N721 Advanced Quantitative Research Methods

Fall 2011

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Professor & Nurse Practitioner

Tuesdays 13:00 - 16:00

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Course Outline, Readings, Handouts, Power Points and other learning resources are posted on Blackboard

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N721 Advanced Quantitative Research Methods

Course Description

Nursing 721 provides opportunities for developing nurse scientists and other health professional doctoral students to increase understanding of, and ability to use, quantitative research methods for scientific inquiry. The course focuses on identifying issues/dilemmas arising during the research process and methods to address these challenges.

Pre-requisite: Consent of the Faculty.
Recommended pre-requisites are:
Nursing 621 Clinical Nursing Research (or equivalent)
Nursing 705 Philosophy of Science in Nursing

Course Overview

This course is primarily intended for learners engaged in doctoral studies in Nursing. Doctoral students in other disciplines are encouraged to register for the course. The major course objective is to prepare students for independent research using quantitative methods. Students will have opportunities to address issues encountered by researchers during design, conduct, and implementation of quantitative research. Learners enter the course with different backgrounds and strengths, the course will be modified where possible to address the learning needs of course participants. Laboratory experience with data management and analysis will be provided.

Course Objectives

Building on previous knowledge gained about quantitative research methods from personal experience and in undergraduate and graduate education, learners will:

- Identify issues in quantitative research and discover methods to address those issues
- Increase their appreciation of the relationship between theory, quantitative research methods and clinical practice
- Use inquiry-based methods to investigate and apply course concepts
- Appreciate the challenges associated with “matching” the research question to the appropriate research method (the mantra is: ” The Question Drives the Method”)
- Increase their understanding of chance, bias, confounding, interaction and how these concepts relate to research quality and interpretation of results
- Review the concepts of validity and reliability and how these relate to quantitative measurement
- Increase their knowledge of sampling, systematic reviews, and measurement
- Apply an approach to selecting appropriate and meaningful statistical methods for data analysis
- Improve scholarly writing skills
- Further develop the organizational and communication skills and knowledge required to conduct multi-disciplinary research
- Understand the challenges and identify strategies for translating quantitative research into practice and policy

Class Format and General Expectations

The class format for this course is interactive seminar with some didactic presentations. Class attendance cannot be required but it is expected. *Students are expected to come prepared for class and are responsible for contributing to the learning environment.* Preparation for, and participation in, seminars is valued and expected; it is not extrinsically rewarded.
Students are expected to reflect on the relevance of the topic under discussion as it relates to their area of practice and population of focus. Students are responsible for the core components of the course. All students are required to have a UC email account and to use this account for all communication in the course.

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Student Evaluation

There are three assignments. All assignments will receive a letter grade according to the grading scale for graduate students in the Faculty of Nursing (see page 11). Dr. Rankin will use a marking rubric (see page 10) in consideration of the letter grade.

1.	Manuscript for publication – Part 1	= 30%	Due date: November 1
2.	Manuscript for publication – Part 2	= 45%	Due date: December 6
3.	Data entry, analysis and interpretation	= 25%	Due date: November 22

Assignments #1 and #2 are two parts of the same assignment. The overall goal is to explain/describe/discuss a particular quantitative research topic/issue to the "uninitiated" and to submit the manuscript for publication.
Format of the manuscript: Use the "Guidelines for Authors" from the journal you choose. Do NOT submit the manuscript according to APA and F of N guidelines (unless this is what the journal editor wishes).

Please note that for the manuscript assignment Dr Rankin will co-author as second author. The completed manuscript will be the conclusion of an iterative process between both authors.
Following feedback from the journal editor, the student is expected to work collaboratively with Dr. Rankin. In the event that there is no collaboration on the part of the student Dr. Rankin will be designated as the primary author.

The following bullet points are adapted from the Examiner's Report document from the Faculty of Graduate Studies. The areas identified below indicate what an examiner is expected to comment on when providing a written submission for an examination. These are very helpful criteria to consider when writing any scholarly paper:

- Relevant literature
- Organization of the written submission
- The literary competence displayed
- The logic of enquiry in the paper and the interpretation of results
- The argumentation leading to the conclusions
- The degree of sophistication shown in the treatment
- Originality and contribution to the discipline

Assignment 3 Data entry, analysis and interpretation

You may discuss this assignment in groups and work together but the final version that is submitted must be completed individually.
Number of Pages***:*** As specified for each section below (double spaced). Style**:** APA Note requirements for tables and figures.

The intent of this lab exercise is to give you practice in developing questionnaire items, analysing your data and then critiquing your own work. Consult your textbook, seminar notes, other textbooks, websites and Dr. Rankin as resources.

There are 5 components to this assignment; each component is described in more detail below.
The 5 components are:

1. Generate questionnaire items and provide a rationale
2. Generate an SPSS database of fictitious data
3. Analyze your fictitious data using SPSS
4. Test 2 hypotheses from your own fictitious data concerning age and marital status
5. Submit a final edited report of your work

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1. Generate questionnaire items and provide a rationale

- Think of items that you would like to have in a general population health survey on risk-taking behaviours
- Develop demographic items for variables such as sex, educational level and socio-economic status
- You may have as many variables as you want but you **must** have age and marital status in your database
- Choose **one or two** risk behaviours related to health and construct items on the questionnaire.
- **Briefly** justify your decisions as to wording and format of each of the questions (**maximum 2 pages**). Consult your course textbook and Dr. Rankin regarding wording/formatting of items.

2. Generate an SPSS database of fictitious data

- Generate fictitious data from the variables you have selected from a hypothetical sample of 100 people: 50 females and 50 males. For example, for the variable 'age' enter 50 ages for men and 50 for women 'at random' e.g. 28, 32, 56, 29, 34, 18, 44, 78 ….and so on).

- Enter the data into an SPSS file and ensure that you have variable and value labels

- Send your completed data file (.sav) to me as an email attachment. Your completed data file will have all your variables (age, marital status…and so on) with 50 data entry points for men and 50 for women for each variable.

3. Analyze your data

Note there are 3 types of files generated by SPSS, these are: .sav, .sps and .spo

1. SPSS data editor contains your dataset it is a .sav file (this is the one you will send me as an email attachment)
2. SPSS syntax editor – I'll explain in class - is an .sps file
3. SPSS output of analysis – this has all your results and is an .spo file

Provide:

- the relevant descriptive statistics for each variable
- **one** bar chart for any variable you choose
- **one** boxplot for any variable you choose
- me with a hard copy of the **edited** results file (i.e. an .spo file) and the data file (i.e. your .sav file)

4. Test these 2 hypotheses:

1. There is no difference in age between the females and males

2. There is no difference in marital status between females and males

- Include the hard copy of the edited results (i.e. your .spo file)
- Provide a brief rationale for your choice of test including the appropriateness of the test to the level of measurement. What are the assumptions surrounding your choice of test(s)? (**maximum 2 pages**)

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- Critique your work and comment on what you have learned from this exercise (**maximum 1 page**).

5. Submit a final report of your work

Checklist for assignment #2:

1. Generate questionnaire items and provided a rationale for the items (part of your written submission)

2. Complete an SPSS database with several variables including: age and marital status for 50 men and 50 women (.sav file that you send to Dr. Rankin as an attachment)

3. Analyze your data including testing 2 hypotheses on age and marital status**.** Provide one bar chart and one boxplot from variables that you choose from your dataset

4. Provided a rationale for your choice of tests including assumptions concerning the tests (part of your written submission)

5. Provided Dr. Rankin with a hard copy **edited** report of your results including your analysis, your bar chart, boxplot and hypothesis testing (your .spo file)

6. Provided a critique of your work and what you learned (part of your written submission)

Points to Consider:

- Are the items clearly stated? Do they make sense? Is the general format "user friendly" to the respondent? Do the items measure what you intend them to measure?
- Have you chosen appropriate statistical tests? Have you stated the assumptions? Are the graphs and tests appropriate for the level of measurement? Have you **edited** your final version of the results file?
- What might you do differently if you were to start this assignment over? What have you learned?

Criteria:

1. Content – have correct procedures been used and justified? Is your language accurate? Are you presenting the answer in a clear, concise and systematic way?
2. Process – is each part of your rationale or discussion clearly written? Are tables and figures properly edited, labelled and easily understood?
3. Scholarliness – is there evidence of critical thinking? Have you referenced appropriately?

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Resources

Required Text and Readings:

1. Polit, D.F. & Beck, C.T. (2012). Nursing research: Generating and assessing evidence for nursing practice (9th ed.). Philadelphia: Lippincott Williams & Wilkins.

2. The course outline, readings, handouts, Power Points and other learning resources are posted on Blackboard.

Useful websites and readings:

Questionnaire design. American Association for Public Opinion Research. www.aapor.org/Content/aapor/Resources/ForResearchers/BestPractices/default.htm

Questionnaire design. Some Bad & Best Practices in Survey Design. George Chynoweth. www.dxresearch.net/resources/bestPractices.pdf

Questionnaire design. Statistics: Power from data! Statistics Canada www.statcan.gc.ca/edu/power-pouvoir/ch2/questionnaires/5214775-eng.htm

Questionnaire design and levels of measurement. Research Methods Knowledge Base. Survey Research. William M.K. Trochim. www.socialresearchmethods.net/kb/surey.php

Interesting stats website: http://faculty.vassar.edu/lowry/VassarStats.html

Canadian Cancer Statistics: www.cancer.ca/statistics

Evidence based website: http://www.medicine.ox.ac.uk/bandolier/knowledge.html

Tri-Council Policy Statement (find it on web by “Googling” Tri-Council Policy Statement)

Dr. Rollin Brant’s website for sample size calculations: http://stat.ubc.ca/~rollin/

A glossary of certain terms used in research: http://www.nlm.nih.gov/nichsr/hta101/ta101014.html

Overview of evidence-based medicine: http://www.answers.com/topic/evidence-based-medicine

Margin of error calculator: http://www.raosoft.com/samplesize.html

Overview of some statistical tests: http://www.bmj.com/collections/statsbk/index.dtl

The Cochrane Collaboration: http://www.cochrane.org/index.htm

Calculator for Sensitivity and Specificity: http://www.josephsunny.com/medsoft/sensitivity_specificity.html

Babbie E. (2010) The practice of social research (12th Ed). Wadsworth, Belmont, California.

Brink, P.J. & Wood, M. J. (1998). Advanced design in nursing research (2nd ed.). Thousand Oaks, California: Sage.

DeVellis RF 2003. Scale development: Theory and applications. Thousand Oaks, California: Sage.

Gonick L. and Smith W. (1993). The cartoon guide to statistics. Harper Collins: New York

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Gravetter F & Wallnau L 2002. Essentials of statistics for the behavioural sciences. California: Wadsworth.

Griffen D & Audige L 2003. Common statistical methods in orthopaedic clinical studies. Clinical Orthopaedics and Related Research 413, 70-79.

Kuhn TS. (1970) The structure of scientific revolutions (2nd Ed). University of Chicago Press: Chicago.

McDowell I 2006. Measuring Health. New York: Oxford University Press.

Meadows P. 2003. So you wan to do research? 5 Questionnaire design. Brit J Community Nsg 8(12) 562.

Murray P 1999. Fundamental issues in questionnaire design. Accident & Emergency Nursing 7, 143-153.

Norman GR & Streiner DL 2000. Biostatistics : The bare essentials. Hamilton: BC Decker Inc.

Pallant J. 2005. SPSS Survival manual. UK Open University Press.

Rattray J & Jones M 2007 essential elements of questionnaire design and development. J Clin Nsg 16 234-243.

Salmond S 2007. Box and whisker plots. Orthopaedic Nursing. 26(1) 33

Shavelson RJ. (1995). Statistical reasoning for the behavioural sciences. Allyn and Bacon: Toronto.

Streiner DL & Norman GR 2003. Health measurement scales: A practical guide to their use and development. Oxford: Oxford University Press.

Woodward, C.A. & Chambers, L.W. (1983). Guide to improved data collection in health and health care surveys. Ottawa: Canadian Public Health Association.

Woodward, C.A. & Chambers, L.W. (1983). Guide to questionnaire construction and question writing. Ottawa: Canadian Public Health Association.

Other useful resources

Carmines, E.G. & Zeller, R.A. (1979). Reliability and Validity Assessment. Thousand Oaks: Sage century. New York: Henry Holt and Company.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Hillsdale: Lawrence Erlbaum Associates.

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

Dillman, D.A. (2000). Mail and Internet surveys: The tailored design method (2nd ed.) New York: John Wiley & Sons.

Gordis, L. (2004). Epidemiology (3rd ed.) Philadelphia: Elsevier Saunders.

Kerlinger, F.N. & Lee, H.B. (1999). Foundations of behavioral research (4th ed.). Toronto: Harcourt College.

Salzburg, D. (2001). The lady tasting tea: How statistics revolutionized science in the 20th

Tabachnick, B. G. & Fidell, L. S. (2001) Using multivariate statistics (4th ed.). Boston: Allyn & Bacon.

A classic: Likert, R. (1932). A technique for the measurement of attitudes. Archives of Psychology 22, 140.

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Class Schedule: Wednesdays 13:00-16:00 Rm 2253

Chapters refer to the required Polit textbook

Week	Date	Seminar Topics and Readings	Professor
1	Sep 13	Theory. Chs. 1, 3, 4 & 6.	Dr. Rankin
2	Sep 20	Writing for publication Ch. 28	Dr. Rankin
3	Sep 27	Research method: Survey. Questionnaire design. Measurement issues Chs 14, 15	Dr. Rankin
4	Oct 4	Validity and Reliability. Chs. 9, 10 & 11	Dr. Rankin
5	Oct 11	Data collection and analysis. Chs 13, 16-19	Dr. Rankin
6	Oct 18	Data entry and analysis Lab	Dr. Rankin
7	Oct 25	Sample size issues. Ch 12	Dr. Rankin
8	Nov 1	Epidemiological concepts: e.g. Lead time, length time and over-diagnosis **First paper due**	Dr. Rankin
9	Nov 8	Research method: Experiment, Quasi-experiment and Causality Ch 9 pp 203-215	Dr. Rankin
10	Nov 15	Research method: Case control p. 224	Dr. Rankin
11	Nov 22	Research method: Cohort p. 225 **Second paper due**	Dr. Rankin
12	Nov 29	Chance, Bias, Confounding and Interaction.	Dr. Rankin
13	Dec 6	Knowledge Translation and Research Capacity. Chs 2, 7, 28, 29 **Third paper due**	Dr. Rankin

Important dates:

November 11 Remembrance Day

November 10-11 Reading days

December 6 Last day of classes for N721

December 9 Last day of classes at UC (last day to withdraw with permission)

1. Manuscript for publication – Part 1 Due date: November 1
2. Data entry, analysis and interpretation. Due date: November 22
3. Manuscript for publication – Part 2 Due date: December 6

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University of Calgary Regulations

The University of Calgary's Graduate Studies Calendar 2011 - 2012 outlines the rights and responsibilities of a student. Students are responsible to read and understand the Academic Regulations as specified in the Calendar.

Withdrawal

The last day to withdraw with permission from N721 is Friday, December 9, 2011.

Reappraisals and Appeals

Students are referred to the U of C Calendar 2011-2012 for guidelines regarding reappraisal and appeal processes. There is a 15-day time limit between the receipt of a mark and a request for a reappraisal or appeal.

Academic Accommodation for Students with Disabilities

Students with a disability who may require academic accommodation are advised to register with the Disability Resource Centre in MacEwan Student Centre Room 293 (telephone 403-220-8237).

Freedom of Information and Protection of Privacy

Information (such as a phone number, addresses, tracking sites of practica, etc.) that you may be asked to provide is collected under the authority of the Universities/Colleges Act and Freedom of Information and Protection of Privacy Act, Section 32c. It will be used for contact purposes. Your personal information is protected by Alberta's Freedom of Information and Protection of Privacy Act and can be reviewed upon request. If you have any questions about the collection or use of this information, please contact Pat Jolly, Graduate Administrator at 220-6241.

Student Academic Conduct

Students are expected to comply with the academic regulations specified in the University of Calgary Calendar. Intellectual honesty is expected at all times. A single offence of cheating, plagiarism, or other academic misconduct, on term work, text, or final examinations, etc., may lead to disciplinary probation or a student's suspension or expulsion from the Faculty by the Dean, if it is determined that the offence warrants such action (Academic Regulations, University of Calgary Calendar, 2011- 2012). Confidentiality of patient/client information must be ensured. Discussion of clinical practice should be restricted to the students, their professors and their clinical preceptors.

If you have any doubts or questions with respect to what plagiarism actually is please consult with Dr. Rankin.

Here are useful websites relating to plagiarism:

Extensive definition of plagiarism is found in the graduate student calendar: http://grad.ucalgary.ca/calendar
see 0.1 Plagiarism/cheating/other academic misconduct.

http://ec.hku.hk/plagiarism/introduction.htm

http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml#plagiarized

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Rubric for Evaluating Formal Scholarly Papers – (Thanks to Dr. Nancy Moules)

Elements	Does not meet requirements (< or = B-)	Meets requirements (B to B+)	Exceeds requirements (A- to A+)
Aim or purpose of paper; topic or question to be addressed	Purpose of paper is difficult to identify, unclear or restatement of an obvious issue. Introduces topic that is not related to N721 course objectives	Clearly describes the topic or question that the paper seeks to answer. Significance of the topic is clear (who cares and why).	Purpose & significance of paper are clearly identifiable, sophisticated & insightful, pushing beyond stereotyped questions. The thesis of an A+ paper is highly original, opening new arenas of discussion related to the selected topic.
Analysis/Synthesis	Assumptions and approach to interpreting and analyzing relevant materials is incongruent with scholarly writing. Points/statements often lack supporting evidence. Quotes may be poorly integrated & explored. Relies primarily on course materials and issues covered in class discussion. It is unclear how the author is making sense of the literature.	Background assumptions and selected organizing framework are consistent. Effectively incorporates examples from a reasonable cross-section of current literature to support key points. Quotes are well integrated, explored and discussed. Demonstrates ability to explain & critique, compare & contrast current literature. Uses several literature sources beyond course readings.	Clearly demonstrates ability to write, analyze and critique materials in a manner that demonstrates fluid writing . Draws upon cutting edge, current, peer-reviewed literature in specific areas related to the paper topic. Excellent integration of quoted material. Demonstrates analytic depth and sophistication to critique current literature. Clearly links literature to personal professional experience and proposed dissertation project. The analysis & critique of an A+ paper poses essential questions about the topic that push inquiry and understanding well beyond readings and class discussion.
Argumentation	Simplistic view of topic. Little or no effort to grasp possible alternative views. May contain logical contradictions.	Counter-arguments are acknowledged, though perhaps not addressed or explored effectively.	Anticipates and successfully defuses or responds to counter-arguments. Makes novel connections to outside material that illuminates the thesis.
Conclusion	There is no clear conclusion, no attempted response to the question or issue posed in the purpose/thesis statement.	The thesis and its significance are restated, emphasizing the discovered importance, answers, or possibilities explored within the paper.	The thesis and its significance are restated, emphasizing the discovered importance, answers, or possibilities explored within the paper. Clearly proposes answers to questions such as “so what?” or “who cares?” and “what are the implications for the field of nursing & research?” Poses questions that push readers toward thinking about new understandings of the topic.
Literary skill	Writing style is bland & and disconnected. Numerous errors in sentence structure, grammar, punctuation & diction.	Writes in a manner that is congruent with the quantitative research tradition. Sentence structure, grammar punctuation & diction are strong with occasional minor errors.	Demonstrates throughout a fluent capacity to write in a manner that demonstrates scholarly writing in the quantitative research tradition. Sentence structure, grammar punctuation & diction are excellent with negligible errors.
Style	Numerous errors in APA formatting and citations.	Follows APA format appropriately with few errors	Meticulous APA format is followed consistently.

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Grading Scale

Please familiarize yourself with the following grading scale used by the Graduate Program in the Faculty of Nursing and the policies outlined in the University of Calgary Graduate Studies Calendar, in particular, those related to student progression.

Grade on assignment:	Percentage taken from:	Total for all assignments is:	Final grade will be:	GPA for course will be:
A+	4.0	3.95-4.00	A+	4.0 Outstanding
A	4.0	3.85-3.94	A+	4.0 Excellent-superior performance showing comprehensive understanding of the subject matter
A-	3.7	3.50-3.84	A-	3.7 Very good performance
B+	3.3	3.15-3.49	B+	3.3 Good performance
B	3.0	2.85-3.14	B	3.0 Satisfactory performance (Note: the grade point value (3.0) associated with this grade is the minimum acceptable average that a graduate student must maintain throughout the program as computed at the end of each year of the program)
B-	2.7	2.50-2.84	B-	2.7 Minimum pass for students in the Faculty of Graduate Studies
C+	2.3	2.15-2.49	C+	2.3 Unsatisfactory (Note: all grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements)
C	2.0	1.85-2.14	C	2.0 Unsatisfactory
C-	1.7	1.50-1.84	C-	1.7 Unsatisfactory
D+	1.3	1.15-1.49	D+	1.3 Unsatisfactory
D	1.0	0.50-1.14	D	1.0 Unsatisfactory
F	0	0.00-0.49	F	0 Unsatisfactory

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