter 9 (p. 153-176)

* Gall, M. D., Borg, W. R., & Gall, J. P. (2002). *Educational research: An introduction*. Boston, MA: Allyn and Bacon (7th edition). Chapter 13 (p. 365-399)

Week 8, March 9 – Non-experimental research design: Correlational and ex post facto studies (Take home mid-term distributed)

Jaeger – Chapter 4 (p. 61-76)

* Wiersma, W. & Jurs, S. G. (2004). *Research methods in education: An introduction*. Boston, MA: Allyn and Bacon (8th edition). Chapter 7 (p. 155-196)

Assignment due: Outline of your literature review (group). Bring 3 copies to class.

Week 9, March 16 - No class (Spring Break)

Week 10, March 23 – Sampling

*Light, R. W., Singer, J. D., & Willett, J. B. (1990). *By design: Planning research on higher education*. Cambridge, MA: Harvard University Press. Chapter 3 (p. 41-70)

*Fowler, F. J. (2002). *Survey research methods (3rd edition)*. Thousand Oaks, CA: Sage Publications. Chapter 1 (p. 10-38).

Assignment due: Take-home midterm

Week 11, March 30 – Hypothesis testing and statistical inference

Jaeger – Chapters 7-10 (p. 135-213)

Assignment due: One page description of method (group). Bring 3 copies to class.

Week 12, April 6 – No Class (AERA) - Work on proposal

Week 13, April 13 – Analysis of Variance

Jaeger – Chapters 12-14 (p. 236-302)

Assignment Due: Draft of proposal (group). Bring 3 copies to class.

Week 14, April 20 – Partial correlation and bivariate regression

Jaeger – Chapter 11 (p. 215-234)

*Williams, F., & Monge, P. (2001). *Reasoning with statistics: How to read quantitative research* (5th edition). Orlando, FL: Harcourt College Publishers. Chapter 11 & 12 (p. 125-152).

Week 15, April 27 – Group presentations (if necessary) and multiple regression

*Allison, P. D. (1998). *Multiple regression: A primer*. Thousand Oaks, CA: Pine Forge Press. Chapter 1 (p. 1-24).

Select ONE of the following:

*Bellas, M. L. (1994). Comparable worth in academia: The effects on faculty salaries of the sex composition and labor market conditions of academic disciplines. *American sociological review*, 59(6), 807-821.

*Perna, L. W. (2003). The private benefits of higher education: An examination of the earnings premium. *Research in higher education*, 44(4), 451-472.

Week 16, May 4 – Group presentations

Assignment due: Group research proposal

Course Schedule At-a-glance

Week	Topic	Required readings	Assignment due
1/19	Introductions, expectations, and introduction to research		
1/26	Framing research, elements of a research proposal, and the introduction section	Creswell – Ch. 1, 3, & 4 (skim qualitative) *McMillan & Schumacher – 1 & 2 (skim qualitative)	Three copies of one paragraph describing research problem
2/2	Narrowing your topic and introduction to quantitative research design	Creswell – Ch. 5-8 (skim mixed and qualitative) Jaeger – Ch. 6 *Antonio, Chang, Hakuta, Levin, & Milem (2004)	
2/9	Writing the literature review and understanding data	Creswell – Ch. 2 (skim mixed and qualitative) Jaeger – Ch. 1-3	Three copies of two page prospectus (group)
2/16	Validity, reliability, and methods of collecting data	Jaeger – Ch. 5 *Best & Kahn – Ch. 9	
2/23	Experimental research design	*Gall, Borg, & Gall – Ch. 12 *Steele & Aronson (1995)	Article critique
3/2	Methods section and quasi-experimental design	Creswell – Ch. 9 *Gall, Borg, & Gall – Ch. 13	
3/9	Non-experimental research design (take-home midterm distributed)	Jaeger – Ch. 4 *Wiersma & Jurs – Ch. 7	Three copies of outline of literature review (group)
3/16	No class (spring break)		
3/23	Sampling	*Light, Singer, & Willett – Ch. 3 *Fowler – Ch. 1	Mid-term exam
3/30	Hypothesis testing and statistical inference	Jaeger – Ch. 7-10	Three copies of one page description of method (group)
4/6	No class (AERA)		
4/13	Analysis of variance (ANOVA)	Jaeger – Ch. 12-14	Three copies of proposal draft (group)
4/20	Partial correlation and bivariate regression	Jaeger – Ch. 11 *Williams & Monge – Ch. 11 & 12	
4/27	Group presentations (if necessary) and multiple regression	*Allison (1998) – Ch. 1 <i>Select ONE of the following:</i> *Bellas (1994) *Perna (2003)	
5/4	Group presentations		Group research proposal