Quantitative Methods for Education Leadership
EAPS614

Course Description

Vast amounts of information concerning schools, especially about students and faculty, are continually being collected. This course is designed to prepare students to make use of this valuable information as both analysts producing statistical reports and consumers of those reports. Mastery of such skills is vital for educators, administrators, policymakers, and researchers involved in planning and evaluation of educational programs at all levels.

This course will provide students with an introduction to quantitative data analysis. The focus will be on the theory and application of basic statistical techniques such as descriptive statistics, confidence intervals, hypothesis tests, and causal modeling. Students should complete the course with a solid understanding of descriptive and inferential statistics along with the ability to organize and analyze quantitative data. In addition, students will be expected to develop the ability to clearly and correctly interpret and present in written and oral form the results of univariate, bivariate, and multivariate analyses.

In this course, students work on formulating questions that can be answered using numerical data suitable for statistical analyses and drawing conclusions based on the results produced by Microsoft® EXCEL or SPSS. The course is structured around the analysis of three quantitative data sets. In class sessions, the application of statistical techniques will be illustrated through the analysis of middle school students’ social backgrounds, effort in school, and eighth grade test scores. The homework assignments are designed to guide students through the analysis relating to differences in salaries between male and female faculty in a regional school district or large community college. In groups, students will analyze a third data set related to questions of particular interest to them.

Passing this course with a B or better grade will satisfy EAPS’s statistics requirement for the doctoral program.
Quantitative Methods for Education Leadership

Required Texts:


Strongly Recommended Texts:


Jaeger, Richard M. *Statistics: A Spectator Sport*. SAGE.


Recommended Resources:


Picciano, Anthony G. *Data-Driven Decision Making for Effective School Leadership*. Pearson Merrill Prentice Hall.

Recommended Exercises and Problems

While none of the exercises in the texts are assigned, students are expected to take responsibility for their learning by attempting review or practice questions from sections covered in the course (especially those exercises under applying concepts or relating to schools and education). These will provide students with an opportunity to test their understanding of the materials and to practice using Microsoft® EXCEL or SPSS.

Course Requirements and Assignments

The class will start promptly. Students should come to class each week having read at least some of the assigned sections in the textbooks and, preferably, attempted some of the recommended exercises. Students should expect to spend 4½-6 hours per week outside of class on the readings and assignments, although some may need more time to master the material.

Grading for this course will be based on students’ demonstration of their understanding of and ability to use basic statistical techniques through their performance on homework assignments, examinations, and a group project.

1. **Homework Assignments** (40%): Students will be required to complete four homework assignments during the semester. The assignments will provide students with experience conducting data analysis using Microsoft® EXCEL or SPSS. The data set will be provided via Blackboard. Each assignment will require students to use the statistical techniques covered in that section of the course and are designed to help prepare students for the quiz at the end of each section. The assignments will be handed out at the beginning of the semester and students should plan to work on them each week. DO NOT try to do the entire assignment the week it is due!

**IMPORTANT POLICIES:** NO LATE assignments will be accepted unless arranged in advance of their due dates. Also, EACH student must turn in an assignment that reflects HIS or HER own individual work and should be distinctive (i.e., differ in more than minor variations in wording or format).

2. **Examinations** (40%): There will be three short quizzes and a cumulative final consisting of multiple choice questions based on the required texts and lectures.
   
a. Quizzes (20%) will each consist of 20 questions related to the section of the course indicated on the Tentative Course Schedule. Only the two highest scores on the quizzes will be used in calculating a student’s final course grade.

b. Final (20%) will be cumulative and consist of 40 questions, over half of which will closely resemble items from the quizzes.

3. **Group Project** (20%): The class will be formed into groups of 3-4 students based on interests and skills. Each group will analyze and produce a brief statistical report using a data set agreed upon with the professor. The final report will be graded based upon clarity, appropriateness, and technical correctness. Each group will also present their report during the last class period of the semester.
4. **Extra Credit:**

   a. For the Quizzes: If a score of less than 16 questions correct (80% or a B) is received on a quiz, the grade will be raised to 16 questions correct when a brief 1-2 paragraph explanation of the correct answer for each of the 20 questions is submitted. These extra credits will be accepted up to the beginning of the final exam, for which this exercise should help students prepare.

   b. For Participation (maximum of 2 percentage points added to the course grade): Students may earn extra credit points by making short in-class presentations or posts to the Blackboard discussion area on topics related to the course material. Especially encouraged are examples of the use of quantitative analysis in educational administration or evaluation (e.g., a school report card, a Board of Regents’ report concerning special education classification rates, or a newspaper article concerning state test results). These presentations and postings must be approved in advance by the professor.

   c. For Growth (2 percentage points added to the course grade): Students who correctly answer 80% of the final exam items based on questions from the quizzes will receive bonus points on their course grade.
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Course Schedule

**Part A: The Basics**

**Week 1**  
**Introducing the Contestants.**  
*Statistics for Managers:* Ch 1.  
*or Using Statistics to Make Educational Decisions:* Ch 1.;  
*Quantitative Research Methods for Professionals:* Ch 5.  
*or Statistics: A Spectator Sport:* Ch 5 & 6.  
*Writing about Numbers* Ch 1.

**Week 2**  
**Organizing Data and Defining Variables.**  
*Statistics for Managers:* Ch 2.  
*or Using Statistics to Make Educational Decisions:* Ch 2;  
*Statistics: A Spectator Sport:* Ch 1.  
*or Quantitative Research Methods for Professionals:* Ch 1 (p. 1-11).  
*Writing about Numbers* Ch 2 & 5.

**Week 3**  
**Measuring Tendencies and Spreads.**  
*Statistics for Managers:* Ch 3: 3.1-3.4 & 3.6  
*or Using Statistics to Make Educational Decisions:* Ch 3;  
*Statistics: A Spectator Sport:* Ch 2 & 3.  
*or Quantitative Research Methods for Professionals:* Ch 2 (p. 19-23) & 4.  
*Writing about Numbers* Ch 6-8.

**Week 4**  
**Playing with Distributions**  
*Statistics for Managers:* Ch 5: 5.1 & 5.3; Ch 6: 6.1-6.3.  
*or Using Statistics to Make Educational Decisions:* Ch 4;  
*or Quantitative Research Methods for Professionals:* Ch 2 (p.23-25).
Part B: Describing Distributions

Week 5  Grasping the Basics of Probability.  Homework #1 Due & Quiz on Part A.
Statistics for Managers:  Ch 4.
    or Using Statistics to Make Educational Decisions: Ch 5;
Quantitative Research Methods for Professionals: Ch 6.

Week 6  Developing Confidence in Statistics.
Statistics for Managers:  Ch 7: 7.3-7.5 & Ch 8: 8.1-8.4 & 8.6.
Statistics: A Spectator Sport: Ch 8.
    or Quantitative Research Methods for Professionals: Ch 8 (p.128-130; 141-143).

Week 7  Testing Hypotheses.
Statistics for Managers:  Ch 9.
    or Quantitative Research Methods for Professionals: Ch 1 (p. 13-16); Ch 8 (p.130-135).

Part C: Exploring Bivariate Relationships

Week 8  Comparing Two Samples  Homework #2 Due & Quiz on Part B.
Statistics for Managers:  Ch 10.
    or Using Statistics to Make Educational Decisions: Ch 6;
    or Quantitative Research Methods for Professionals: Ch 8 (p.131-134).

Week 9  Analyzing Variation in Means.
Statistics for Managers:  Ch 11.1.
    or Using Statistics to Make Educational Decisions: Ch 7;
    or Quantitative Research Methods for Professionals: Ch 8 (p.135-141).
Week 10  **Cross-Classifying Data**  
*Statistics for Managers*: Ch 12: 12.1-12.3.  
  or *Using Statistics to Make Educational Decisions*: Ch 13;  
*Statistics: A Spectator Sport*: Ch 12.  
  or *Quantitative Research Methods for Professionals*: Ch 3: Ch 11 (p.191-197).  

**Part D: Exploring Multivariate Relationships**

Week 11  **Simply Regressing**  
*Statistics for Managers*: Ch 3:3.5 & Ch 13.  
  or *Using Statistics to Make Educational Decisions*: Ch 10 & 11;  
  or *Quantitative Research Methods for Professionals*: Ch 2 (p.25-36) & Ch 9.  

Week 12  **Multiplying Regressions.**  
*Statistics for Managers*: Ch 14 & 15:15.4-15.5  
  or *Using Statistics to Make Educational Decisions*: Ch 12;  
Or:  *Quantitative Research Methods for Professionals*: Ch 10.  

Week 13  **Developing Models with Regression & Course Review.**

Week 14  **Describing Schools with Statistics**  
Group Projects Due  
Group Presentations

Week 15  **Final**  
Homework #4 Due