TE 934: Introduction to Quantitative Methods in Educational Research[1]

Fall 2021

COURSE INFORMATION:

Instructor:	Dr. Shireen Al-Adeimi	Email:	aladeimi@msu.edu
Class times:	Tuesdays, 4:10pm-7:00pm	Location:	Erickson Hall 111
Office Hours:	By appointment		

COURSE STRUCTURE:

This course is designated as an in-person class with asynchronous activities. Every Monday by noon, I will post recorded lectures and slides to our D2L page. Please watch these lectures, complete class readings/materials (see detailed Course Schedule below), and come prepared to discuss weekly lectures and readings/materials prior to our Tuesday classes.

Meeting times:
- We will meet from 4:10-7:00pm on our first class (9/7) and during lab days. Beginning in week 2, class will be held from 4:10pm-6pm ET on non-lab days. We will use this time for discussions, student-led presentations, questions, and other class activities.
- We will have 4 lab sessions throughout the semester, where we will meet for the full 3 hours (the second half of class will be dedicated to lab work.) Lab days are scheduled on the following days: 9/21, 10/5, 10/19, and 11/9. We will also have a 3-hour workshop for the final project on 11/30.

COURSE GOALS:

Students who successfully complete this course will be able to:
- Locate and obtain research reports, using databases and other tools and strategies;
- Understand the defining features of different kinds of empirical research (of a quantitative nature) and what can be learned from different kinds of studies;
- Read closely and extract useful information from a quantitative research reports and publications;
- Understand, critique, and synthesize material from the education knowledge base, producing summaries or reviews for use by oneself or by others, including educational practitioners, policy makers, and the public;
- Formulate research questions, articulate relevant conceptual frameworks, and design appropriate methodological strategies for investigating the questions;
- Use the statistical software R to conduct analyses including descriptive statistics, bivariate relationships (correlations, t-tests), tables, and multiple regression;
- Understand potential biases in quantitative research;
- Design a tool for collecting quantitative data; and
- Interpret statistical output and write up research results in a form that academic journals typically expect them to be presented

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[1]Course materials and content adapted from Dr. Anne-Lise Halvorsen's Spring 2021 Syllabus

COURSE READINGS:

An electronic version of our course text (Nardi, 2018) is available through the MSU library:
- Nardi, P.M. (2018). *Doing survey research: A guide to quantitative methods*. Fourth Edition. Routledge.

Additionally, please use the MSU library to access electronic journal articles assigned as weekly readings.

COURSE OVERVIEW

This course is a hands-on introductory course in quantitative research methods, data analysis, and conceptualization that focuses on non-experimental methods. As such, the course emphasizes the application of statistical concepts to practical questions in social science, policy, and evaluation, while also including instruction in appropriate statistical theory. It also introduces you to quasi-experimental and experimental design. The course has two parts: a consumer-based component and a producer-based component. You will learn to become a smart reader of quantitative studies and you will also develop skills for doing your own quantitative data analysis.

With regard to part 1, reading quantitative studies, we will discuss and analyze the types of quantitative studies educational researchers conduct. We will learn how they collect data or gain access to publicly available datasets, how they analyze the data, and how they draw conclusions based upon their analyses. We will learn to evaluate these studies along a variety of criteria–the degree to which they are humanizing, soundness of design, reliability, validity, ethics, and generalizability.

Regarding conducting your own data analysis, our study will start with descriptive statistics (e.g., means, standard deviations, distributions), and will then move to hypothesis testing using t-tests, contingency tables, and regression methods with a few variables. The course interweaves several concepts: framing research questions, statistical theory, computing using quantitative methods, converting data into usable tables, learning to use a large-scale longitudinal database, designing empirical tests to examine policy issues by using appropriate statistical techniques, interpreting of results, and writing up research results.

Because the course emphasizes secondary analysis of existing data, rather than the collection of new data, we treat issues of research design in the context of large-scale educational studies. Students who complete this course will become competent in the use of R statistical software, capable of relatively sophisticated secondary analysis with large datasets, able to formulate and investigate their own educational problems, interpret findings in terms of their importance for policy, and able to write competently about research. Our focus is on the field settings and quasi-experimental designs commonly found in educational research.

This course is intended to help you develop your own knowledge, skills, and dispositions for the practice of quantitative research throughout your professional career, as you access and use the existing education knowledge base and as you add to that knowledge base by engaging in research. You will learn to locate, read, and evaluate quantitative research; you will learn to write summaries and reviews about research for a variety of audiences; and you will learn the basic elements of planning and conducting original research projects utilizing a range of different research designs and data collection and analysis strategies.

This course should be useful to you if you are planning to be a "scholar-practitioner" who incorporates inquiry of a quantitative nature into your regular professional practice, if you want to interpret research reports on different topics and, and if you want to be able to convey that knowledge effectively to others. It will also be foundational to those researchers who plan to take higher level quantitative methods courses. Finally, it will strengthen your skills at critically analyzing quantitative research through a justice-oriented lens.

DEPARTMENT OF TEACHER EDUCATION CORE PRINCIPLES

This course aims to adhere to the Department of Teacher Education Core Principles. We will share specific ways in which quantitative research can be humanizing as well as dehumanizing; the importance of linking theory to the practice of conducting quantitative analyses;

We are scholars, researchers, and teacher educators committed to practices of equity and social justice in education. As an intellectual community, we aspire to prepare students who have the strong disciplinary content knowledge, the skills and the dispositions to be effective educators and agents of equity-oriented change.

Our work is guided by the following core principles:

- **Humanizing Interactions, Practices & Scholarship**: We recognize the importance of attending to the humanizing aspects of our work and that building relationships of dignity and care is ethically necessary across our teaching, research and service.

- **Linking Theory, Action & Practice:** We seek to challenge the status quo of educational scholarship by reflexively engaging practice and theory for the purpose of advancing a graduate and undergraduate teacher education that produces excellence among future teachers and teacher educators.

- **Amplifying Voices:** We value multiple conceptual, theoretical, methodological and translational perspectives paying close attention to diverse and varied voices from communities that are often marginalized in education, including in our own work.

- **Transforming Relationships:** We seek to create trust and reciprocity to both nurture and challenge relationships with communities, students and other partners for the purpose of elevating the profession of teaching.

- **Participating in Public Discourse:** We proactively engage in public discourse with educational leaders, policy makers, and others concerned with education and teacher education.

- **Engaging in Ongoing Critical Self-reflection:** We study, question, debate and revise these dynamic and robust areas of investigation in order to improve our practice.

Our stance is that these functions should not be seen as separate, but interdependent in the sense that strength in any one area depends upon strength in the others. We see the articulation of these principles as ongoing and continuously evolving.

COMMUNICATION AND SUPPORT:

There are several ways to get in touch with me and to get help. Please consider which is most appropriate for your specific question.

Email
Email is the best way to get in touch with me. I check email regularly and will try to get back to you within 24 hours, though I may be a little slower on weekends. If you have an urgent question or concern, you can call my cell phone between 8am and 8pm. Please use this option for matters that are too urgent to wait for email or a meeting.

One-on-one Meetings
One-on-one meetings are great for discussing your particular research interests, your writing, or any individual questions or concerns. Please email me to schedule a Zoom meeting.

Technology Issues:
If you are having a technical problem with D2L, Google Docs, or any other technology issues, please contact MSU Distance Learning Services. They have a 24/7 helpline: 1-800-500-1554 OR 1-517-355-2345. There will always be someone there, so call them for big or small issues you encounter. This includes if (I've heard this can happen during busy times), D2L times out on you or you otherwise lose something that you are in the middle of doing on D2L. They can sometimes recover your work if you call immediately.

ASSIGNMENTS AND PROJECTS

This course includes written assignments and participation. Detailed assignment guidelines and grading criteria will be posted on our D2L site.

Attendance & Participation (10%):
Attendance and participation in class are critical for your learning. I understand that you may not be able to attend all class sessions for various reasons, and expect you will communicate with me as your absence will affect the planning of weekly activities.

Your participation in whole-class and small-class discussions is also important for your own and our class community's learning. Reading our class materials and watching lectures before class will best prepare you to engage critically in our weekly discussions, so please take time to note your questions and insights prior to class. I value multiple ways of participation and engagement. Given the modality of this class, I especially appreciate you giving your full attention to discussions, contributing to the discussion by speaking, listening, and asking questions or sharing your thoughts on readings.

Critical Review & Presentation (Partner Optional) (15%)
In this assignment, you will write a short (750 words) review and conduct a 10-minute presentation on a quantitative study related to your area of interest. You will select one piece of scholarship that uses quantitative analyses, read it carefully, and share with the class the kinds of data the author(s) collected and the analytic methods the author(s) used. These presentations will begin a few weeks into the semester, and you will sign up in advance below. Your article will be listed as required reading on your presentation day, and your report will be due one week after you present.

Three Lab Analyses and Reports (Partner) (45%)

Because this is a "hands-on" course in learning to use appropriate statistical techniques, you and a partner will conduct three short analyses throughout the semester. Using a class dataset, you will submit three lab analyses and reports on the following topics:

1. Descriptive Statistics (10%) – Due 10/15, 11:59 pm
2. Bivariate Relationships (15%) – Due 11/5, 11:59 pm
3. Multivariate Relationships (20%) – Due 11/19, 11:59 pm

These assignments will require you to conduct the analyses using R and write a short analysis of them, to demonstrate your skills in interpreting statistical output.

Final Project (Partner) (30%) ………...……....Due Wed. 12/15 at 11:59pm (No Extensions)

The purpose of this assignment is for you to apply your learning from this course by analyzing a dataset using the quantitative skills you built throughout the semester. You will come up with your own research question(s), present your hypotheses, present univariate descriptions of your variables of interest, present bivariate relationships, and conduct a regression analysis that addresses your research question(s). You will then interpret your findings in a 2-page report.

Assessment Criteria:

All of the assignments will be graded according to these criteria:

Substance:

Care and thoroughness in completing the assignment; evidence that you have worked hard, reflected carefully on what you are doing, and polished the final product; quality and integrity of the ideas, methods, and materials that are represented in the assignment; evidence that you have thought seriously about the activity, utilized what we have covered in class, and approached the assignment with a deep and broad range of thought.

Style and Form:

Quality of the writing and format of the assignment; evidence of a well-organized, well-written, and carefully proofread product.

Overall Grading Scale

4.0	94 – 100%	2.5	71 – 78%	1.0	51 – 56%
3.5	86 – 93%	2.0	64 – 70%	0.0	0 – 50%
3.0	79 – 85%	1.5	57 – 63%		

COURSE POLICIES AND RESOURCES

Deadlines

Because materials in this class build on one another (culminating in the final project), meeting assignment deadlines will ensure that you are keeping up with course materials and are prepared for the final project. Information about due dates and evaluation guidelines (e.g., rubrics, feedback

procedures) are included on the syllabus and D2L. Please seek out and follow this information. I recognize that due to unforeseeable events in our lives, it may not always be possible to adhere to due dates. Please discuss any concerns you have with me well in advance of the due date so we can make alternate arrangements when possible. Please note that extensions on the final project are not possible due to the turnaround time of final grades.

Academic Honesty and Integrity

In all classes, we assume that the student is honest and that all coursework and examinations represent the student's own work. Violations of the academic integrity policy such as cheating, plagiarism, selling course assignments or academic fraud are grounds for academic action and/or disciplinary sanction as described in the university's student conduct code. Incidents of plagiarism are taken very seriously and will be pursued. Students are strongly cautioned not to copy any text verbatim on class quizzes, tests, reports, projects, or other class assignments without using appropriate quotations and source citations. For University regulations on academic dishonesty and plagiarism, refer to the Student Affairs & Services Website and the Office of the University Ombudsperson.

Accommodations for Students with Disabilities

From the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

Other Resources

- Utilize the Writing Center and MSU Library Resources for help with writing and learning.
- The Learning Resources Center provides tutoring, study skills help, technology assistance, and a computer lab.
- The Counseling Center's licensed counselors are available to help with everything from test anxiety to depression, homesickness to marriage counseling. Please talk to someone if you need help. It is not uncommon for capable, intelligent, and reasonable persons like the members of this class to sometimes face situations and problems that they find difficult to manage by themselves. The Center is at 207 Student Services Building, (517-355-8270).
- The Office of Supportive Assistance can provide advising, skills development, career guidance, and personal planning.
- The Office of Cultural and Academic Transitions supports individual students in their navigation of cross-cultural encounters, and in their own understanding, exploration and development of cultural identity.

GRADING AND FINAL GRADES:

All assignments and requirements must be completed satisfactorily to receive a passing grade in the course. The basis on which assignments will be graded will be indicated prior to the due date for each assignment. You will be given feedback with both comments and grades. Your final grade will reflect the written assignments and your participation. Unless otherwise negotiated, assignments are due as indicated on the course syllabus or in other written communication.

Late Work
Assignments are due as indicated on the course syllabus or in other written communication; please note them down and keep track of when they are due. Unless acceptable arrangements are made in advance of the due date, submitting late assignments may affect your grade.

Incomplete Grades
The grade "incomplete" MSU policy is that "the 'I' (incomplete) grade may be given only when the student (a) has completed at least 12 weeks of the semester, but is unable to complete the class work and/or take the final examination because of illness or other compelling reasons; and (b) has done satisfactory work in the course; and (c) in the instructor's judgment can complete the required work without repeating the course." Please see MSU's grading policies and procedures for further information.

Weekly Course Schedule

- Table 1 provides an overview of weekly topics and assignments
- Table 2 includes weekly readings (to be completed before class), topics, and due dates.
- This is a tentative schedule, and you will be notified when changes are made.

Table 1. Overview of Course Schedule, TE 934, Fall 2021

Week	Tuesday Class Topics	Assignments Due
Week 1	9/7: Introduction	
Week 2	9/14: Quantitative Research Questions & Ethics	
Week 3	9/21: Conceptualizing & Conducting Research & Lab 0	
Week 4	9/28: Questionnaires & Sampling	
Week 5	10/5: Descriptive Statistics & Lab 1	
Week 6	10/12: Bivariate Relationships: Part 1	**10/15:** Lab 1 Report
Week 7	10/19: Bivariate Relationships: Part 2 & Lab 2	
Week 8	10/26: No class	
Week 9	11/2: Multivariate Analyses: Part 1	**11/5:** Lab 2 Report
Week 10	11/9: Multivariate Analyses: Part 2 & Lab 3	
Week 11	11/16: Mixed Methods	**11/19:** Lab 3 Report
Week 12	11/23: Presenting & Visualizing Results	
Week 13	11/30: Final Project Workshop (full class)	
Week 14	12/7: Anti-Racist Methodologies	
Finals		**12/15:** Final Project

Table 2. Detailed Course Schedule, TE 934, Fall 2021

Week & Topic	Class Readings & Materials	After Class
Week 1: **9/7/21** Introduction	**Read:** 1. Nardi (2018), Chapter 1: Why We Do Research, pp.13-39. 2. Mackenzie, N., & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. *Issues in Educational Research*, *16*(2), 193-205.	
Week 2: **9/14/21** Quantitative Research Questions and Ethics	**Read:** 1. Howard, T. C., & Flennaugh, T. (2011). Research concerns, cautions and considerations on black males in a 'post-racial' society. *Race Ethnicity and Education: The Education of Black Males in a 'Post-Racial' World, 14*(1), 105-120. 2. Frisby, C.M.(2017) A content analysis of Serena Williams and Angelique Kerber's racial and sexist microaggressions. *Open Journal of Social Sciences, 5,* 263-281. 3. Sablan, J. R. (2019). Can You Really Measure That? Combining Critical Race Theory and Quantitative Methods. *American Educational Research Journal*, *56*(1), 178–203.	Sign-up for Critical Presentations
Week 3: **9/21/21** Conceptualizing & Conducting Research	**Read:** 1. Nardi (2018), Chapter 2: Finding Ideas to Research, pp.40-59. 2. Nardi (2018), Chapter 3: Designing Research: Concepts, Hypotheses, and Measurement, pp.60-84. 3. Ohlund, B. & Yu, C. Threats to validity of research design 4. AERA Code of Ethics (2011)	**Lab 0: Introduction to R (6-7pm)**
Week 4: **9/28/21** Questionnaires & Sampling	**Read:** 1. Nardi (2018), Chapter 4: Developing a Questionnaire, pp.85-128. 2. Nardi (2018), Chapter 5: Sampling, pp.130-150. 3. Selecting Subjects for Survey Research 4. **Critical Presentation #1 (Kristin & Allison)**: Kosko, K. (2012). Student Enrollment in Classes with Frequent Mathematical Discussion and Its Longitudinal Effect on Mathematics Achievement. Mathematics Enthusiast, 9(1–2), 111–148.	

Week 5: 10/5/21 Descriptive Statistics	**Read:** 1. Nardi (2018), Chapter 6: Presenting Data: Descriptive Statistics, pp.151-179. 2. Knowles, R.T., Hawkman, A.M., Nielsen, S.R. (2020). The social studies teacher-coach: A quantitative analysis comparing coaches and non-coaches across how/what they teach. *The Journal of Social Studies Research, 44*(1), 117-125.	**Lab 1: Univariate Statistics (6-7pm)**
Week 6: 10/12/21 Bivariate Relationships: Part 1	**Read:** 1. Nardi (2018), Chapter 7: Analyzing Data: Bivariate Relationships, pp.180-204.	**Friday, 10/15: Lab 1 Report Due (Univarites)**
Week 7: 10/19/21 Bivariate Relationships: Part 2	**Read:** 1. Nardi (2018). Chapter 8: Analyzing Data: Comparing Means, pp.205-223. 2. TBD: Critical Presentation #2	**Lab 2: Bivariate Relationships (6-7pm)**
Week 8: 10/26/21	**No Class/Readings**	
Week 9: 11/2/21 Multivariate Analyses, Part 1	**Read:** 1. Nardi (2018), Chapter 9: Analyzing Data: Multiple Variables, pp.224-236. 2. TBD: Critical Presentation #3	**Friday, 11/5: Lab 2 Report Due (Bivariates)**
Week 10: 11/9/21 Multivariate Analyses, Part 2	**Read:** 1. Nardi (2018), Chapter 9: Section on Multiple Regression, pp.237-250. 2. 10 Things to Know about Reading Regression Tables **Watch:** ● Statistics 101: Linear Regression (~23min)	**Lab 3: Multivariate Relationships (6-7pm)**
Week 11: 11/16/21 Mixed Methods Research	**Read:** ● Johnson, R.B., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26. ● TBD: Critical Presentation #4	**Friday, 11/19: Lab 3 Report Due (Multivariates)**

Week 12: 11/23/21 Presenting and Visualizing Results	**Read:** 1. Nardi (2018), [Chapter 10: Presenting Results, Making Conclusions, and Writing Reports](#), pp.251-270. 2. TBD: Critical Presentation #5	
Week 13: 11/30/21 Final Project Workshop	Final project workshop	**Final Project Workshop**
Week 14: 12/7/21 Anti-Racist Research Methodologies	• Dei, G. (2005). [Chapter One: Critical Issues in Anti-racist Research Methodologies: AN INTRODUCTION](#). *Counterpoints, 252*, 1-27. • Hadley, E. (2020, June). [5 Steps to Take as an Antiracist Data Scientist](#). *Towards Data Science.*	**Wednesday, 12/15: Final Project Due**