George Mason University
College of Education and Human Development
Educational Psychology

EDRS 620.DL2 – Quantitative Methods in Educational Research
3 Credits, Spring 2021
Mondays, 9:00-11:40am; Synchronous Online via Zoom and Blackboard

Faculty

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Prerequisites/Corequisites
EDRS 590 or equivalent experience.

University Catalog Course Description
Examines fundamental concepts and methods of statistics as applied to education problems, including descriptive and inferential statistics. Offered by the Graduate School of Education. May not be repeated for credit.

Course Overview
This course examines fundamental concepts and methods of statistics as applied to educational problems including descriptive and inferential statistics. The course explores hypothesis testing, correlational techniques, t-tests, analysis of variance, post-hoc comparison, factorial designs, regression, and non-parametric statistics.

Course Delivery Method
This course will be delivered online (76% or more) using a synchronous format via Blackboard Learning Management system (LMS) housed in the MyMason portal. You will log in to the Blackboard (Bb) course site using your Mason email name (everything before @masonlive.gmu.edu) and email password. The course site will be available by January 22nd.

Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers

  To get a list of supported operation systems on different devices see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students will need a microphone and webcam for use with the Zoom web conferencing tool.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
  - Adobe Acrobat Reader: https://get.adobe.com/reader/
  - Windows Media Player: https://support.microsoft.com/en-us/help/14209/get-windows-media-player
  - Apple Quick Time Player: www.apple.com/quicktime/download/

Expectations

- Course Week: Our course week will begin on the day that our synchronous meetings take place as indicated on the Schedule of Classes.
- Log-in Frequency: Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 2 times per week. In addition, students must log-in for all scheduled online synchronous meetings.
- Participation: Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions.
- Technical Competence: Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.
- Technical Issues: Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.

- Workload: Please be aware that this course is **not** self-paced. Students are expected to meet *specific deadlines* and *due dates* listed in the **Class Schedule** section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.
- Instructor Support: Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. These meetings will occur via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.
- Netiquette: The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. *Be positive in your approach with others and diplomatic in selecting your words*. Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.
- Accommodations: Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services.

COVID 19 Procedures: Spring 2021

Students, please be aware of and follow all policies and procedures for Mason's Safe Return to Campus: https://www2.gmu.edu/Safe-Return-Campus

Learner Outcomes or Objectives

This course is designed to enable students to do the following:
(1) Understand basic concepts, terminology, and assumptions pertinent to statistical analyses;
(2) Identify the type of statistic appropriate for a given research question;
(3) Use basic inferential statistics to test hypotheses;
(3) Interpret statistical findings;
(4) Compute, by hand and computer, basic statistical analyses;
(5) Design the basic components of a small-scale quantitative research study;
(6) Write clearly and coherently about the conceptual framework, research questions and methods used in a study;
(7) Report statistical results in correct APA format.

Required Materials

(1) Privitera, G. J. (2019). *Essential statistics for the behavioral sciences (2nd ed.).* Thousand Oaks, CA: Sage.
(2) Access to SPSS software. There are computer labs on campus that provide access to SPSS. You can access SPSS software through GMU's virtual computer library at https://its.gmu.edu/service/citrix-virtual-lab/ It is the student's responsibility to ensure access to SPSS for class time and outside of class time to complete required assignments.
(3) A simple nonprogrammable calculator that has a square root function.

Recommend Resource:
American Psychological Association. (2020). *Concise guide to APA style (7th ed.)*. Washington, DC. **The standard version of the publication manual is also acceptable.*

Class Preparation: Students are expected to come to class time having read the applicable textbook chapter and watched the asynchronous content found on the Blackboard site. Class time will be used to complete activities practicing the material. Information on course assignments, weekly quizzes, and class lectures are available on the course Blackboard site.

Statistics Study Tips:
1. Read widely; then read some more.
2. 'Google' difficult concepts. There is lots of helpful statistical information on the web.
3. Check for understanding frequently. This means that when a formula is presented, take time to see if you can explain how the formula works. If Greek letters are difficult for you, write out what each letter means.
4. Complete as many questions/problems as possible at the end of the chapters.
5. Develop examples of research questions and hypotheses that are appropriate for each statistical technique.
6. Form a study group.
7. Start the homework as soon as possible after class; waiting until the night before it is due does not help you process the material.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

- **Assignments and/or Examinations**

  Online Quizzes (10%): Each week there will be a short quiz posted on Blackboard. The quizzes are composed of short answer and multiple choice items which will cover the basic concepts presented in class and in the textbook. Quizzes are timed (usually 25 minutes) and must be completed during the specified time period. These quizzes are designed to provide you (and me) with feedback about your course progress. Your quiz score cannot lower your overall course grade (unless you have received 0's on quizzes due to failure to complete them). You must complete the online quiz by midnight the day before class meets. *You are encouraged to take the quizzes soon after the class meeting; the purpose of the quiz is to help you to isolate key concepts from the class period and to focus your study time.*

  Homework Assignments (20%): Assignments will be posted weekly on Blackboard. Each week's assignment will include problems that are recommended as well as problems that will be graded. The graded problems will be collected periodically (see course schedule). All assignments need to be completed by the beginning of the class on the due date. No late

assignments will be accepted. Some questions will ask you to explain statistical concepts, some will ask you to work out problems, and others will require you to run analyses using SPSS and interpret results. You should show all of your work for any problem that you complete and include appropriate computer printouts **(please cut and paste from SPSS to Word)**. You may work together on your assignments; however, students should submit their own independent write-up of results.

Exams (50%): The two exams will cover the material from the class and textbook and include multiple choice and short answer questions as well as interpretation of SPSS output. The midterm exam is worth 25% and the final exam is worth 25%. *The final exam is a Performance-Based Assessment for the Educational Psychology program; more detailed description of Performance-Based Assessment is included at the end of the syllabus*.

Article Summaries (10% each—20% total): Students will complete two article summaries with a particular emphasis on the research questions, methods, analysis, and results. For the first article summary, students will respond to a series of questions using an article that has been selected by the instructor. For the second article summary, each student may select from options provided by the instructor or identify an empirical journal in the student's area of interest that includes the required statistical tests. Students will read the entire article, identify key components of the methods/analysis and write a short commentary/critique (3 pages maximum) of the Methods & Analysis section. Helpful hint: *Pay attention to the methods and analyses sections of articles from other courses or research projects. These are great candidates for this course requirement.*

- **Other Requirements**

  Class Attendance & Participation: It is expected that all students will read assigned materials before coming to class, view any asynchronous content including watching all video lectures, come to class on time, participate in class discussions/activities, and complete in-class assignments. Each class session will include: questions and answers on lecture content, going over key components of lecture material, and lab work to practice the material. The lab portion of the class will include time for hands-on computer work that is directly related to the homework and course goals. ***Questions are encouraged.***

- **Grading**

  Grades will be assigned based on the following:

A+ 98-100%	A 93-100%	A- 90-92%
B+ 88-89%	B 83-87%	B- 80-82%
C 70-79%	F below 70%	

Professional Dispositions

See https://cehd.gmu.edu/students/polices-procedures/

Class Schedule

Week	Date	Topic	Reading/ Assignment Due
1	1/25	Course Info Intro to Statistics & Frequency Distributions Intro to SPSS Central Tendency	Ch. 1 -3 Appendix A: Basic Math Review
2	2/1	Variability Probability & Standard Distributions Z-scores: location	Ch. 4 & 5
3	2/8	Distributions of Sample Means Standard Error	Ch. 6 **HW #1 (week 1 & 2)**
4	2/15	Hypothesis Testing & Power	Ch. 7
5	2/22	The t distribution	Ch. 8 **HW #2 (week 3 & 4)**
6	3/1	Independent and Dependent t-Tests	Ch. 9 & 10
7	3/8	Catch-up/Review	**HW #3 (week 5 & 6)**
8	3/15	**Midterm Exam**	
9	3/22	ANOVA: One-way	Ch. 11 **Article Summary #1**
10	3/29	ANOVA: Post hocs and within subjects	Ch. 11 continued
11	4/5	Correlation and Regression	Ch. 13 **HW #4 (week 9 & 10)**
12	4/12	Chi-Square	Ch. 14
13	4/19	ANOVA: Two way	Ch. 12 **HW #5 (week 11 & 12)**
14	4/26	Review	**Article Summary #2**
15	5/3	**FINAL EXAM**	

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Core Values Commitment
The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: http://cehd.gmu.edu/values/.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see https://catalog.gmu.edu/policies/honor-code-system/).
- Students must follow the university policy for Responsible Use of Computing (see https://universitypolicy.gmu.edu/policies/responsible-use-of-computing/).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see https://ds.gmu.edu/).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or https://cehd.gmu.edu/aero/tk20. Questions or concerns regarding use of Blackboard should be directed to https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/.
- For information on student support resources on campus, see https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking:

As a faculty member, I am designated as a "Responsible Employee," and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

For additional information on the College of Education and Human Development, please visit our website https://cehd.gmu.edu/students/ .