



**School of Education
Ed.D. in School Improvement**

**EDRM 6352.060
Quantitative Research Methods in the Education Setting
Fall 2026**

Instructor: Christopher L. Thomas, Ph.D.

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Office Hours: Thursday 4:00 – 7:00 pm (& by appointment)

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Course Description (as listed in the catalog):

This course focuses on the field of quantitative research and statistics. It focuses on the stages of quantitative research including the development of educational research questions, research designs, conceptual frameworks, methodological stances, data collection and analysis, statistics, instrument design, and implementation in education settings. The course will focus on the interpretation and use of quantitative data with emphasis on the implications for school improvement, educational policy, and research design.

Last day to Withdraw from the course: October 30th, 2026

Student Learning Outcomes

After completion of this course, students will be able to:

1. Read and critically evaluate educational research.
2. Identify and describe different types of quantitative research methodology.
3. Discuss the influence of research data on pedagogy and accountability practices.
4. Formulate clearly stated, important research questions
5. Design and conduct research studies with the potential to improve teaching and learning experiences, counseling and support services, school leadership, and educational organizations and structures.

Program Goals

- a. Produce the next generation of educational leaders who understand the philosophical and historical perspectives of school reform, diversity, and learning opportunities for all, and can address educational issues using a variety of strategies.
- b. Develop critical reasoning and a deep understanding of change theory to address challenges in school improvement contexts. This will include the skills to provide

transformative leadership to schools that are failing to meet academic, social, and emotional standards.

- c. Provide opportunities to develop doctoral students' ability to approach challenges in innovative data-driven ways, including the use of interdisciplinary teams, as well as expand their problem solving, creative design, communication, and collaboration skills.
- d. Challenge the norms within educational systems using data and the engagement of other educators and stakeholders in professional learning to lead disruptive change through interdisciplinary work with experts in other educational fields.
- e. Conduct research of practice and responsiveness to improve teaching and learning experiences, counseling and support services, school leadership, educational organizations and structures, and all other educational disciplines.
- f. Prepare the next generation of educators with the knowledge, skills and tools to utilize data to guide school improvement and policy and to improve learning outcomes leading to college and career readiness.
- g. Prepare educators with a deep understanding of assessment and accountability systems.
- h. Produce scholar practitioners that have a P-20 perspective of the education system to address school improvement in the broader perspective including educator preparation, teaching and learning.

Required Resources

Textbooks

Strunk, K. K., & Mwavita, M. (2022). *Design and analysis in educational research using jamovi: ANOVA design*. Routledge.

Free through UT Tyler Library.

Software:

JAMOVİ (v. 2.3.XX Solid) - Available for free at <https://www.jamovi.org/download.html>

Additional Readings (to be distributed by instructor):

Coughlan, M., Cronin, P., & Ryan, F. (2007). Step-by-step guide to critiquing research. Part 1: quantitative research. *British journal of nursing*, 16(11), 658-663.

Galloway, A. (2005). Non-probability sampling. In K. Kempf-Leonard (Ed) *Encyclopedia of Social Measurement* (pp 859 – 864). Elsevier

Harlacher, J. (2016). An Educator's Guide to Questionnaire Development. REL 2016-108. *Regional Educational Laboratory Central*.

Kraft, M. A. (2020). Interpreting effect sizes of education interventions. *Educational Researcher*, 49(4), 241-253

Labaree, D. F. (2003). The peculiar problems of preparing educational researchers. *Educational researcher*, 32(4), 13-22.

Taylor-Powell, E., & Marshall, M. G. (1998). *Questionnaire Design: Asking questions with a purpose*. Cooperative extension service, university of wisconsin-extension

Thompson, B (1994). The concept of statistical significance testing. *Practical Assessment, Research & Evaluation*, 4(5). Available online:
<http://PAREonline.net/getvn.asp?v=4&n=5>.

Vance, D. E., Talley, M., Azuero, A., Pearce, P. F., & Christian, B. J. (2013). Conducting an article critique for a quantitative research study: perspectives for doctoral students and other novice readers. *Nursing: Research and Reviews*, 3, 67-75.

Supplemental Readings:

Blom-Hoffman, J., Leff, S. S., Franko, D. L., Weinstein, E., Beakley, K., & Power, T. J. (2009). Consent procedures and participation rates in school-based intervention and prevention research: using a multi-component, partnership-based approach to recruit participants. *School mental health*, 1(1), 3-15.

Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Rand McNally & Company.

Gibbons, B., & Herman, J. (1996). True and Quasi Experimental Designs. *Practical Assessment, Research & Evaluation*, 4
Available at: <https://scholarworks.umass.edu/pare/vol5/iss1/14>

Götz, F., Gosling, S., & Rentfrow, J. (2021). Small effects: The indispensable foundation for a cumulative psychological science.

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: a practical primer for t-tests and ANOVAs. *Frontiers in psychology*, 4, 863.

NSF Program Evaluation Handbook

Pope, P., Boleman, C., & Cummings, S. (2005). Questionnaire design: Asking questions with a purpose. Texas A&M University System.

de Winter, J.C.F. (2013). Using the Student's t-test with extremely small sample sizes. *Practical Assessment, Research, and Evaluation*, 18,
Available at: <https://scholarworks.umass.edu/pare/vol18/iss1/10>

Course Policies and Expectations:

Use of Artificial Intelligence: Generative artificial intelligence tools, such as ChatGPT, Gemini,

and Copilot, may be used in this course only in ways permitted by the assignment instructions and the full Artificial Intelligence Policy included in the appendix to this syllabus. In general, AI may be used to support learning, such as explaining concepts, generating practice problems, identifying search terms, or improving the clarity of writing you have already drafted. AI may not perform the analytic reasoning being assessed, including selecting analyses, evaluating assumptions, interpreting statistical output, or drafting interpretations and conclusions.

Every assignment must include an AI Disclosure identifying the tool used, explaining how it was used, describing how its accuracy was verified, and providing the relevant prompts and responses. Students who did not use AI must state “No AI used.” Disclosure does not make an otherwise prohibited use acceptable. Undisclosed or prohibited AI use may constitute unauthorized assistance, plagiarism, fabrication, or another violation of academic integrity. See the full Artificial Intelligence Policy in the appendix for complete requirements and examples.

Course Environment: This is an online course that is delivered through the Canvas Learning Management System. As such, it is imperative that you check Canvas for necessary information and course materials. If you experience technical problems or have a technical question about this course, you can obtain assistance by emailing itsupport@patriots.uttler.edu. When you email IT Support, be sure to include a complete description of your question or problem including: (1) the title and number of the course, (2) the page in question, (3) If you get an error message, a description and message number, and (4) what you were doing at the time you got the error message.

Written Assignments: All written assignments should be typed (double-spaced, Times New Roman, 12-point font) and submitted by midnight Central Standard Time on the due date. All written assignments should be submitted through the assignment link that I will provide. Assignments completed for other courses may **NOT** be turned in for this course and will be considered academic dishonesty.

Email: Questions and concerns about course content and assignments should be submitted to my email. I will make every effort to respond quickly to your emails. Generally speaking, I check email twice a day during the workweek and less frequently on the weekend. If my schedule makes me unavailable to answer emails for an extended period, I will try to post an announcement so that you can plan accordingly. My priority is communicating with you and providing you with the tools needed to be successful in the course, so if there are any problems, we will work to solve them.

Late Work Policy: Late work refers to any course assignment that is submitted after the stated deadline. **Late work will be accepted in this class. However, there will be a 10% penalty for each late day.** Practically, this means that you will not receive credit for an assignment if you submit it after 10 or more days.

Student Activities, Assignments & Projects:

The course is designed to be delivered in a "module format." This means that there will be a few different modules that you will work through that include their own readings and assignments.

The modules will be presented in a standardized format. The following are standard activities that will be included in the modules:

Readings: This course requires a considerable degree of independent reading to ensure that you develop content mastery. There will be two main reading requirements throughout the semester. Specifically, you will be required to read selections from the course textbooks and research articles that I will assign. All research articles will be available on the Canvas site. I will also be posting supplemental readings for some of the topics that we will cover this semester. These readings are optional and are provided for those who would like to explore the course topics in more detail.

Lecture Videos: Each week, I will post lecture videos to the Canvas site to support the development of content mastery. The topic of each lecture video(s) will be related to key concepts found within the readings for that week. The lecture video(s) for each topic will be available on the Canvas site each Monday morning beginning at 9:00 am Central Standard Time. Please expect that the lectures in this course will be similar in length to those seen in a traditional face-to-face course.

Data Analysis Assignments: Students will be expected to conduct and interpret the results of basic statistical procedures conducted using the JAMOV software.

Final Project: You will work to design and test a hypothesis using a hypothetical dataset that I provide. Additional information about the final project will be provided later in the semester.

Article critique: It is critical that all educational researchers can critically evaluate the quality of published research. As such, students will be expected to complete one written critique of a published educational research article. The focus of this critique will be on the questions that the researcher(s) hoped to answer using statistical methods discussed in the course, the approach selected and the suitability (or lack thereof) of their application of this method to the question(s) at hand, and the appropriateness of the authors' interpretation of the statistical results. More information about the article critique assignment will be posted later in the semester.

Self-Reflections. Research shows that metacognition (the ability to reflect on study success and make changes) is critical for success in doctoral programs. As such, I will be asking you to complete several low-stakes reflections designed to increase your metacognitive ability. I will provide information about these assignments later in the semester.

Exit Tickets: During select weeks of the semester you will complete a brief exit ticket in Canvas. These are short, low-stakes responses in which you identify what remains unclear, apply that week's concept to your own research interests, or interpret a small piece of output. Additional information about exit tickets will be provided during the second week of the semester.

Research Pool Requirement: Students in select course must fulfill a research pool requirement. The research pool requirement must be completed before the final week of the academic

semester. The research requirement for these courses can be satisfied in one of two ways. First, students can fulfill the research pool requirement by volunteering to participate in approved research studies offered by the School of Education. Alternatively, students can satisfy the research pool requirement by completing alternative assignments that are equal in time and effort to the research opportunities. Detailed information about the research requirement can be found on the CANVAS page for the course.

Due Date: Unless stated otherwise, all assignments are due before Midnight on Sunday the week they appear on the course schedule. Stated another way, each week's assignments are due before Midnight on Sunday.

Grade Item	% Of final grade	Total Points
Week 1 Introductory Assignment	1 %	5 points
Data Analysis Assignments	57%	5 Assignments x 40 points per assignment = 200 points
Article Critique	14%	50 points
Final Project	21%	75 points
Exit Tickets	2%	10 points (1 per ticket)
Research Requirement	2%	10 points
Course Total		350 points

Please note: The number, content focus, and point value of all assessments and assignments are an approximation and may change. Letter Grades: Letter grades will be assigned using the following guidelines:

A: 90.00% of points or above, B: 80.00% -89.999% of points, C: 70.00% - 79.999% of points, D: 60.00% -69.999% of points, F: 59.999% of points or below

Proposed Semester Schedule

Date	Topic(s)	Required Reading(s)	Supplemental Readings (Optional)	Discussion Board Post	Assignments
Week 1					
August 24 th – August 30 th	Introduction to Quantitative Educational Research	Strunk & Mwavita – Ch. 1			Introduction Assignment
Week 2					
August 31 st – Sept 6 th	Research Design, Sampling, levels of measurement	Strunk & Mwavita – Ch. 2 Galloway (2005)	Campbell & Stanley (1963) Gibbons & Herman (1996)		Exit Ticket: Week 2
Week 3					
Sept 7 th - Sept 13 th	Measures of Central Tendency and Variability (Conceptual Introduction)	Strunk & Mwavita – Ch. 3			

Proposed Semester Schedule

Date	Topic(s)	Required Reading(s)	Supplemental Readings (Optional)	Discussion Board Post	Assignments
Week 4					
Sept 14 th - Sept 20 th	Measures of Central Tendency and Variability (JAMOV)				Exit Ticket Week 4
Week 5					
Sept 21 st - Sept 27 th	Introduction to NHST	Strunk & Mwavita – Ch. 4 Thompson, 2004			Data Analysis Assignment #1: Descriptive Statistics Exit Ticket Week 5
Week 6					
Sept 28 th – Oct. 4 th	Single Sample Tests (z – test & one-sample t-test)	Strunk & Mwavita – Ch. 5	Kraft, 2020 Lakens, 2013		Exit Ticket Week 6

Proposed Semester Schedule

Date	Topic(s)	Required Reading(s)	Supplemental Readings (Optional)	Discussion Board Post	Assignments
Week 7					
Oct. 5 th – Oct 11 th	Comparing means from 2 independent groups	Strunk & Mwavita – Ch. 6 Strunk & Mwavita – Ch. 7	Winter, 2013		Exit Ticket Week 7
Week 8					
Oct 12 th – Oct 18 th	Comparing 3 or more independent means (one-way ANOVA)	Strunk & Mwavita – Ch. 8 Strunk & Mwavita – Ch. 9			Data Analysis Assignment #2: Single Sample Tests and Independent Group Comparisons Exit Ticket Week 8
Week 9					
Oct 19 th – Oct 25 th	Factorial ANOVA (Part #1)	Strunk & Mwavita – Ch. 10 Strunk & Mwavita – Ch. 11			

Proposed Semester Schedule

Date	Topic(s)	Required Reading(s)	Supplemental Readings (Optional)	Discussion Board Post	Assignments
Week 10					
Oct 26 th – Nov 1 st	Factorial ANOVA (Part #2)				Exit Ticket Week 10
Week 11					
Nov 2 nd - Nov 8 th	Paired samples analysis with 2 measurement points.	Strunk & Mwavita – Ch. 12 Strunk & Mwavita – Ch. 13			Data Analysis Assignment #3: One Way and Factorial ANOVA
Week 12					
Nov 9 th - Nov 15 th	Paired samples analysis with 3 or more measurement points	Strunk & Mwavita – Ch. 14 Strunk & Mwavita – Ch. 15			Data Analysis Assignment #4: Paired Samples T-test and Repeated Measures ANOVA Exit Ticket Week 12

Proposed Semester Schedule

Date	Topic(s)	Required Reading(s)	Supplemental Readings (Optional)	Discussion Board Post	Assignments
Week 13					
Nov 16 th - Nov 22 nd	ANOVA with between and within subjects' variables	Strunk & Mwavita – Ch. 16 Strunk & Mwavita – Ch. 17			Article Critique Exit Ticket Week 13
Week 14: Thanksgiving!					
Nov 23 rd - Nov 29 th					
Week 15					
Nov 30 th – Dec 6 th	Survey design, Reliability, and Validity	Harlacher, J. (2016) Taylor-Powell (1998)	Patrick & Berry, 1991 Pope et al., 2005		Data Analysis Assignment #5: Split Plot ANOVA and survey design Research Requirement Exit Ticket Week 15
Finals Week					
Dec 7 th – Dec 12 th					Final Project All Due Thursday December 10 th

Artificial Intelligence Policy

You may use generative artificial intelligence tools, such as ChatGPT, Gemini, or Copilot, for certain learning and productivity purposes in this course. Appropriate uses may include brainstorming, receiving explanations of difficult concepts, generating practice problems, or using AI as a supplemental tutor. However, you remain the author of record and are responsible for the accuracy, quality, originality, and integrity of all work you submit. All use of AI must comply with the University's Student Code of Conduct and the requirements described below.

Appropriate Uses of AI

This course is designed to develop your own analytic reasoning and decision-making. AI may be used when it helps you engage more deeply with material you are already working to understand. Examples of appropriate uses include:

- Asking for an explanation of a difficult statistical concept
- Clarifying the differences among competing analytic approaches
- Generating practice problems to test your understanding
- Asking what a particular option or setting in Jamovi does
- Improving the grammar or clarity of writing you have already drafted
- Generating keywords or search terms for literature research
- Summarizing a methodological reading after you have personally read the original source

Any information generated by AI must be checked against course readings, software documentation, or an appropriate primary source before it is used in an assignment.

Prohibited Uses of AI

The analysis assignments, written interpretations, and exit tickets in this course require you to select, conduct, evaluate, and defend your own analyses. AI must not perform this work for you because these decisions and interpretations are the skills being assessed.

You may not use AI to:

- Select the statistical analysis required for an assignment
- Determine whether statistical assumptions have been met
- Interpret statistical output
- Draft interpretations of results, conclusions, or analytic justifications
- Generate any of the work described above as a starting draft that you later revise
- Complete an exit ticket or other individual assessment on your behalf
- Upload statistical output and ask AI to explain or interpret it

Interpretations of output are part of the assignments. The decisions about which analysis to conduct, how to evaluate assumptions, and what conclusions can be drawn are also part of the assignments. You must be able to explain every analytic choice you made and every sentence of interpretation you submit.

AI Disclosure

Every assignment must include an AI Disclosure section containing the following information:

- The AI tool used and the model used, if that information is displayed, or the statement “No AI used.”
- A brief explanation of how the tool was used.
- An explanation of how you verified the accuracy of any information retained.
- The prompts and AI responses that directly influenced the work submitted for the assignment.

Examples of acceptable disclosures include:

- “I used ChatGPT to explain heteroscedasticity. I verified the explanation using the course textbook and lecture materials.”
- “I used Copilot to check the grammar and clarity of text I had already written. I reviewed each suggested change before accepting it.”
- “No AI used.”

Disclosure does not make an otherwise prohibited use permissible. For example, disclosing that AI interpreted your statistical output does not make that use acceptable.

AI Detection and Academic Integrity

Turnitin and other available information may be used when reviewing submitted work. AI-detection scores are not always accurate and will not be treated as proof, by themselves, that a violation occurred.

When concerns arise, the review process may include:

- A meeting with the student
- A review of drafts or document history
- A review of the student’s AI disclosure and relevant AI exchanges
- A comparison with the student’s previous work
- An oral explanation of the analysis, reasoning, or writing
- A request for the student to reproduce or explain portions of the work

Undisclosed or prohibited AI use may constitute unauthorized assistance, plagiarism, fabrication, or another violation of academic integrity, depending on how the tool was used. Suspected violations will be addressed in accordance with university policy.