

Vanderbilt University School of Nursing

Spring, 2003

NRSC 393: QUANTITATIVE RESEARCH METHODS

COURSE DESCRIPTION: This course provides an in-depth analysis of quantitative research methods employed in nursing and health-related research, focusing on topics such as design, sampling, and instrumentation. It includes a review of descriptive univariate statistics and an introduction to bivariate parametric and nonparametric inferential statistics for use with research designs relevant to the health sciences. This latter portion of the course emphasizes the use of SPSS-PC and interpretation of output generated by the SPSS-PC program. Students will begin work on a project to develop a research instrument and establish its psychometric properties. Students will also write the first draft of a methodological section of a research proposal, including the IRB submission.

CREDIT: 3 semester hours

PREREQUISITES: Doctoral student

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TIME & PLACE: Wednesdays, 2 to 5 p.m., Room 250 Frist Hall

COURSE OBJECTIVES: At the completion of this course, students will be able to:

- 1) Apply and critically analyze concepts relevant to the design and conduct of quantitative nursing and health-related research;
- 2) Critically analyze the theoretical underpinnings and psychometric properties of selected data collection instruments frequently used to measure nursing and health-related phenomena;
- 3) Understand how to develop psychometrically sound instruments to assess nursing and health-related phenomena;
- 4) Apply and critically analyze procedures for estimating sample sizes for quantitative nursing and health-related research, including the use of power analysis to determine the optimum size of a sample;
- 5) Select and communicate the reasoning behind choosing the appropriate bivariate inferential statistic(s) suitable for most situations arising in the health sciences;
- 6) Utilize SPSS-PC (and occasional hand calculations using small data sets) to

compute relevant statistics and generate statistical reports;

- 7) Critique (at a beginning level) manuscripts of quantitative studies submitted for publication to scientific journals, and prepare feedback to authors and editors;
- 8) Draft a quantitative Experimental Methods & Procedures section of a research proposal, including a draft of an IRB submission; and
- 9) Critically evaluate drafts of research proposals and give helpful feedback to the originator of the proposal.

COMPETENCIES: In meeting these objectives, the core competencies that the student will demonstrate are:

- 1) Ability to critically analyze quantitative research literature.
- 2) Ability to interpret quantitative data.
- 3) Knowledge and comparison of quantitative research methodologies.
- 4) Knowledge of quantitative data collection tools and procedures.
- 5) Beginning ability to develop proposals.
- 6) Independently propose a research study.

COURSE REQUIREMENTS:

- 1) Weekly preparation for class discussions, including assigned reading, unassigned readings, and identification of pertinent questions related to class topics.
- 2) Participation in class discussions, including sharing unassigned readings with the instructor and other students in the class.
- 3) Submission of occasional homework assignments including a written critique of at least one manuscript submitted for publication to a scholarly journal.
- 4) Development of the methodological section (including the IRB proposal) of a quantitative research proposal based upon a critical review of the literature. [Note: Does not include Data Analysis section.]
- 5) Delivery of a written and verbal critique of a fellow student's research proposal.
- 6) Successful completion of a take-home mid-term examination.

STUDENT PERFORMANCE EVALUATION:

Based on instructor's appraisal of class participation (20%); homework assignments (including written critical analysis of research manuscripts and research proposal(s) (30%); mid-term exam (20%); and written draft of the experimental methods & procedure section of a quantitative research proposal, including the IRB proposal (30%).

GRADING SYSTEM:

A+	=	98 - 100	A	=	93 - 95	A-	=	90 - 92
B+	=	87 - 89	B	=	83 - 86	B-	=	80 - 82
C+	=	77 - 79	C	=	73 - 76	C-	=	70 - 72
F	=	≤ 69						

HONOR CODE POLICY: Students are required to adhere to the Vanderbilt University Honor Code for the completion of all work used to determine the student's grade.

DUE PROCESS: The instructor welcomes the opportunity to work closely with you to facilitate your learning and to assist you in meeting course objectives. If at any time you have concerns regarding the course, discuss the problem first with Dr. Wallston. If further discussion is needed, contact Dr. Melanie Lutembacher, Director of the Ph.D. Program in Nursing Science. You should bring a written statement of the problem or grievance to this meeting. If the problem still persists, contact Dr. Peter Buerhaus, Senior Associate Dean for Nursing Research.

'REQUIRED' TEXTBOOKS:

DeVellis, R.F. (1991). *Scale development: Theory and application*. Newbury Park, CA: Sage.

Lipsey, M.W. (1990). *Design sensitivity: statistical power for experimental research*. Newbury Park, CA: Sage.

Munro, Barbara Hazard. (1997). *Statistical Methods for Health Care Research, 3rd Edition*. Philadelphia, PA: Lippincott.

Pedhazur, E.J. and Schmelkin, L.P. (1991). *Measurement, design, and analysis: An integrated approach*. Hillsdale, NJ: Erlbaum.

Note: In addition to chapters from the above textbooks, there will be a number of journal articles and other readings assigned (to be determined).

Tentative Class Schedule
NRSC 393, Spring 2003

DATE	TOPIC(S)	ASSIGNMENT(S)
1/08/03	Introduction to Course Review of Univariate Descriptive Statistics	Munro, Chapters 1, 2
1/15/03 (1999)	Lois Wagner's Dissertation Research	Smyth et al. Richards et al. (2000) Wagner's proposal (+ IRB submission)
1/22/03 Chapter 3	Probability and the Logic of Hypothesis Testing	Munro, Pedhazur & Schmelkin Ch. 9
1/29/03 articles proposal (+	Sheila Ridner's Dissertation Research	Selected Ridner's IRB submission)
2/05/03	Introduction to Measurement/Instrument Development DeVellis; Chs. 1, 2	P & S, Ch. 2
2/12/03 100-109	Different types of Measurement Instruments Planning the group project The Chi-square statistic	P & S (Ch. 6) DeVellis, Ch. 5 Munro, pp
2/19/03	Reliability Further planning for group project	DeVellis, Ch. 3 P & S, Ch. 5
2/26/03	Validity Correlational statistics (r and ρ)	DeVellis, Ch. 4 P & S, Chs. 3, 4 Munro, Ch. 11

NOTE: Mid-Term Exam (due 3/12/03) will be available after class on 2/26

3/05/03	NO CLASS – SPRING BREAK	
3/12/03 Chs. 10, 11, 12	Quantitative Research Designs -- Part I	P & S,
3/19/03 Chs. 13, 14	Designs, Part II Independent and paired t-tests; Mann-Whitney U-test	P & S, Munro, Ch. 6
3/26/03	Sampling and other quantitative procedures	P & S, Ch. 15 DeVellis, Ch. 7
4/02/03	Sample Size Determination; Power Analysis	Lipsey, Part I
4/09/03	Putting together an IRB Proposal	IRB web-site
4/16/03	Other issues regarding ethics and scientific integrity	TBA
NOTE: Draft of Research Proposals (including IRB proposals are due on 4/16)		
4/23/03 proposals	Critique of Student Proposals	Student