

“Implementing an Integrative Research Sequence:
The ‘Scientific Core’”*

Valerie Eastman, Ph.D.
Associate Professor of Psychology
Drury University

R. Robin Miller, Ph.D.
Associate Professor of Sociology
Drury University

Summary: The Behavioral Sciences Department at Drury University, an interdisciplinary department consisting of the fields of psychology, sociology, and criminology, has just begun implementation of a new undergraduate curriculum, the “scientific core,” funded by a grant from the National Science Foundation. Teaching the processes of scientific inquiry requires a comprehensive infrastructure that systematically carries students through the interconnected knowledges and practices of science. We propose a progressive model that affords students the opportunity to both understand and do science. More specifically, this research initiative will facilitate the mastery of problem-solving skills and disciplinary socialization, and thereby produce graduates who are well prepared to enter the community of scholars. It includes a coordinated sequence of courses that consists of instruction in scientific writing, research methodologies, statistical analysis, behavioral ethics, and a 32-week capstone research application where students participate in a team-based, student-initiated, hands-on research project, culminating in a public presentation.

*Presented at the Association of American Colleges & Universities, the Student as Scholar: Undergraduate Research and Creative Practice conference, Long Beach, California, April 2007.

Scientific Core

- All students majoring in the behavioral sciences must complete a series of courses designed to engender scientific literacy. These courses are referred to as the “scientific core” and include the following:

109: Scientific Writing. 1 hour.

This course introduces students to professional writing styles used in the Behavioral Sciences, emphasizing the guidelines of the American Psychological Association and American Sociological Association. The course is also designed to familiarize students with library databases used to conduct empirical literature reviews.

200: Research Methods in Social Science. 3 hours.

Considers the major methods of the social sciences, including applied statistics. Topics include: research design, surveys, secondary data, and other unobtrusive methods, evaluation research, sampling, and research reports.

275: Statistics for the Behavioral Sciences. 3 hours. Co-requisite: 275-L.

This course introduces the student to the basic design methodologies and statistical techniques used in behavioral sciences. Some of the topics considered are mixed and correlational designs, analysis of variance, and data collection procedures. Offered both semesters. *Recommended: 200.*

275-L: Statistics for the Behavioral Sciences Laboratory. 1 hour. Co-requisite: 275.

359: Advanced Behavioral Research I. 3 hours.

Students enrolled in this course complete the initial stages of an original, team-based research project, to include conducting and writing a literature review, devising a research design strategy, and applying ethical protection to human participants. *Prerequisites: 109, 200, 275, 275-L.*

361: Advanced Behavioral Research II. 3 hours.

As a continuation of Advanced Behavioral Research I, students enrolled in this course complete their original, team-based research project. This involves conducting the study, data analysis, reporting the findings in the context of a scientific paper, and delivering a formal presentation of the research. *Prerequisites: 109, 275, 275-L, 359.*

- Students who wish to gain a Recognition in Scientific Analysis must complete the scientific core as well as the following courses:

335: Psychological Tests and Measurements. 3 hours. Co-requisite: 335-L

An intensive study of the theory of measurement with emphasis on errors in measurement, validity, reliability, item analysis, test construction, and prediction. A laboratory period will include training in the construction, taking, scoring and interpretation of psychological tests. *Prerequisites: 275, 275-L.*

335-L: Psychological Tests and Measurements Laboratory. 1 hour. Co-requisite: 335.

339: Ethical Dilemmas in the Behavioral Sciences. 3 hours.

Designed as an exploration of contemporary moral issues and as an introduction to research ethics, this course examines philosophy-based ethics theories and encourages their application in case studies across an array of disciplines. A segment of the course is exclusively devoted to application in research endeavors. Students are required to obtain National Institutes of Health certification to conduct research with human participants.

475: Advanced Statistics for the Behavioral Sciences. 3 hours. Co-requisite: 475-L

This course provides an in-depth examination of inferential statistics used in Behavioral Sciences. Topics include analysis of variance, analysis of covariance, multivariate techniques, and non-parametric analyses. *Prerequisites: 275, 275-L.*

475-L: Advanced Statistics for the Behavioral Sciences Laboratory. 3 hours. Co-requisite: 475

Course Contributions in Attaining Project Goals:

Scientific Writing

- Problem-solving Skills:* Conducting a comprehensive literature review of a problem of interest
Writing a scientific paper using a professional format
- Disciplinary Socialization:* Increasing sensitivity to ethical issues
Developing a greater appreciation of the scientific process

Research Methods for the Behavioral Sciences

- Problem-solving Skills:* Designing and conducting an original study to examine a problem
Writing a scientific paper using a professional format
- Disciplinary Socialization:* Increasing sensitivity to ethical issues
Developing a greater appreciation of the scientific process

Statistics for the Behavioral Sciences

Psychological Tests & Measurements

Advanced Statistics for the Behavioral Sciences

- Problem-solving Skills:* Understanding appropriate use of statistical analyses
Writing a scientific paper using a professional format
- Disciplinary Socialization:* Increasing sensitivity to ethical issues
Developing a greater appreciation of the scientific process

Ethical Dilemmas in Behavioral Research

- Problem-solving Skills:* Writing a scientific paper using a professional format
- Disciplinary Socialization:* Increasing sensitivity to ethical issues

Advanced Behavioral Research I & II

- Problem-solving Skills:* Conducting a comprehensive literature review of a problem of interest
Designing and conducting an original study to examine a problem
Understanding appropriate use of statistical analyses
Writing a scientific paper using a professional format
- Disciplinary Socialization:* Increasing sensitivity to ethical issues
Participating in collaborative research
Communicating research findings to a larger audience
Developing a greater appreciation of the scientific process

Project Goals

- 1) Enhance problem-solving skills
 - a. Conduct a comprehensive literature review of a problem of interest
 - b. Write a paper using a professional format
 - c. Design and conduct an original study to examine a problem
 - d. Understand appropriate use of statistical analyses
- 2) Greater disciplinary socialization
 - a. Increase sensitivity to ethical issues
 - b. Greater appreciation of the scientific process
 - c. Participation in collaborative research
 - d. Communicate research findings to a larger audience
- 3) Attract more scientifically-talented students to our department
- 4) Enhance professional and academic credentials
- 5) Facilitate informed citizenry