The University of Wisconsin-Madison
School of Education

# ELPA 940-003, Randomized Trials to Inform Education Policy
# Fall 2006
# Educational Sciences Building, Rm. 303, Thursday 4:40 – 7:10


## Instructor:

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## Office Hours:

By appointment

## Required Text:

Bloom, H.S. (Ed.) (2005). *Learning more from social experiments: Evolving analytical approaches.* New York: Russell Sage Foundation.

Additional required readings are noted below and are available at Dr. Borman's web page: www.education.wisc.edu/edadmin/people/faculty/borman.htm

## Course Objectives:

The purpose of this course is to help students understand the policy, practical, and methodological issues related to the design and implementation of randomized trials in school-based settings. *Randomized Trials to Inform Education Policy*, will offer perspectives on the current demands for evidence-based policy in education and will discuss how researchers and evaluators can design research to respond to these demands. Most fundamentally, policymakers want to know "what works" in education. Answering this causal question has become increasingly important for guiding education policy and, as a result, policy analysis has grown to become more reliant on the perceived "gold standard" for responding to causal questions: the random assignment experiment. The experiment is a research method whereby participants are sorted by chance into either a program group that is subject to a new policy or program, or a control group that is not. Because the groups are selected at random, they do not differ from one another systematically. Therefore any differences between the groups at the end of the study can be attributed solely to the influence of the program or policy. Classic experimental designs, however, do not always fit the complex world of schools and classrooms.

In the course, we will discuss the complications related to carrying out randomized experiments in education. We will discuss why there has been resistance to experiments among many involved in education. We will identify when they are appropriate and when they are not. We will profile advancements in the scientific underpinnings of social policy research that can

help improve randomized experimental studies and make them fit and inform the world of education more effectively. For instance, enhanced experimental designs and methods will be discussed that take into account: (1) the nested structure (students nested within classrooms, and classrooms within schools, and schools within school districts) of education; (2) differences in the implementation of programs and policies and varying levels of student participation in the interventions; and (3) complexities in statistical power estimation.

## Prerequisites:

To gain the most from the class, students should have completed, *at minimum*, an introductory statistics sequence.

## Course Requirements:

Students will:

1. Participate in all class activities (notify instructor of any absences in advance) and complete all assigned readings and be prepared to discuss them in class;
2. Lead the in-class discussion of one assigned reading;
3. Complete a final paper;
4. Deliver an in-class presentation of the paper.

**Further Information about Class Participation.** The course objectives cannot be realized without regular attendance and participation. Your attendance and participation at each of the 12 classes is worth 2 points toward your final grade. Specifically, attendance and class participation account for 24 points (2 pts. X 12 days = 24 pts.) of the total of 100 points possible for the class. Please note that there are no provisions for making up for absences.

Students will also take an ongoing responsibility for leading discussions of some class reading material. Nearly every week, I will ask for a volunteer to lead the class in a discussion of an article [**see syllabus agenda for each article with an asterisk (*), which is the one that students will discuss**]. I will ask for volunteers at least one week prior to the class during which the article will be discussed. Students may prepare a brief summary of the article and, to facilitate the dialogue, students leading the discussion will prepare a *thought-provoking* activity that we will do in class. The activity may be a list of approximately three questions that we will discuss concerning the article. These questions might involve asking students how certain points raised in the article apply to real-world examples of research projects or general questions about how students interpret the meaning or importance of a certain point or concept raised in the article. Hands-on activities, small-group discussions, staged debates, and other creative activities or interactive ways of discussing the topics are especially encouraged. In some cases, discussion may be facilitated by preparing questions or a description of the activity and sending it to students via email by at least the day prior to the in-class discussion (i.e., Wednesday). Also, let me know if there is anything I can do to help, such as supplying materials, making photocopies, etc. The discussion may occupy only about 30 minutes of class time, or longer if it leads to interesting and engaging topics.

**Further Information about Final Paper.** There is flexibility regarding the final paper. It may take on several forms, including a well-specified proposal of how you would conduct a randomized trial on an intervention of your choice or an analysis of data (I can provide the data

or you can analyze your own data) from a randomized trial. The key requirement is that the paper must address the topics discussed in the class (i.e., randomized trials and practical, methodological, and statistical issues concerned with their design, implementation, and analysis). The paper must specify the practical and/or theoretical importance of the project, detail the randomization procedure, document that the design has sufficient statistical power, clarify the potential threats to internal validity, and specify an analysis plan (or discuss the results). The suggested length of the paper is approximately 20-25 pages (double-spaced).

## Grading Student Work:

Each student's final grade for the course will be based on the instructor's evaluation of the following:

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| 1. | Class participation/attendance | (12 X 2) | 24 points |
| 2. | Leading discussion of an article | | 18 points |
| 3. | Final Paper | | 40 points |
| 4. | In-class Presentation | | 18 points |

Attendance at each of the 12 class sessions is worth 2 points, with a total of 24 points for perfect attendance. A well-done presentation and discussion of an article earns 18 points. A high-quality final paper submitted on time will receive 40 points. Final papers turned in one day late will receive a maximum of 35 points and final papers turned in more than one day late will receive half-credit, or a maximum of 20 points. A well-done final presentation of your results on Dec 8 or 15 earns 18 points. Students who do not present their results in class on Dec. 8 or 15 receive no credit for the presentation. Obviously, these ground rules suggest that I believe that attending the class and completing your work on time (and being able to discuss it in class) are important for your learning and for the learning of your classmates. Attending all of the classes, doing high-quality work, and completing all of the work on time will earn an "A."

## Full Inclusion:

Students needing special accommodations to enable full participation in this course should contact the instructor as early as possible. All information will remain confidential. You also may contact the McBurney Disability Resource Center, 905 University Ave., 263-2741 regarding questions about campus policies and services.

## Course Schedule:

| Date | Topics, Activities, and Readings |
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| Sept. 7 | **Introduction: Experiments for educational evaluation and improvement**<br>Course description<br>Explanation of assignments<br>Overview of topics covered in class<br><br>**Readings:**<br>Borman, G.D. (2002). Experiments for educational evaluation and improvement. *Peabody Journal of Education, 77*(4), 7-27. |

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| Sept. 14 | **The current policy context for randomized trials in education**<br>The concept and logic of randomized experiments<br>Current policies and initiatives to increase the use of randomized trials<br><br>**Readings:**<br>Boruch, R. F. (1998). Randomized controlled experiments for evaluation and planning. In L. Bickman & D. J. Rog (Eds.), *Handbook of applied social research methods* (pp. 161-191). Thousand Oaks, CA: Sage.<br>Boruch, R., de Moya, D., & Snyder, B. (2002). The importance of randomized field trials in education and related areas. In F. Mosteller & R. Boruch (eds.), *Evidence matters: Randomized trials in education research* (pp. 50-79). Washington, DC: Brookings.<br>National Research Council (2002). *Scientific research in education.* Washington, DC: National Academies Press. (Chapter 3: Guiding principles for scientific inquiry, pp. 50-79)<br>*Rubin, D.B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology, 66,* 688-701.<br>Slavin, R.E. (2002). Evidence-based education policies: Transforming educational practice and research. *Educational Researcher, 31*(7), 15-21. |
| Sept. 21 | **Recent examples of randomized trials in education**<br>I report two recently completed experiments and one ongoing experiment as practical examples<br><br>**Readings:**<br><br>Borman, G.D., & Dowling, N.M. (2006). The longitudinal achievement effects of multi-year summer school: Evidence from the Teach Baltimore randomized field trial. *Educational Evaluation and Policy Analysis, 28,* 25-48.<br>Borman, G.D., Slavin, R.E., Cheung, A., Chamberlain, A., Madden, N., & Chambers, B. (2005). The national randomized field trial of Success for All: Second-year outcomes. *American Educational Research Journal, 42,* 673-696. |

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| Sept. 28 | **Randomized trials in field settings: Political, ethical, and practical issues**<br>The objections to randomized experiments and education<br>How do we implement randomized trials in education that are ethical, practical, and informative?<br><br>**Readings:**<br>Bloom, H.S. (Ed.) (2005). *Learning more from social experiments: Evolving analytical approaches* (Chapter 1: Precedents and prospects for randomized experiments, pp. 1-36)<br>*Cook, T.D., & Payne, M.R. (2002). Objecting to the objections to using random assignment in educational research. In F. Mosteller & R. Boruch (eds.), *Evidence matters: Randomized trials in education research* (pp. 150-178). Washington, DC: Brookings.<br>Gueron, J.M. (2002). The politics of random assignment: Implementing studies and affecting policy. In F. Mosteller & R. Boruch (eds.), *Evidence matters: Randomized trials in education research* (pp. 15-49). Washington, DC: Brookings.<br>National Research Council (2002). *Scientific research in education.* Washington, DC: National Academies Press. (Chapter 4: Features of education and education research, pp. 80-96) |
| Oct. 5 | **Are experiments in education the gold standard?**<br>How do the outcomes of reasonably well-designed nonexperimental studies compare to those of experimental studies?<br>Are random assignment studies truly the gold standard, or are nonexperimental methods "close enough"?<br><br>**Readings:**<br>Bloom, H.S. (Ed.) (2005). *Learning more from social experiments: Evolving analytical approaches* (Chapter 5: Using experiments to assess nonexperimental comparison-group methods for measuring program effects, pp. 173-235).<br>Glazerman, S., Levy, D.M., & Myers, D. (2002). *Nonexperimental replications of social experiments: A systematic review.* Princeton, NJ: Mathematica Policy Research, Inc.<br>*Heinsman, T.H., & Shadish, W.R. (1996). Assignment methods in experimentation: When do nonrandomized experiments approximate answers from randomized experiments? *Psychological Methods, 1*, 154-169.<br>Wilde, E.T, & Hollister, R. (2002). *How close is close enough? Testing nonexperimental estimates of impact against experimental estimates of impact with education test scores as outcomes.* Madison: University of Wisconsin—Madison, Institute for Research on Poverty. |

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| Oct. 12 | **Cluster randomized trials: Random assignments of groups and places**<br>The multilevel, nested nature of schools and educational systems<br>How can randomized experiments fit this multilevel context?<br><br>Bloom, H.S. (Ed.) (2005). *Learning more from social experiments: Evolving analytical approaches* (Chapter 4: Randomizing groups to evaluate place-based programs, pp. 115-172).<br>Boruch, R., May, H., Turner, H., Lavenberg, J, Petrosino, A., de Moya, D., Grimshaw, J., & Foley, E. (2004). Estimating the effects of interventions that are deployed in many places: Place-randomized trials. *American Behavioral Scientist, 47,* 608-633.<br>*Burstein, L. (1980). The analysis of multilevel data in educational research and evaluation. In D. Berliner (Ed.), *Review of Research in Education, 8*, 158-233. |
| Oct. 19 | **Cluster randomized trials: Random assignments of groups and places (continued)**<br>Analytical and statistical implications of cluster randomized trials.<br><br>*Raudenbush, S.W. (1997). Statistical analysis and optimal design for cluster randomized trials. *Psychological Methods, 2*, 173-185. |
| Oct. 26 | **Power analysis and effect sizes**<br>The concept and calculation of a research design's statistical power<br>Effect sizes: What are small, medium, and large effects in education?<br><br>**Readings:**<br>Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,*155-159.<br>Lipsey, M.W. (1998). Design sensitivity: Statistical power for applied experimental research. In L. Bickman & D.J. Rog (Eds.), *Handbook of applied social research methods* (pp. 39-68). Thousand Oaks, CA: Sage.<br>*Lipsey, M.W., & Wilson, D. B. (1993). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis. *American Psychologist, 48,* 1181-1209.<br><br>**Assignment Due:**<br>Submit brief 1-3 page proposal for your final paper |

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| Nov. 2 | **Estimating Power for Cluster Randomized Trials—A Presentation and Demonstration**<br>A practical discussion of the design and analysis of cluster randomized trials<br>A hands-on activity: Estimating statistical power for a cluster randomized design.<br><br>Download Free Power Analysis Software, "Optimal Design," at: http://sitemaker.umich.edu/group-based |
| Nov. 9 | **Intention-to-treat and complier effects**<br>Evolving methods for estimating treatment effects for those who really get the treatment.<br><br>*Bloom, H. (1984). Accounting for no-shows in experimental evaluation designs. *Evaluation Review, 8*, 225-246.<br>Bloom, H.S. (Ed.) (2005). *Learning more from social experiments: Evolving analytical approaches* (Chapter 3: Constructing instrumental variables from experimental data to explore how treatments produce effects, pp. 75-114). |
| Nov. 16 | **Intention-to-treat and complier effects (continued)**<br>A hands-on activity: Estimating complier effects with statistical software<br><br>Angrist, J.D., Imbens, G.W., & Rubin, D.B. (1996). Identification of causal effects using instrumental variables. *Journal of the American Statistical Association, 91,* 444-455.<br>Holland, P. (1986). Statistics and causal inference (with discussion). *Journal of the American Statistical Association, 81*, 945-970. |
| Nov. 23 | **No Class – Thanksgiving** |
| Nov. 30 | **Topic to be determined (or "catch-up day")** |
| Dec. 7 | **Student Presentations** |
| Dec. 14 | **Student Presentations**<br>**Final Paper Due** |