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EDLD 618.01: Advanced Statistical Procedures in Education

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The University of Montana

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THE UNIVERSITY OF MONTANA

SCHOOL OF EDUCATION

Department of Educational Leadership and Counseling

EDLD 618

ADVANCED STATISTICAL PROCEDURES IN EDUCATION

Three Credits

Spring Semester, 2004

Class Location: Ed 315

4:01 p.m. – 7:00 p.m.

Instructor: Merle J. Farrier

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Office Hours

Thursday -Friday

By Appointment

EDLD 618: ADVANCED STATISTICAL PROCEDURES IN EDUCATION

TEXTS

Statistical Methods for Psychology Fourth Edition
David C. Howell / Paperback / Thomson Learning / June 2001

Statistical Significance Testing in Contemporary Practice: Journal of Experimental Education
Vol 61, Number 4, Summer 1993

COURSE PURPOSE

The purpose of this course is to extend an elementary understanding of statistics in such a way as to prepare the student for the successful evaluation, design, and conduction of formal quantitative research.

COURSE OF OBJECTIVES

To help the student:

1. understand statistical concepts and terminology,
2. become critical readers of research,
3. develop an ability to conduct action and formal research,
4. acquire competencies in the development and defense of an individual educational research proposal as per statistical analysis and methodology,
5. apply the appropriate descriptive and inferential statistics to sets of data and utilize the results in a logical way,
6. use computer technology to enter data, compute appropriate statistics, and print out results in a variety of formats.
7. utilize statistical research to contribute to the educational knowledge base.

COURSE OUTLINE

Selected from the Following Topics:

1. Review of Basic Concepts of Statistical Procedures

- ∅ Primary Assumptions
- ∅ Descriptive
- ∅ Inferential

Activities/Assignments

T Students will review broad statistical considerations and assumptions about populations, samples, data, and statistical validity.

2) Advanced Parametric Procedures

- ∅ t-tests
- ∅ ANOVA
- ∅ Factorial ANOVA
- ∅ ANCOVA
- ∅ Multiple Regression
- ∅ DFA

Activities/Assignments

Students will work on problems using computer software and give class presentations.

3. Advanced Non-Parametric Procedures

- ∅ Kruskal Wallis
- ∅ Mann-Whitney U
- ∅ Friedman two-way rank ANOVA
- ∅ Discriminate Function Analysis

Activities/Assignments

Students will work on problems using computer software and give class presentations.

4. Application of Statistics to Research Designs
 - ∅ Hypothesis Testing
 - ∅ Pseudoexperimental Designs
 - ∅ True Research Designs
 - ∅ Quasi-experimental Designs

Activities/Assignments

Students will select a research design and apply the appropriate statistical procedures. Students will analyze their research data on computer software. Students will present methodology and results to class.

5. Consideration of Critiques Regarding Contemporary Statistical Testing

Activities/Assignments

Student presentations critiquing the critiques.

INSTRUCTIONAL METHODS

Instructional methods will utilize "hands on" as the primary means of learning. Lectures, student presentations, cooperative learning, discussions, and individual/group research will also be employed. Computer technology will be employed at all times.

EVALUATION CRITERIA

- 1) Class participation -- 17.5% -- Students will be expected to attend all classes, interact verbally, and develop discussion beyond the level of the text and/or presentations. Attendance is essential. Please make arrangements if you must miss class.

- 2) Assignments -- 38.2% -- Students are expected to complete all assignments in a timely manner. Assignments are to be turned in reflecting very high quality of

thought and content. All writing assignments are to be written using APA format.

- 3) Final Examination -- 49.4% -- The final examination will consist of a take home portion as well as one during final week.
- 4) Class Attendance – immeasurable – Please make every effort to attend

Assignments:

- 1) Complete handout assignments by the following class.
- 2) Prepare an in-class presentation based upon an article in the *Journal of Experimental Education* text or equivalent. The details of this assignment will be specified in class.
- 3) Each member of the class will individually prepare a piece of mock research. You will prepare a shortened Chapter 1, and Chapter 2, a complete Chapter 3, report the findings in Chapter 4 and form a conclusion in Chapter 5. This research may or may not be consistent with any other research you are conducting. The data may be dummy data. Time permitting, students will defend the methodology to the class.
- 4) The final examination will be held in class on the final class session. There also may be a take home final exam given to you prior to the end of the semester.

IMPORTANT NOTICE

Students may work together or independently on assignments. However, all work turned in must be original. Assignments that are duplicates or, in my judgement, clones, will be returned without credit or grade. No work may be plagiarized. If you are quoting another source, you must cite the source.

You are strongly urged to have all work completed by the end of the semester. If, **for good cause**, you are unable to have all work completed an I or N may be assigned and you will have up to two additional weeks to complete the assignments.

PROFESSIONAL STANDARDS FOR STUDENT PERFORMANCE

Graduate students in the Department of Educational Leadership at The University of Montana are expected to:

- Demonstrate professional vision in the practice of educational administration
- Accept responsibility and accountability for class assignments in their role as members of the class
- Demonstrate growth during the period of their graduate career
- Demonstrate good decision making and an awareness of organizational issues from a variety of perspectives
- Demonstrate imagination and originality in the discussion of educational leadership issues
- Understand the relationship between theory and practice and the value of reflective leadership
- Demonstrate a moral, humanistic, ethical and caring attitude toward others
- Demonstrate an ability to build trust and positive relationships with others
- Demonstrate a tolerance for diversity and a warm acceptance of others regardless of their backgrounds or opinions
- Demonstrate emotional stability and an ability to work well with other members of the class, including the instructor
- Demonstrate an ability to express himself/herself well in speech and writing, and
- Demonstrate mastery of fundamental knowledge of course content and an understanding of its application

FAILURE TO DEMONSTRATE THE AFOREMENTIONED QUALITIES ON A CONSISTENT BASIS MAY RESULT IN REMOVAL FROM CLASSES AND/OR THE EDUCATIONAL LEADERSHIP PROGRAM.

REFERENCES

- Borg, W. R. & Gall, M. D. (1988). Educational research. Longman.
- Huck, S. W. (1974). Reading statistics and research. Harper and Row.
- Kazmier, L. J. (1988). Business statistics. McGraw Hill.
- Keppel, G. & Zedeck, S. (1989). Data analysis for research design. Freeman and Company.
- Moore, D. S. & McCabe, G. P. (1991). Introduction to the practice of statistics. Freeman and Company.

Software

Utilized in the Course

Excel 2000

GB-STAT 8.0 (2000)

26-Jan

2-Feb

9-Feb

16-Feb Presidents' Day

23-Feb

1-Mar

8-Mar

15-Mar

22-Mar

29-Mar Spring Break

5-Apr

12-Apr

19-Apr

26-Apr

3-May

10-May Finals

Class Schedule Spring Semester, 2004

January 24

Overview of class
Consideration of Student/Class Assignments
Review of Basic Stats

February 2

Complete specific assignments for semester and dates of presentations
Review of Basic Stats B Univariate Procedures
Carver C A Look at Significance Testing

February 9

Correlations/Regressions

February 16

No Class... President's day

February 23

Multiple Regression

March 1

DFA/Logistical Regression

March 8

ANOVAs

Class Presentations from *The Journal of Experimental Education*

**Class Schedule
Spring Semester, 2004**

March 15

Factorial ANOVAs
Class Presentations from *The Journal of Experimental Education*

March 29

Spring Break -- No Class ®

March 22

Non parametric procedures for Likert Scales
Class Presentations from *The Journal of Experimental Education*

April 5

Wilcoxon Matched Pairs
Mann-Whitney U
Class Presentations from *The Journal of Experimental Education*

April 12

Kruskal Wallis
Friedman ANOVA
Class Presentations from *The Journal of Experimental Education*

April 19

Research Designs
Student defense of methodology

April 26

Multivariate Analysis B Elimination of Test-wise Error
Student defense of methodology

**Class Schedule
Spring Semester, 2004**

May 3

Canonical Correlation and its relationship to multivariate parametric tests.
Class Presentations

May 10

Final Examination Subtitled: Life does not get any better than this!