THE UNIVERSITY OF MONTANA

PHYLLIS J. WASHINGTON

COLLEGE OF EDUCATION AND HUMAN SCIENCES

DEPARTMENT OF EDUCATIONAL LEADERSHIP

EDLD 618

EDUCATIONAL STATISTICS

January 25- May 13, 2015

Class Location: Room 322

Class Date and Time: Thursdays 4:10-7:00 pm

Instructor: Patty Kero, Ed.D.
Office Room: 206
Office Phone: 243-5623
Office Hours: By appointment
Office Email: patty.kero@mso.umt.edu

Charity Atteberry
Office Room: 210
Office Phone: 243-5586
Office Hours: By appointment
Office Email: charity.atteberry@mso.umt.edu
STATISTICAL PROCEDURES IN EDUCATION

Course Purpose
The purpose of this course is to present the understanding of statistical theory and practice necessary to ensure that the student of educational leadership is capable of both analyzing and conducting formal quantitative research in an exemplary manner.

Course Objectives
To help the student:
1. understand statistical concepts and terminology,
2. understand the philosophical and logical basis of research,
3. become a critical reader of research,
4. grasp the significance, importance, and implication of statistics in the process of improving schools,
5. critically evaluate educational data,
6. interpret and analyze assessment data,
7. understand the relevance of research to practice,
8. develop an ability to conduct action and formal research,
9. use computer technology in numerous components of research,
10. utilize statistical research as a means to build a personal knowledge base, and
11. utilize statistical research to contribute to an appropriate knowledge base.
12. evaluate research designs appropriate to quantitative research questions.
13. understand univariate and multivariate research designs and be able to utilize data analysis methods for both designs.

Evaluation Criteria and Course Requirements

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<tr>
<th>REQUIRED ASSIGNMENTS</th>
<th>Total</th>
<th>Percent of Total</th>
<th>Your score</th>
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<tbody>
<tr>
<td>Class attendance</td>
<td>30</td>
<td>30%</td>
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<tr>
<td>Class participation, quizzes, and weekly assignments</td>
<td>10</td>
<td>10%</td>
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<tr>
<td>Journal article facilitation: JEE article</td>
<td>10</td>
<td>10%</td>
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<td>Main paper/project</td>
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<tr>
<td>Paper: The Role of Statistics in Research</td>
<td>18</td>
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<td>Weekly summaries: JEE journal articles (7)</td>
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<tr>
<td>Final exam (p-value question)</td>
<td>10</td>
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<tr>
<td>TOTAL</td>
<td>100</td>
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Instructional Methods
Instructional methods will utilize “hands on” procedures as the primary means of learning. This course will provide a number of teaching and learning formats to promote individual personal and professional growth, and to advance group interactions with all participants. Formats will include large class presentations, small class process groups, reflective and synthesis writing, problem-solving case study activities, cooperative learning activities, structured book discussions,
individual/group research, guest speakers, lectures, and independent reading. Computer technology will be used in the class.

**Expectations and Requirements**

1. **Weekly Class Attendance**
   Graduate students who attend class regularly are more successful than those who do not. By simply being in class, a student is more capable of learning and absorbing the statistical information discussed. In this course, discussion is a key element of the learning process. The class members explore significant questions together. Students cannot benefit from these rich, meaningful conversations without attending class regularly. Because of the intensive schedule of the class, student attendance at all class meetings is essential. The value of class attendance is immeasurable. If students must miss a class, then they must make arrangements with another student to take notes for them.

   Attendance records start with the first day of class. Two absences result in the final course grade being lowered ½ letter grade. Three absences result in the final course grade being lowered one full letter grade, etc.

2. **Class Participation**
   Class participation gives graduate students the opportunity to practice using the language of statistics. In the past, many students have shared that learning the vocabulary of statistics was difficult. Active, engaging participation provides the chance to practice using a statistics vocabulary.

   For students to get credit for participation they will need to actively participate in class by asking questions and participating in discussion in a thorough, meaningful way that stimulates rich conversation. The textbook or an outside reading should be cited.

   Participation also provides the instructor and student with feedback. When students answer questions or try to explain concepts, the instructor can assess the extent of their understanding. Students will be expected to attend all classes, interact verbally, and develop discussions beyond the level of the text and/or presentations.

   Class participation also includes completing weekly assignments and bringing them to class as assigned. Completed assignments must be of high quality.

   Computer technology is used in class. Do not go online, play games, or read emails during class. If students use their computers/laptops for other than class work during class time, they will have to do their statistical calculations by hand. Please turn off cell phones. NO Macs in this class, because this professor cannot help with that technology. SPSS will be used in this class.

   Quizzes will be given at the end of most classes. You will have plenty of time to complete and turn in. Make sure to read the textbooks and listen to the discussion in class.

   SPSS print-outs will be assisted at the end of most classes. A list of computer labs on campus with SPSS is included in Appendix L. The assignments will need to include the following:
a. output summary  
b. narrative presentation of the results  please review Pallant’s examples)

3. **Journal Response Paper**  
All students will write a response paper for each journal article in the *Journal of Experimental Education*. Each week students will bring a one page response paper to submit at the end of class. This paper can be used as a reference guide for the journal article facilitation. It can be used for in-class notes. Revision notes can be added to it during the discussion. This response paper is intended to be a mechanism for formative assessment and personal reflection. The purpose of this response paper is not to repeat and summarize the content but rather to critically evaluate and assess the content contained within the article. At least two citations from the article should be provided within the response to support your critical analysis. The response papers will be returned the following week and should function as a reference guide for class assignments. This is a credit/no credit assignment. Points will not be given on the basis of correct or incorrect responses.

4. **Journal Article Facilitation**  
Student facilitators will select from the journal articles that have been assigned from the *Journal of Experimental Education*. To prepare their classmates for the discussion of the article, facilitators should notify them at the previous class session regarding any additional preparatory reading. The facilitator will lead this discussion as if it was a Professional Learning Community (PLC) session with a school faculty team. This is NOT a presentation, but rather a facilitated adult learning experience. Facilitation is expected to engage the participants in active and meaningful interaction around the content of the article.

PowerPoint or Prezi presentations are NOT expected or encouraged; rather thoughtful questions and/or activities are required. Two days before the student is scheduled to lead the discussion, he/she needs to email Charity a ½ page outline. The outline should include the activities planned and the questions used to stimulate conversation. Examples of exemplary discussions will be demonstrated and presented in class.

Here are some tips for your 15 minute discussion:

*Be creative!* Do something different. Make it interesting. Use small groups, use the board, use a computer, use props, use dramatization. Use your imagination. There's lots of room for creativity in this assignment. (Try to make sure that your innovations enhance, or at least don't detract from the content.)

*Plan the discussion!* Lead the class in a discussion of the issues raised in the article or chapter.

*Ask interesting, thoughtful questions!* Don't limit the discussion to questions for which you have answers. Use the discussion as an occasion to inquire jointly with other prepared students into questions you find interesting and important. Please remember this is not a time to quiz the instructor.
If a concept is unclear to the student facilitator, please contact the instructor or GA before class in order to discuss the concept until it is clear and understood.

All students will be assigned to facilitate two of the articles. The required articles are listed below:

a. Forward: Thompson (discussion facilitated by Patty or GA)
b. The Case Against Statistical Significance Testing, Revisited: Carver
c. What Statistical Significance Testing Is, and What It Is Not: Shaver
e. The Use of Statistical Significance Tests in Research: Thompson
f. Statistical Significance Testing From Three Perspectives: Levin
g. Interpreting Statistical Significance and Nonsignificance: Schafer
h. The Role of Statistics in Research: Asher

5. Main Paper and Presentation

Discuss your paper selection with Dr. Kero within the first three weeks of the course. Listed below are two options for your paper. Remember, you can come up with your own idea.

a. The University of Montana will hold the UM Graduate Student Research Conference on Saturday, April 16.

The UM Graduate Student Research Conference brings together graduate students, community members, and faculty from a variety of disciplines. It offers graduate students an opportunity to gain valuable professional experience by presenting their work in a formal and intellectually supportive environment. It also fosters greater understanding among graduate students and faculty of the various disciplines' approaches to and methods of research.

For more information, visit http://scholarworks.umt.edu/gsrc/.

Students are expected to apply for an oral presentation or the poster session. Good preparation will increase your confidence and effectiveness. If students are enrolled in EDLD 625 Quantitative Research and this course, they have the option of completing a joint research paper.

b. Here is another suggestion for a research paper:

Write and submit a manuscript to a statistics journal. To get started, find and read the author’s guidelines for a journal that you have selected. Check out what the editors look for in manuscripts. We will discuss this manuscript in class.

Suggestions for topics:
Levels of measurement in statistical tests
Likert surveys are ordinal data
Experimental importance in a frequency table
Effect size
Descriptive statistics in a dissertation
Suggestions for journals:
- *Journal of Statistics Education*
- *Statistics Education Research Journal*
- *Teaching Statistics*
- *Statistical Science*
- *Journal of Educational and Behavioral Statistics*

6. **Paper: The Role of Statistics in Research**

**Weekly Summaries**
Prepare summaries for each of the seven journal articles on statistical significance testing. Beginning on the first week of class, one article per week will be assigned. Each student will write a one-page summary for the assigned article and turn it in on the date when it is due.

**Paper**
Write a scholarly paper critically analyzing the role of statistics in research and demonstrating your understanding of the p-value. This paper must address the elements outlined in the assigned articles in the *Journal of Experimental Education*. The details of this assignment will be specified in class, but basically the format for this paper (3-4 pages) is listed below:

a. Role of statistics in research
b. Definition of the p-value
c. What it is and what it is not
d. Uses and misuses of the p-value
e. Supplement to statistical significance testing (listed by Thompson, 1993)
f. Relationship of the null hypothesis to the p-value.

7. **Final Examination**
The final examination will be on the last day of class. It will be taken on the computer.

This graded final will be available in the instructor’s office during summer semester.

**Required Texts and Readings (which students are required to obtain)**


**Required Texts and Readings (Patty will provide for the students.)**


Another book on statistics (will be explained in class)
Other materials will be distributed in the class and posted online.
Remote Option
This course is taught in a face-to-face format with the option of attending class via remote connection. The system is at the discretion of the instructor. Students who attend the course via remote connection will be as responsible for all of the assignments and activities as those attending in-person.

With the assistance of our newly added Double Robotics Robots, you are able to access a face-to-face campus course from any location in the world with an internet connection. Students who live outside a specific parameter from the University of Montana may be eligible for this option. To learn more about this feature, watch our case study video with Double Robotics.

Double Robotics: Instructions for Accessing Telepresence Robot
Double Robotics Driving Tutorial

Please contact the Department of Educational Leadership at 406.243.5586 or edld@mso.umt.edu to set up a practice session before your first remote login.

It is the student’s responsibility to have the proper technology before the course begins. If the technology does not work and the student is absent from class then it will be counted as an absence. If students are absent it is their responsibility to get the class notes from other students.

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, will be returned without credit or grade. No work may be plagiarized. If you are quoting another source, you must cite the source. Much of what is to be learned in this class is learned by attending class and participating in discussions. It is important to attend all classes if you are working for an A.

All students must practice academic honesty. Academic misconduct is subject to academic penalty by the course instructor and/or disciplinary sanction by the University. You are required to be familiar with the Student Conduct Code. The Student Conduct Code is available for review online at http://www.umt.edu/vpsa/documents/Student%20Conduct%20Code%20FULL%20-%20UPDATED%20AUG%2028%202012.pdf

In addition, students are required to be current in the assigned reading for the course and to submit and/or present required assignments in a timely manner. Late assignments will be accepted only by prior consent of the instructor.

Counseling Graduate Students
This course comports with the following doctoral education research and scholarship standards established by the Council for Accreditation of Counseling & Related Programs.

Research and Scholarship: http://www.cacrep.org/
<table>
<thead>
<tr>
<th>Standards</th>
<th>Measureable Acquisition of Knowledge, Skills, and Dispositions Evaluation of Student Learning</th>
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<tbody>
<tr>
<td>4. a. Research designs appropriate to quantitative research questions.</td>
<td>1. Weekly class discussions on the research design appropriate to quantitative research questions</td>
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<td>2. Quizzes on the research questions</td>
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<td>3. Projects and presentations on research questions</td>
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<tr>
<td>4. b. Univariate and multivariate research designs and data analysis</td>
<td>1. Weekly summaries of journal articles regarding univariate and multivariate research designs and data analysis.</td>
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<tr>
<td>methods</td>
<td>2. Student led discussion of research designs and data analysis methods.</td>
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<td>3. Quiz on this standard</td>
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<td>4. Weekly assignments on this topic</td>
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<td>5. Summative paper on the role of statistics in univariate and multivariate research designs and data analysis methods.</td>
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**Tentative Class Topics and Assignment Due Dates**
The following schedule is tentative, subject to change, because each year the students set the pace of the class by their comments and questions. The class may move faster or slower depending on the make-up and interests of the students.

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introductions</td>
<td>Privitera: Chapter 1</td>
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<td>Syllabus Discussion</td>
<td>Pallant: Chapters 1-5</td>
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<td>Introduction to Stats</td>
<td>JEE: Forward</td>
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<td></td>
<td>Definitions Review</td>
<td>Readings:</td>
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<td></td>
<td>Measurements Scales</td>
<td>1. Likert is Pronounced “LICK-ert” not “LIKE-ert” and the Data are Ordinal</td>
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<td>Getting Started with SPSS</td>
<td>not Interval</td>
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<td>2. Slider Scales and Web-Based Surveys: A Cautionary Note</td>
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<td>(on Moodle)</td>
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<td>Due: Three thoughtful questions on Likerts.</td>
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<td>Week 2</td>
<td>Summarizing Data: Frequency Distributions</td>
<td>Privitera: Chapters 2 and 3</td>
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<td>in Tables and Graphs</td>
<td>Pallant: Chapters 6-7</td>
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<td></td>
<td>Summarizing Data: Central Tendency</td>
<td>JEE: Carver p. 287</td>
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<td>Descriptive Statistics with SPSS</td>
<td>APA: Introduction p. 27-3</td>
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<td>Due: Summary of JEE (The Case Against Statistical Significance reading)</td>
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<td>Due: Bring APA manual to class or have access to Owl Purdue or some website</td>
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<td>that sets sound and rigorous standards for writing dissertation or research articles.</td>
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<td>Due: Three specific examples of the most important APA components to remember when using statistics in research (look in Chapter 2). For example, one component could be: The Methods section includes the conceptual and operational definitions of the variables in the study.</td>
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</table>
| **Week 3**  
| Feb. 11 | Summarizing Data: Variability  
|        | Probability | Privitera: Chapters 4 and 5  
|        |            | Pallant: None  
|        |            | JEE: Shaver p. 293  
|        |            | Due: Summary of JEE  
| **Week 4**  
| Feb. 18 | Probability, Normal Distributions, and z-scores.  
|        | Probability and Sampling Distributions  
|        | SPSS: Cronbach’s Alpha  
|        | Class will be online.  
|        | Patty will be at the GDE Conference | Privitera: Chapters 6 and 7  
|        |            | Pallant: Chapters 8-10  
|        |            | JEE: Huberty p. 317  
|        |            | Due: Summary of JEE  
| **Week 5**  
|        |            | Pallant: none  
|        |            | JEE: Thompson p. 361  
|        |            | Due: Summary of JEE  
| **Week 6**  
| Mar. 3  | Testing Means: One-Sample and Two – Independent Sample $t$ Tests | Privitera: Chapter 9  
|        |            | Pallant: Chapter 17  
|        |            | JEE: Levin p. 378  
|        |            | Due: Summary of JEE  
| **Week 7**  
| Mar. 10 | Testing Means: The Related-Samples $t$ Tests | Privitera: Chapter 10  
|        |            | Pallant: Chapter 17  
|        |            | JEE: Schafer p. 383  
|        |            | Due: Summary of JEE  
| **Week 8**  
| Mar. 17 | Estimation and Confidence Intervals | Privitera: Chapter 11  
|        |            | Pallant: None  
|        |            | JEE: Asher p. 388  
|        |            | Due: Summary of JEE  
| **Week 9**  
| Mar. 24 | Analysis of Variance: One-Way Between-Subjects Design  
|        | Choosing the Right Statistics | Privitera: Chapter 12  
|        |            | Pallant: Chapter 18  
|        |            | Due: The Right Statistics Worksheet  
| **Week 10**  
| Mar. 31 | Analysis of Variance: One-Way Within-Subjects (Repeated-Measures) Design  
|        | Analysis of Variance: Two-Way Between – Subjects Factorial Design | Privitera: Chapter 13 and 14  
|        |            | Pallant: Chapter 19 and 20  
|        |            | Due: TBA  
| April 7 | Spring Break | No class |
| Week 11 | Correlation | Privitera: Chapter 15  
Pallant: Chapters 11  
Due: Paper or Project |
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<tr>
<td>Apr. 14</td>
<td>Graduate Student Research Conference</td>
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<tr>
<td>Apr. 16</td>
<td>Saturday</td>
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| Week 12 | Linear Regression and Multiple Regression | Privitera: Chapter 16  
Pallant: Chapter 13  
Due: Paper: Role of Statistics |
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<td>Apr. 21</td>
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| Week 13 | Nonparametric Tests | Privitera: Chapter 17  
Pallant: Chapters 16  
Due: Research Presentations |
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<td>Apr. 28</td>
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| Week 14 | Nonparametric Tests | Privitera: Chapter 18  
Pallant: Chapters 16  
Due: Research Presentations |
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<td>May 5</td>
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<tr>
<th>Final</th>
<th>Final Exam</th>
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<td>May 12</td>
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References


APPENDIX A

Mission Alignment

The Department of Educational Leadership has aligned itself with the mission of The University of Montana-Missoula and the College of Education and Human Sciences Mission. The following mission statements demonstrate this alignment. Learning activities in this course have been designed to address appropriate areas of these mission statements.

The University of Montana-Missoula Mission
The mission of The University of Montana-Missoula is the pursuit of academic excellence as indicated by the quality of curriculum and instruction, student performance, and faculty professional accomplishments. The University accomplishes this mission, in part, by providing unique educational experiences through the integration of the liberal arts, graduate study, and professional training with international and interdisciplinary emphases. Through its graduates, the University also seeks to educate competent and humane professionals and informed, ethical, and engaged citizens of local and global communities. Through its programs and the activities of faculty, staff, and students, The University of Montana-Missoula provides basic and applied research, technology transfer, cultural outreach, and service benefiting the local community, region, state, nation and the world.

College of Education and Human Sciences Mission Statement
The College of Education and Human Sciences 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. We work together producing and disseminating knowledge to advance the physical, emotional, and intellectual health of a diverse society.

Educational Leadership Mission Statement
The mission of Educational Leadership at The University of Montana-Missoula 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.
APPENDIX B

Course Outcomes and Standards for School Leaders

The Department of Educational Leadership (EDLD) has adopted the Interstate School Leaders Licensure Consortium (ISLLC) Standards for School Leaders. The ISLLC Standards were developed by the Council of Chief State School Officers and member states in 1996 and later revised in the spring of 2008. The ISLLC Standards are used to guide courses in educational leadership. The six standards are either directly or indirectly addressed in this course. For a detailed explanation of the ISLLC Standards, visit the web site for the Council of Chief State School Officers at http://www.ccsso.org/content/pdfs/elps_isllc2008.pdf

The Department of Educational Leadership has adopted the Doctoral Standards from the Council for Accreditation of Counseling & Related Educational Programs for the research classes.

RESEARCH AND SCHOLARSHIP

1. research designs appropriate to quantitative and qualitative research questions
2. univariate and multivariate research designs and data analysis methods
3. qualitative designs and approaches to qualitative data analysis
4. emergent research practices and processes
5. models and methods of instrument design
6. models and methods of program evaluation
7. research questions appropriate for professional research and publication
8. professional writing for journal and newsletter publication
9. professional conference proposal preparation
10. design and evaluation of research proposals for a human subjects/institutional review board review
11. grant proposals and other sources of funding
12. ethical and culturally relevant strategies for conducting research

http://www.cacrep.org/section-6-doctoral-standards-counselor-education-and-supervision/
Students in C & I / EDLD 618 are expected to:

- Demonstrate professional vision in the practice of education.
- Accept responsibility and accountability for class assignments in their role as members of the class.
- Demonstrate growth during the period of their continued education.
- Demonstrate good decision making and an awareness of organizational issues from a variety of perspectives.
- Demonstrate imagination and originality in the discussion of statistical issues.
- Understand the relationship between theory and practice and the value of reflective practices.
- 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 class*
APPENDIX D

Recommendations

My recommendations for doing well in this class include:

1. The material is cumulative - don't get behind in your reading or miss class.

2. While there is considerable overlap between the readings and lectures, there is unique material in both. To perform well you need to master the information in both the readings and lectures (i.e., the quizzes and tests contain questions covering material from both sources).

3. Read the assigned material several times until you have a good grasp of it. This will be the first time many of you are introduced to these concepts.

4. Keep in mind Bloom's Taxonomy - go beyond rote memorization and work towards application, analysis, and synthesis of the concepts.

5. Come to class prepared to discuss the material - then engage in active discussions. If something is unclear, please speak up. If I go too fast, please let me know.

6. If you ask a question and my explanation is unclear or inadequate, please ask me to clarify or expand on it. This will be appreciated, not resented.

7. Attend the review sessions that are offered during the semester.

8. Contact the graduate assistant or professor if you are having difficulty. Don't wait until you have several poor grades to seek help. The professor’s office hours are on the front cover of this syllabus. They will typically be available for consultation (appointments recommended).
Guidelines for Evaluating Research Reports

1. Researchers often examine narrowly defined problems.
2. Researchers often conduct studies in artificial settings.
3. Researchers use less-than-perfect methods of observation.
4. Researchers use less-than-perfect samples.
5. Even a straightforward analysis of data can produce misleading results.
6. Even a single, isolated flaw in research methods can lead to seriously misleading results.
7. Research reports often contain many details, which can be very important when evaluating a report.
8. Many reports lack information on matters that are potentially important for evaluating a research article.
9. Some published research is obviously flawed.
10. No research report provides “proof.”
11. Other things being equal, research related to theories is more important than nontheoretical research.
12. Many researchers acknowledge obvious flaws in their research.
13. To become an expert on a topic, one must become an expert at evaluating original reports of research.
APPENDIX F

Requirements for the Abbreviated Research Paper

Chapter One: Introduction
- Introduction
- Statement of the Problem
  - What is the issue, problem or phenomenon that prompts this study?
- Purpose of the Study
  - Indicate the purpose or intent of the study
  - Indicate the theory, model or conceptual framework to be tested in the study
  - Indicate the specific method of inquiry to be employed in the study
  - Indicate why this study is important
- Research Question(s)
  - State whether the independent and dependent variables will be related or whether two or more groups will be compared in terms of the dependent variable
  - State your research question(s)
- Definition of Terms
  - Broadly define key terms, including the dependent and independent variables
  - Make sure to include citations
- Delimitation and Limitations of the Study
  - Delimitations refers to the boundaries of the study—its limits based on the context in which the inquiry is carried out and the subjects who will be involved
  - Limitations refers to potential weaknesses in the study, such as limits resulting from the approach to selecting subjects
- Significance of the Study
  - Indicate why this study is important
- Summary of Chapter One and transition to Chapter Two

Chapter Two: Review of Related Literature (Past Tense)
- Overview
  - Describe how your review is organized, indicating major themes or questions you have pursued.
  - Briefly describe how you carried out your search.
  - In broad terms, what have others learned that is relevant to your question?
- Findings: Present specific findings represented in the literature you have reviewed. Organize your presentation thematically rather than serially.
  - What are the major findings and most significant studies pertinent to your topic?
  - What are the most promising methodological approaches to investigating your topic?
- Conclusions
o Summarize major themes and major contributions of significant studies and articles to the body of knowledge under review, maintaining the focus established in the introduction.
o Evaluate the current "state of the art" for the body of knowledge reviewed, pointing out major methodological flaws or gaps in research, inconsistencies in theory and findings, and areas or issues pertinent to future study.
o Summarize promising methodological approaches to investigation of your topic.
o Conclude by providing some insight into the relationship between the central topic of the literature review and the research project you are pursuing.

- Summary of Chapter Two and transition to Chapter Three (Some professors will want to see a conclusion instead of a summary.)

Chapter Three: Method

- Research design & procedures
  o What is the research design? Experimental? Quasi-experimental? Descriptive? Ex post facto? How will the study be conducted?

- Research Question and Hypothesis (es)

- Sample, Population, and Participants
  o Describe the sample: Who are the participants? How are they to be selected? What are important characteristics of the sample?
  o Describe the population

- Variables in the Study
  o Describe both the dependent and independent variables in the study levels of measurement

- Data Collection Procedures
  o Instrumentation and Materials
  o How will each variable be measured? What measurement instruments will be used?
  o What materials
- Reliability and internal validity

- Data Analysis
  o Type of analysis anticipated
  o What statistical treatments of the data will be carried out?
  o A priori assumptions
    o Alpha level
    o Null hypothesis
      Definition of the Null
    o Distribution
- Statistical Assumptions (Pallant listed the Assumptions)
- Summary of Chapter Three and transition to Chapter Four
Chapter Four: Results or Finding

- Data Analysis (Description of the quantitative analysis procedure(s))
  - Theoretical Foundation which guided the study
- Descriptive statistics
  - Demographics of the sample
  - Description of central tendencies and variability in independent and dependent variables
  - Use tables, graphs, charts as appropriate and integrate into the text
- Inferential Statistics
- Findings and Discussion
  - Present the results of your analysis organized by research questions/hypotheses, using tables as appropriate
  - Interpret and discuss the results: what do the results of the statistical tests mean?
- Summary of Chapter Four and transition to Chapter Five

Chapter Five: Conclusions and Recommendations

- Conclusion from the analysis of the data
  - Determination of the null hypothesis
  - Conclusions linked back to the literature review
- Implications of findings
  - Inferences based upon the results
  - Application of the results to practice
- Questions for further research
- Recommendations for future study and for practitioners/others
- Summary
  - Brief restatement of the problem
  - Main features of the methods
  - Most important findings

Reference List

Appendices
APPENDIX G
Administrative Biography

Patty Kero

Patty M. Kero, Ed.D., is an Associate Professor of Education in the Department of Educational Leadership at the P.J.W. College of Education and Human Sciences of The University of Montana. She holds an Ed.D. from the University of Montana in Educational Leadership; a M.Ed. from Harvard University in Administration, Planning, and Social Policy; and a B.A. from The University of Montana in Elementary Education.

Professor Kero has taught seventeen consecutive years in the Pre K-12 setting: five years in Montana and twelve years in Washington. Her fifteen years of elementary and secondary administrative experience in public school settings in Nevada, Idaho, and Montana included assistant principal, principal, Title 1 director, and superintendent. Educators, locally and nationally, have studied her school in Nevada after they won Redbook’s nationally recognized America’s Best Schools award and her school in Idaho was the national winner of “What Parents Want in Their Schools.” While in Idaho, she also worked with Barbara Morgan, NASA’s Teacher in Space astronaut.

For six years, she taught as an adjunct for Sierra Nevada College and Great Basin College in Elko, Nevada. While earning her Master’s, she worked at the Harvard Principals’ Center with Roland Barth and Richard Ackerman. As a professor at UM, she has taught undergraduate and graduate courses in the areas of statistics and school administration including analysis of educational data, supervision and evaluation, public relations, and advanced educational statistics.

Working as a Due Process Hearing Officer in Nevada, she served the students who were identified as needing special education services. Her published article in Kappan addressed special education issues in schools. Her research interests are brain-based learning and teaching, leadership in education, and legal issues surrounding schools. Her leadership commitment has been to advocate for successful continuous learning and teaching for all members of the educational community, by serving the educational needs of all, regardless of age, gender, cultural group identity, or abilities.
## APPENDIX H

### JEE ARTICLE SUMMARY RUBRIC

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 points</td>
<td>Summarizes the main points of the article concisely and thoroughly, demonstrating an understanding of the content, examples, and conclusions. Summary is well organized and void of mechanical errors.</td>
</tr>
<tr>
<td>0 points</td>
<td>Does not summarize the article accurately or with understanding of its content. Summary is not well organized with 2+ mechanical errors.</td>
</tr>
<tr>
<td>0 points</td>
<td>Student makes no attempt to summarize article or does not submit assignment.</td>
</tr>
</tbody>
</table>

Student Name: _______________________________ Date of submission: ___________
Total: ____ / 1

### JOURNAL FACILITATION

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point possible</td>
<td>Article content was accurately and full represented and topics were presented in a logical manner.</td>
</tr>
<tr>
<td>1 point possible</td>
<td>Presentation represented multiple intelligences and was developed using creativity and authenticity.</td>
</tr>
<tr>
<td>1 point possible</td>
<td>Presentation required class participation and directions were clear and well-articulated.</td>
</tr>
<tr>
<td>1 point possible</td>
<td>Presentation was approximately 10-15 minutes in length.</td>
</tr>
<tr>
<td>1 point possible</td>
<td>Each group member was an active participant in the presentation.</td>
</tr>
</tbody>
</table>

Student Name: _______________________________ Date of submission: ___________
Total: ____ / 5
APPENDIX I

Comprehensive Exams

Comprehensive exams are arranged after you have completed the coursework in your doctoral program. Your doctoral program will be developed working with your academic advisor. If you are uncertain as to whom your academic advisor is, please contact the Department of Educational Leadership office for this information. To arrange the date of your comprehensive exams, you will need to contact the Chair of Comprehensive Exams for The Department of Educational Leadership. Working with the Chair, dates for your comprehensive exams will be established.

In the Department of Educational Leadership, comprehensive exams are composed of 16 questions over the body of knowledge that made up your academic doctoral program. The 16 questions will be given to you over the course of two consecutive days. Each day you will be provided with eight comprehensive exam questions and you will have eight hours total to write your answer to these eight questions. On the second day you will be given the remaining eight questions to be answered in the final eight hours.

Comprehensive Exam answers are read and scored by all faculty in the department. For each answer that does not receive an assessment of "PASS" from the majority of the faculty, the student will have to return at a day and time of their choosing (coordinated with the Chair of Comprehensive Exams) to retake each question (it may or may not be the same question) that was assessed as NO PASS by the faculty. A student will have only 1 chance to rewrite an answer. If the second answer is not assessed as a PASS, the student will be exited from the doctoral program.

A comprehensive exam answer should directly address the question rather than a "shotgun" approach where the student provides an answer that wanders hoping that it hits the target! Typically this occurs when a student has adopted a strategy where, prior to taking Comps, they guess at the type of questions that will be asked and then go into the two day exam with 16-18 answers. This strategy is not recommended and is typically a formula for failure.

Successful answers for a doctoral comprehensive exam question have four important components. First of all they directly answer the question. Secondly, the answer has a logical design going from the general to the specific. Next, the answer should synthesize the appropriate theory and class content. Finally, the positions stated in the answer should be supported with appropriate scholarly citations using correct APA style noting the author's last name and the date of publication (xxxx). The number of citations are dependent on the question but at a minimum the seminal works associated with the body of knowledge contained in the question and answer should be cited.

If English is not your first language, then you can request accommodations regarding the length of time given to you to complete the Comps.

When discussing comprehensive exams, the question always comes up, how long does the answer need to be? The department has no minimum length so I can only give you my standard. At a minimum, I feel that a comp answer should be at least two double spaced pages. Any shorter than this and it becomes very difficult to give a thorough answer that addresses the seminal works associated with the question.
Comprehensive Exam Questions for Advanced Statistics are basically two types of questions that I feel address the content of advanced educational statistics. One type of question addresses your understanding of the role of statistics in research and your understanding of the p-value. Your scholarly answer will synthesize the critical elements of the p-value as outlined in the assigned articles in the Journal of Experimental Education. The answer must give a clear definition of the p-value, what it is and what it is not, uses and misuses, alternative methods to “statistical significance testing” and an explanation of the relationship between the null hypothesis and the p-value.
APPENDIX J: Hypotheses Testing

By Myers, Well, & Lorch

Steps for Testing Hypotheses Using the p-Value Approach

1. State the null and alternative hypotheses, $H_0$ and $H_1$.
2. Decide on the test statistic that will be used to assess the evidence against $H_0$.
3. Decide, making reasonable assumptions, what sampling distribution the test statistic should have if $H_0$ is true.
4. Decide on the significance level that will be used as the criterion for deciding whether or not to reject the null hypothesis. We will reject $H_0$ only if our result is very unlikely under the assumption that $H_0$ is true. The significance level (denoted by $\alpha$, the Greek letter alpha) specifies exactly how unlikely the result must be.
5. Use the sampling distribution that assumes $H_0$ is true to find the probability of getting a value for the statistic that is at least as “extreme” as what was actually obtained in our sample of data—distribution that are consistent with $H_1$.
6. Reject $H_0$ in favor of $H_1$ if $p \leq \alpha$. If we reject $H_0$, we say that our result is “statistically significant at the level of $\alpha$.” If $p > \alpha$, we say that we have failed to reject $H_0$ or that we have insufficient evidence to reject $H_0$.

Steps for Testing Hypotheses Using the Rejection Region Approach

Steps 1-4 are the same as for the p-value approach.

5. Identify values of the test statistic that would constitute the most convincing support for the alternative hypothesis. Using the sampling distribution that assumes $H_0$ is true, determine the set of those values whose cumulative probability equals $\alpha$. Call the part of the distribution that is beyond the critical value the rejection region or critical region. Call the value of the test statistic that demarcates the boundary of the rejection region from the rest of the sampling distribution the critical value of the test statistic.
6. Reject the $H_0$ in favor of $H_1$, if the value of the test statistic falls in the rejection region.
APPENDIX K: Journal Facilitation

1. The Case Against Statistical Significance Testing, Revisited: Carver

2. What Statistical Significance Testing Is, and What It Is Not: Shaver


4. The Use of Statistical Significance Tests in Research: Thompson

5. Statistical Significance Testing From Three Perspectives: Levin

6. Interpreting Statistical Significance and Nonsignificance: Schafer

7. The Role of Statistics in Research: Asher
You will need to use the software program SPSS for your weekly homework assignments. SPSS stands for “Statistical Program for the Social Sciences” and is the software that you will use when you analyze data. There are multiple places on campus for you to access SPSS. You may want to have your own copy of SPSS so that you can conduct data analysis at home on your own computer. If so, a base version/grad-pack subscription is available at a reduced price for students (approximately $45.00). Additionally, if you work for the university system, you may have access to SPSS through your department.

On-Campus Student Access:

Computer Lab, UC 225
Computers on Levels 1 and 3, Library
Social Sciences Resource Lab, SS 258
Technology Resource Center, EDU 113

SPSS Subscription:


http://studentdiscounts.com/spss.aspx
APPENDIX M

CACRP

Assessment

This course comports with the following doctoral education research and scholarship standards established by the Council for Accreditation of Counseling & Related Programs.

Research and Scholarship: [http://www.cacrep.org/](http://www.cacrep.org/)

<table>
<thead>
<tr>
<th>Standards</th>
<th>Measureable Acquisition of Knowledge, Skills, and Dispositions Evaluation of Student Learning</th>
<th>Student Ratings&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
</table>
| 4. a. Research designs appropriate to quantitative research questions.    | 1. Weekly class discussions on the research design appropriate to quantitative research questions  
2. Quizzes on the research questions  
3. Projects and presentations on research questions                          |                             |
| 4. b. Univariate and multivariate research designs and data analysis methods | 1. Weekly summaries of journal articles regarding univariate and multivariate research designs and data analysis.  
2. Student led discussion of research designs and data analysis methods.  
3. Quiz on this standard  
4. Weekly assignments on this topic  
5. Summative paper on the role of statistics in univariate and multivariate research designs and data analysis methods. |                             |

<sup>1</sup> 1 = Student did not meet standard, 2 = Student met the standard, 3 = Student exceeded the standard
APPENDIX N

Assignment Title

Title of the Paper

by

Your name

Submitted to

Patty Kero, Ed.D.

In Partial Fulfillment of the Requirements of

EDLD 618: Educational Statistics

The University of Montana

Spring 2016