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EDLD 519.01: Measurement and Analysis of Educational Data

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THE UNIVERSITY OF MONTANA

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATIONAL LEADERSHIP AND COUNSELING

EDLD 519

Measurement and Analysis of Educational Data

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EDLD 519: MEASURMENT AND ANALYSIS OF EDUCAITONAL DATA

TEXT

Statistical Methods for Psychology
David C. Howell (2001). 5th Edition. Duxbury Press Belmont, CA 94002

COURSE PURPOSE

The purpose of this course is to present the necessary understanding of measurement and statistical theory so as to ensure the student of educational leadership is capable of making measurements consistent with the nature of educational data, submitting these data to the appropriate analysis, and drawing constructive conclusions from the analysis.

COURSE OF OBJECTIVES

To help enable the student to (as referenced by Montana Accreditation Standards):

1. understand measurement, statistical concepts and terminology, **(OPI 10.58.704.g.i)**
2. understand and develop valid assessment of instruction and student learning, **(OPI 10.58.704.c.iv)**
3. become critical researchers and readers of research for decision making, **(OPI 10.58.704.g)**
4. prepare students for coursework in research methods, **(OPI 10.58.704.g.iii)**
5. use computer technology in numerous components of research, **(OPI 10.58.704.c.v)**
6. use and analyze system data for school improvement, **(OPI 10.58.704.e.ii,iii)**
7. develop, understand, and utilize valid assessment and assessment data, **(OPI 10.58.704.g.iv)**
8. utilize statistical procedures for descriptive and inferential purposes, and **(OPI 10.58.704.g.ii)**
9. utilize statistical research to contribute to the educational knowledge base.

COURSE OUTLINE

Topics: (not necessarily in chronological order)

1. Basic Concepts of Statistical Procedures
   - Primary assumptions
   - Descriptive
   - Inferential

   Activities/Assignments

   Students will be introduced to broad statistical considerations and assumptions about populations, samples, data, and statistical validity.

2. The logic of Quantity, Quality, and Measurement
   - The distinction between quantity and quality
   - The meaning of measurement
   - The use of measurement in statistics
   - The application of measurement to school improvement, student assessment, and qualification for special education

   Activities/Assignments

   Students will work on problems and participate in online discussions.

3. Measurements about the Center of Data for Samples and Populations
   - Mode
   - Median
   - Means, arithmetic, harmonic, geometric, and quadratic
   - Range
   - Quartiles
   - Standard deviation
   - Variance

   Activities/Assignments

   Students will work on problems using computer software. Applications of statistical procedures will be emphasized.

4. Hypothesis Testing and Elementary Procedures

Hypothesis design and Type I/II error
Significance
Standard error of the mean & confidence intervals
Degrees of freedom & critical values

Activities/Assignments

Hypothesis testing will be integrated into assignments.

5. Comparison of means

Parametric & nonparametric (optional) considerations
Z test
t-tests and necessary assumptions for each type
F distributions
Sign test & Wilcoxon matched pairs

Activities/Assignments

Appropriate problems assigned connecting statistical procedures to practical problems.

6. Association between variables

Pearson
Spearman
Point biserial
Phi correlation coefficient, etc.

Activities/Assignments

Appropriate problems assigned connecting statistical procedures to practical problems.

7. Prediction

Regression terminology and assumptions
Linear regression
Other single dependent variable regressions

Activities/Assignments

Appropriate problems assigned connecting statistical procedures to practical problems.

8. Graphs

Bar graphs, histograms, and other statistical graphing

Activities/Assignments

Appropriate problems assigned connecting statistical procedures to practical problems.
Data will be expressed by computer in all graphical formats.

9. Standardized Tests

Percentiles
NCE
Stanines
GE
AE

Activities/Assignments

Assignments given on educational use/misuse of standardized descriptors.

INSTRUCTIONAL METHODS

Instructional methods will utilize "hands on" as the primary means of learning. Course content has been provided online with students providing feedback online to each other and to the instructor. Problem solving will take place on computers using statistical software.

EVALUATION CRITERIA

1. Class participation -- Students will be expected to participate in all discussions and interactions online and develop discussion beyond the level of the text and/or course content. You will be graded by the quality of your contribution to these discussions.

2. Assignments -- Students are expected to complete all assignments in a timely manner. Assignments are to be submitted in reflecting very high quality of thought and content. All writing assignments are to be word processed using APA style sheet.

3. Final Examination -- The final examination will be discussed later in the course.

ASSIGNMENTS

1. Complete assignments by indicated date or within a week from when they were given.

2. Critically review published quantitative research and prepare a paper that specifically identifies statistical, methodological, or logical research errors.

3. Prepare a Chapter 3 in which you discuss data collection, null hypothesis, statistical procedures, *a priori* assumptions, collect the data (it can be made up data), run the data yourself on a computer, report your findings, and make a decision regarding your hypothesis. More on this later.

4. The final examination will be during the last week of the course. The format of this exam may vary, we will discuss it later and see what might be appropriate.

5. Written assignments that are of a formal character must be presented in APA format. In all things, present your work in a manner befitting to graduate level quality.

FIELD EXPERIENCE

Each student is required to complete a substantial amount of work "in the field" as part of the class. This work must be related to the contents of this course, that is, it should involve statistical analysis. It can be integrated with work that your district is presently doing or it can be something that you choose to do based upon research interests you have. This work is considered an important part of the course with completion of the fieldwork required in order to pass the class. You will need to decide early in the course what you would like to do for this requirement, secure the necessary permission, and obtain supervision, if necessary.

You will need to spend at least 15 hours doing some research based activities in your school. There are many research requirements based upon NCLB that might serve as the underlying purpose of your research for many of you. A good source of ideas is to ask your supervisor for action research that would be useful to the school or organization. To document your completion of this requirement, please have someone in your school who has knowledge of the work and time you have spent upon this activity sign a statement to that effect. You do not need to submit a log of your activity but you do need to turn in a paper describing what you did and what you found.

PORTFOLIO PROJECT

Each course in the M.Ed. requires an artifact associated with that course to be part of your portfolio that you will complete prior to graduation. This portfolio and a presentation of your portfolio to a committee of three (two professors and one administrative practitioner) have now replaced the written comprehensive examinations. These artifacts are then submitted on CD and on paper for your portfolio. You should make sure that you determine and complete each required artifact for each of the 12 required classes for your degree.

You must have completed at least 8 of the 12 courses and artifacts from all courses completed present in your portfolio prior to presenting your portfolio. With permission of appropriate instructors, you may synthesize two or more of your courses into a single artifact. You will need appropriate professors to sign off that each artifact meets an acceptable standard before it can be submitted in your portfolio. More detailed information regarding your portfolios is available from the administrative assistant at 406-243-5586. **This information contains a check off list and other requirements which must be received two weeks prior to setting a date for your portfolio presentation. While you may present with as few as eight courses represented in your portfolio, you must have all 12 represented prior to graduation.**

Artifacts for each course will be required to include specific Interstate School Leaders Licensure Consortium (ISLLC) standards that have been met by the project and a brief rationale for how that standard was met. Breaking out the standards into the Knowledge, Disposition, and Performance indicators and denoting those that have been met is anticipated to be the best way to meet this requirement.

Both the portfolio and presentation are expected to be of high professional quality. The presentation must show graduate level synthesis of the courses with an active integration of ISLLC standards, educational authorities, and relevant authors as appropriate. A student whose presentation does not pass is permitted to repeat the presentation in accordance with department rules that are available from the EDLD administrative assistant at 406-243-5586.

Any student taking this class who does not intend to graduate with a master's degree in educational leadership is not required fulfill this requirement.

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 judgment, clones with a few minor changes, will be returned without credit or grade.** No work may be plagiarized. If you are quoting another source, you must cite the source.

REFERENCES

Borg, W. R. & Gall, M. D. (1988). Educational research. Longman.
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
GB-STAT (301-384-2754) www.gbstat.com
Other Software
Mathcad (2002). Mathsoft.
Statistics (2002). Cliffs.
SPSS (2003)

SCHOOL OF EDUCATION MISSION STATEMENT

The School of Education shapes professional practices that contribute to the development of human potential. We are individuals in a community of lifelong learners, guided by respect for knowledge, human dignity and ethical behavior. To advance the physical, emotional, and intellectual health of a diverse society, we work together producing and disseminating knowledge as we educate learners.

EDUCATIONAL LEADERSHIP MISSION STATEMENT

The mission of Educational Leadership at The University of Montana is to develop leaders for learning organizations who are guided by respect for knowledge, human dignity, and ethical behavior. This is accomplished by providing high quality academic and professional opportunities. We subscribe to a definition of leadership wherein individuals assume evolving roles within influence relationships requiring their contributions in order to achieve mutual purposes.

ISLLC STANDARDS USED IN THIS COURSE

The primary ISLLC Standards addressed by this course are:

Standard 1. A school administrator is an educational leader who promotes the success of all students by facilitating the development, articulation, implementation, and stewardship of a vision of learning that is shared and supported by the school community.

Standard 2. A school administrator is an education leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional program conducive to student learning and staff professional growth.

However, each of the other four standards is indirectly addressed by what is learned in this course and should be recognized in your fieldwork and portfolio project when appropriate.

Students are required to reference the ISLLC standards contained in this syllabus and any others they have developed in their work in the course, and reference those standards in their presentation to their portfolio committee.

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.**
- **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.