

Research Design and Analysis I

EDUC – 6600

Fall 2018



Course Instructor:

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335 Education Building

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Course Time and Location:

Edith Bowen Laboratory School Room 233

Tuesday 4:30-7:15

Essential Questions for this Course

- What is quantitative research?
- How does data inform our world?
- How are data analyzed?

IDEA Standards:

- Gaining factual knowledge (terminology, classifications, methods, trends)
- Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
- Learning to apply course material (to improve thinking, problem solving, and decisions)

Course Description:

Applied introduction to statistical methods commonly used in educational, social, and health sciences. Coverage of data types, data base creation, secondary data analysis, data exploration and visualization; use of statistical software to compute descriptive and inferential statistics, including correlation, regression, group comparisons (t-tests, ANOVA), and categorical methods.

Course Outcomes:

- Understanding basic statistical concepts and techniques (e.g., statistical hypothesis testing, effects sizes)
- Utilize the appropriate descriptive and/or inferential statistics for analyzing data.
- Using SPSS/PC, run analyses required addressing a given set of research objectives.
- Interpret data and present results about a given set of data.

Course Resources:

- Course Website – We will be utilizing Utah State University’s Canvas system for course management. Assignments, readings, and grades will be posted on Canvas.
- Required textbooks:
 - Field, A. (2013). *Discovering statistics using SPSS, 4th edition*. London: SAGE Publications. [book website: <http://www.sagepub.com/field4e/>]
 - DeVellis, R. F. (2011). *Scale development: Theory and application, 3rd edition*. Los Angeles: SAGE Publications.
- Recommended
 - Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 3rd Edition*. Los Angeles: SAGE Publications.
 - Cohen, B. H. (2008). *Explaining psychological statistics*. John Wiley & Sons.
 - NOTE: Do not buy this book unless you really want to. You can view and read it online FREE at [this link](#).
- Free access to SPSS: apps.usu.edu
 - Purchase student license: [\\$70](https://usu.service-now.com/usu/catalogs_home.do)

Overview of Course/Expectations and Procedures

Class Attendance

You should make every attempt to be at every class session. I hope that you will find the activities, discussions, and demonstrations helpful and insightful. Furthermore, the class lectures and activities will be absolutely essential for you to meet the requirements of some of the assignments in this course. However, as human beings, we sometimes get sick or have extenuating circumstances. Please remember, if you are feeling ill to contact the appropriate health services organization.

Class Participation

You are also expected to participate in class activities and discussions. Research demonstrates that the quality of the classroom environment depends on the interaction of the students and the teacher. This class will be highly interactive and discussion-based.

Assigned Readings

You are expected to read all required assignments for the week before class. Class discussions and participation in the group activities will not be effective unless readings are completed.

Assignment Deadlines

Assignments are due on the date they are listed in this syllabus unless officially changed by the instructor. All changes in assignment due dates will confirmed via e-mailed to all students. **No late work will be accepted.** If you have an extenuating circumstance, please notify the instructor prior to due dates. (Note: Some writing assignments may require multiple submissions. The new date listed on the feedback will count as the next deadline for that assignment.)

Grading Return Rate on Assignments

Because the professor believes in Mastery Learning, students are encouraged to resubmit papers to demonstrate complete and full understanding of the content material. As a result, the grading and feedback in this course may be quite demanding on the professor. As a result, please allow 2-3 weeks to receive completed grades on major assignments.

USU Policy and Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities: <http://personnel.usu.edu/policies/403.htm>.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Plagiarism

Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged used of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling.

Grievance Process (Student Code)

Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: http://studentlife.tsc.usu.edu/stuserv/pdf/student_code.pdf (Article VII. Grievances, pages 25-30).

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266.

Students with Disabilities

The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille."

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Course Fees

Courses that utilize course fees are required to identify the amount of the course fee and explain the purpose of the course fee on the syllabus given to students. Course fee information not included on the syllabus will result in the course fee automatically being deleted.

WRITING EXPECTATIONS

This course assumes graduate level competency in expression through writing. The course requires students to demonstrate proficiency in writing content and mechanics. Peer review and proofing among students is encouraged. *All assignments are expected to be word-processed.*

COURSE ASSIGNMENTS and EXPECTATIONS

	Percent of Final Grade
Participation and Professionalism	10
Research Grid	10
Mid-term examination	15
T-Test/ANOVA Homework	10
Correlation Homework	10
Regression Homework	10
Dataset Review	10
Research Proposal	10
Final Examination	15
TOTAL	100

ASSIGNMENT DESCRIPTIONS

Participation and Professionalism

Attendance and in class participation are important. However, occasions arise where other activities take priority. If you plan to miss a class, please contact the instructor prior to class (unless it is an emergency). Frequent absences will be dealt with on a case-by-case basis. Assignments due on expected absences are still due on that due date. Excessive absences and lack of in class participation will result in an up to 10% reduction in professionalism. *Class participation and keeping up with course content is important. There may be times when in-class exercises will be assessed or (short) pop quizzes are given.*

Data Review

A major advantage of quantitative research is the ability to conduct secondary analysis of existing datasets. Oftentimes researchers develop a dataset to address specific research questions, but the resulting data can be used to conduct further and more contextual analysis. For example, if the American Cancer Society gathers data and publishes a report connecting smoking and lung cancer, a researcher conducting secondary analysis could get the same dataset and test whether the link was as strong for women as for men, or Low-SES versus High-SES, or Low-SES Men/Low-SES Women. The possibilities are endless.

For this assignment find a freely available dataset and address the bullet points below.

- Overview
 - Who collected this data
 - Why was the data collected
 - What previous secondary research has been conducted with the data
 - Ideally you would briefly review 2-3 studies if they are available
 - What is the unit of analysis (students', teachers, schools, adults, parents, principals, etc.)
- Research design
 - Identify four variables or composite variables that you would be interested in exploring further
 - Come up with a plausible research question based around these four questions
 - Ideally you would support this question with scholarship
 - Consider how you could extend this question based on contexts available within the dataset
 - Example: gender, race, community type, SES...

Possible sources for data:

Inter-university consortium for political and social research

- <https://www.icpsr.umich.edu/icpsrweb/>

OECD Data

- Programme for International Student Assessment (PISA)
 - Literacy, mathematics, and more

International Education Association

- International Civic and Citizenship Study (ICCS)
- International Computer and Information Literacy (ICILS)
- Progress in International Reading Literacy Study (PIRLS)
- Trends in International Mathematics and Science Study (TIMSS)
- Literacy and Numeracy Assessment (LaNA)

Homework Assignments

Throughout this semester you will be asked to complete three homework assignments using SPSS to analyze existing datasets. You may conduct the analysis with the datasets and scenarios provided or use a dataset you are working with to run and report the analysis conducted in the homework assignment.

Research Grid

In this class, you should begin to understand the methods and finding sections of research publications within your area of interest. You must find a minimum of ten journal articles in your field with a quantitative component (look for numbers). Create a grid (on excel) that states the

author, year, journal, major research questions, the major constructs (IV or DV), the different statistical methods, and brief summary of findings. Finally, write a roughly one-page response on how the statistical information provided an insight into the research questions (in other words, what did we learn within these studies that we didn't already know?).

Research Proposal

In order to use the information beyond the course, you will need to develop and write a research proposal merging many of the central concepts of the paper. The paper should include the following:

- Brief literature review/theoretical framework
 - What will this research accomplish? How will it inform the literature
- Testable research questions/Hypothesis (with brief description relating to literature review)
- Methods section
 - Describe the dataset (and why this is useful to answer your research questions)
 - Which variables are you using (identify DV and IV(s)), how are they coded, what is the prompt
 - What is the latent variable(s) you are exploring?
 - If this is not a secondary analysis follow the basic guidelines put forth by DeVellis up until you have to actually collect the data.
 - Which statistical methods are you going using (and why?)?
 - Provide a justification for the methods you are using and how you would interpret them
- Brief Discussion and Conclusion
 - This section should connect your results back to your literature review.

Examinations

This course will have two examinations. The first will take occur at the mid-point of the semester and the second will be a final comprehensive examination.

Final examination opt out: A student may produce a research report based on the data they reviewed earlier in the semester. This will require you to conduct actual data analysis. This can incorporate aspects of your data review, homework, and research proposal. If this is something you want to do talk to Ryan.

GRADING SCALE (Percent)*

Grading and Evaluation

The standard grade break down used by Utah State University will be followed to assign the student a letter grade. The final percentage will be determined by dividing the student's total points earned by the total number of possible points:

A 100% to 93%, C < 77% to 73%

A- < 93% to 90%, C- < 73% to 70%

B+ < 90% to 87%, D+ < 70% to 67%

B < 87% to 83%, D < 67% to 63%

B- < 83% to 80%, D- < 63% to 60%

C+ < 80% to 77%, F < 60% to 0%

Course schedule is subject to change due to availability of resource persons and students' learning needs.

Wk.	Date	Class Objective/Topic	Readings and Assignments
1	August 28	Course Induction <ul style="list-style-type: none"> Models of Quantitative Research Data use in the real world 	DeVellis Ch. 1 Cresswell (On blackboard) Gillborn (On blackboard)
2	September 4	Introduction to Statistical Terminology <ul style="list-style-type: none"> Generating hypotheses, collecting data, analyzing data, sampling, reporting data, the structure of quantitative article research. 	<ul style="list-style-type: none"> Field Ch. 1 DeVellis Ch. 2
3	September 11	Statistical Terminology Continued <ul style="list-style-type: none"> Hypothesis testing, Populations and samples, descriptive vs. inferential statistics, effect sizes, confidence intervals, validity and reliability. Understanding Statistical Tables and Figures 	<ul style="list-style-type: none"> Field Ch. 2 DeVellis Ch. 3-4
4	September 18	Reviewing Research <ul style="list-style-type: none"> Reviewing research questions Understanding measures Types of tables Understanding findings 	<ul style="list-style-type: none"> Bring your articles! <i>Research Grid Due</i> DeVellis Ch. 5
5	September 25	Introduction to the SPSS Environment: <ul style="list-style-type: none"> Variable Set-up, Labeling, Transformations, Inclusions/Exclusions Introduction to Creating Tables and Text for Manuscripts 	<ul style="list-style-type: none"> Field Ch. 3 (A little here) Field Ch. 4 (Mostly here) Field Ch. 5 (More of a reference)
6	October 2	Testing Assumptions with SPSS <ul style="list-style-type: none"> Standardized Scores Measures of Central Tendencies and Variability: the 3 M's, Standard Deviation, Distribution, Graphs/Plots 	<ul style="list-style-type: none"> Field Ch. 5 (Most important chapter of the course) <i>Data Review Due</i>
7	October 9	Correlations	<ul style="list-style-type: none"> Field Ch. 8
8	October 16	<u>Midterm evaluation</u>	
9	October 23	Linear Regression <ul style="list-style-type: none"> Review of Hypothesis Testing and Errors 	<ul style="list-style-type: none"> Field Ch.9 <i>Correlation Homework Due</i>
10	October 30	T-tests <ul style="list-style-type: none"> Non-parametric comparisons: Mann-Whitney, Wilcoxon signed-rank 	<ul style="list-style-type: none"> Field pp. 213-235 Field Ch. 10
11	November 6	Analyses of Variance: ANOVA, ANCOVA, MANOVA, etc <ul style="list-style-type: none"> Post-hoc Analyses Kruskal-Wallis test, Friedman's ANOVA 	<ul style="list-style-type: none"> Field Ch. 12, 13 <i>Regression Homework Due</i>
12	November 13	<ul style="list-style-type: none"> Longitudinal data analysis/Repeated Measures 	<ul style="list-style-type: none"> Field 15 <i>T-test/ANOVA Homework Due</i>
13	November 20	Thanksgiving	

14	November 27	No Class – Work on your research proposal	• Field Ch. 8 (Review) and 10
15	December 4	Categorical Data Analysis - Chi-square, assumptions, loglinear, logistic regression Research proposal roundtables	• <i>Research proposal due</i>
F	December 12	Final Examination	

** check Canvas weekly for additional readings