

George Mason University
College of Education and Human Development
Educational Psychology Program

EDRS 620 001/P01 – Quantitative Inquiry in Education
3 Credits, Spring 2023
Mondays, 4:30-7:10pm, Thompson Hall L018, Fairfax Campus

Faculty

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Prerequisites/Corequisites

(EDRS 590^B).

^B Requires minimum grade of B 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 in-person using a combination of lecture and lab formats.

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;
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.

Professional Standards

Across the many courses in the Educational Psychology, a number of standards are addressed. These standards are noted below. Those emphasized most strongly in this course are in bold text.

Standard 1. Candidates will use their knowledge and skills to apply concepts, principles, and theories of learning, cognition, motivation, and development to analyze and design innovative educational activities in diverse applied settings.

Standard 2. Candidates will apply their knowledge of quantitative and qualitative research methods, including basic concepts, principles, techniques, and ethical issues, to read and critique relevant products of research.

Standard 3. Candidates will apply their knowledge and skills of quantitative and qualitative research methods, including basic concepts, principles, techniques, and ethical issues, to conduct research and/or inform practice in diverse applied settings.

Standard 4. Candidates will demonstrate oral and written communication relevant to educational psychology, including knowledge and use of APA style and professional formats (e.g., oral presentations, poster presentations, article abstracts, literature reviews, research proposals, reports).

Standard 5. Candidates will demonstrate professional dispositions relevant to educational psychology such as critical thinking, collaboration, interpersonal communication, intercultural competence, ethical leadership, professionalism, and technological skills

Required Texts/Materials

- (1) Navarro, D. J. & Foxcroft, D. R. (2022). *Learning statistics with jamovi: A tutorial for psychology students and other beginners*. (Version 0.75).
This open-source textbook is available at: <https://www.learnstatswithjamovi.com/>
- (2) Access to the open-source statistical software jamovi: <http://www.jamovi.org/>
- (3) A simple nonprogrammable calculator that has a square root function.

Recommended

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

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, VIA, 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 60 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 11:59pm every Sunday.

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. 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 jamovi and interpret results. You must show all of your work for any problem that you complete and include appropriate computer printouts (please cut and paste from jamovi to Word). You may work together on your assignments; however, students 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 jamovi outputs. The midterm exam is worth 25% and the final exam is worth 25%.

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.

- Other Requirements

Class Attendance & Participation: It is expected that all students will read assigned materials before coming to class, come to class on time, participate in class discussions/activities, and complete in-class assignments. Each class session will include: questions and answers on previous content, going over key components of new 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.

- 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

	Date	Topic	Activities	Activities Due
1	Jan 23	Statistics & Frequency Distribution Introduction to the course, jamovi, central tendency	Readings: Chapter 1 – 3, Appendix A: Basic Math Review	Jan 29, 11:59pm
2	Jan 30	Variability z-scores: location	Chapter 4 and 5 (start)	Feb 5, 11:59pm
3	Feb 6	Probability & Standard Deviation	Chapter 5 (continued) and 6, Homework #1	Feb 12, 11:59pm

		Distribution of Sample Means Standard Error		
4	Feb 13	Hypothesis Testing	Chapter 7	Feb 19
5	Feb 20	The t Distribution Single-Sample t-Test	Chapter 8	Feb 26, 11:59pm
6	Feb 27	Independent and Dependent t- Tests	Chapter 9 and 10	Mar 13, 11:59pm
7	Mar 6	Catch up and Review	Homework #2	Mar 26, 11:59pm
	Mar 13	<i>No Class: Spring Recess</i>		
7	Mar 20	Mid-Term Exam (open Mar 20- 24)		
8	Mar 27	ANOVA: One-way	Chapter 11	Apr 2, 11:59pm
9	Apr 3	ANOVA: post hocs and within subjects	Chapter 11 (continued) Article Summary #1	Apr 9, 11:59pm
10	Apr 10	Correlation and Regression	Chapter 13, Homework #3	Apr 16, 11:59pm
11	Apr 17	Chi-Square	Chapter 14	Apr 23
13	Apr 24	ANOVA: Two way Review	Chapter 12, Homework #4	April 30, 11:59pm
14	May 1	Review		
15	May 15	Final Exam (open May 15-18)		

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/>.

Classroom Climate

You are encouraged to discuss and share ideas with your classmates. To facilitate a respectful and inclusive classroom climate, be open to explore and challenge each other's ideas without criticizing individuals. Diversity is a source of creativity and innovation and I ask that students appreciate diverse perspectives, that they listen respectfully and let everyone speak. If you have concerns about the dynamics or classroom climate, please do not hesitate to bring them to my attention.

Gender identity and pronoun use: If you wish, please share your name and gender pronouns with me and how best to address you in class and via email. I use she/her/hers for myself and you may address me as "Dr. Patzak" or "Mrs. Patzak" in email and verbally.

Individual accommodations: Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all learners by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class,

please first visit <http://ds.gmu.edu> for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474.

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 VIA should be directed to viahelp@gmu.edu or <https://cehd.gmu.edu/aero/assessments> . 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, sexual harassment, interpersonal violence, and stalking:

As a faculty member, I am designated as a “Non-Confidential Employee,” and must report all disclosures of sexual assault, sexual harassment, 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 or support measures 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/>.