

ADVANCED QUANTITATIVE METHODS IN EDUCATION II



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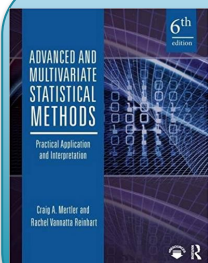
Course Purpose and Description

This course builds upon the quantitative research designs and basic statistical analyses to develop advanced applications of statistical analysis and quantitative writing that support the completion of a quantitative dissertation as well as data use in leadership positions. While students will expand their knowledge and application of several advanced/multivariate statistical tests, they will also develop appropriate data screening techniques and interpretation skills. Most importantly, students will apply the APA guidelines and writing norms to the



CLASS: Olscamp 120; Thursday 4:30-7:20 p.m.

OFFICE HOURS: Thursday, 2:30-4:15 p.m.
Education 556



Mertler, C. A. & Vannatta Reinhart, R. A. (2017). *Advanced and multivariate statistical methods: Practical application and interpretation (6th ed.)*. New York: Routledge.

Nicol, A. M. & Pexman, P. M. (2010). *Presenting your findings: A practical guide for creating tables (6th ed.)*. Washington, D.C.: American Psychological Association.

Course Assessment

Reflections—Two reflection papers/products will be completed to analyze your **strengths and weaknesses** regarding: 1) Statistical Analysis and 2) Writing about Quantitative Results. Students may write a typical paper (about 3 double spaced pages) or may depict their reflection using graphics or video—be creative! Aspects of your reflection may include:

1) Statistical Analysis—organizing and cleaning data, screening data, computing/transforming variables, knowing which statistical test to use, conducting the statistical test, interpreting the output, understanding the results.

2) Writing about Quantitative Results—writing at a doctoral level, applying APA format, determining which results to present and how; presenting results in text, presenting results in tables, formatting tables.

SPSS Practice Assignments—Seven practice assignments will be completed that apply the learned concepts. Each practice assignment is worth 10 points. Since these assignments are practice, you will receive full credit as long as you attempt all questions/tasks. Partial credit is not an option. You either complete it ON TIME or you don't—late submissions will not be accepted.

Qualtrics Survey Plan—This assignment will describe the survey that you plan to administer using Qualtrics. The primary goal of this assignment is to generate a dataset that you will download, clean, and analyze.

Qualtrics Survey Report—After you have administered your Qualtrics Survey to a minimum of 30 friends and classmates, download the data, and move it into SPSS. You will then analyze this data using descriptive and basic inferential statistics. A report will be created that summarizes your results utilizing appropriate APA format.

Research Proposal Outline—Presents plan for your proposed research study. This is a one-page outline of the basic components of your study.

Chapter 3: Methodology—Presents the methodology and procedures of your proposed study. The content of the chapter is as follows: Research Design- 1/2 pg min; Participants- 1/2 pg min; Instrumentation- 1/2 pg min; Procedures- 1/2 pg min; Proposed Data Analysis- 1/2 pg min; Null Hypotheses **or** Research Questions – list; Assumptions- 1/2 pg min.

Final Project—Using your proposed research question(s), you will create a data set that you will analyze using descriptive and inferential statistics in SPSS. Students will write a summary of these results and conduct a short presentation on your research study.

Final Project Presentation—You will have the opportunity to create a presentation that is similar to your dissertation defense. Due to time constraints, you will present a shortened version of this.

Quantitative Skills Reflection Presentation—Now that you have completed Quant I and II, reassess your strengths and weaknesses in conducting and writing about quantitative research. Create a presentation that shares these strengths and weaknesses and how you plan to utilize/address these as you move forward.

Course Evaluation

Point Distribution

Assignment	Points
Reflections	20
SPSS Practice 1-7 (10 pts each)*	70
Qualtrics Survey Plan*	20
Qualtrics Survey Report*	50
Proposal Outline*	15
Chapter 3*	50
Final Project*	50
Project Presentation	25
Skills Reflection Presentation	10
Total	310

- **Assignments noted by an asterisks (*) are due in hard copy at the time of class for peer review.**
- **Practice assignments will be submitted at the end of class with revisions noted.**
- **The Survey Report, Chapter 3, and Final Project may be submitted the day after class to include your revisions.**
- **Please submit these assignments to Canvas as a PDF.**

Final Grade Ranges

Grade	% Range
A	93-100
B	84-92
C	73-83
D	65-72

Course Expectations

What I expect from you...

- Come to class prepared with laptop and having completed all necessary assignments so that you are prepared to participate, discuss and apply the content.
- Come to class with an attitude to learn!
- Complete assignments on time and work with me when that isn't possible.
- Play with SPSS to develop a level of comfort and familiarity with the program.
- Maintain an openness and willingness to learn difficult concepts and receive feedback.

What you can expect from me...

- Prompt feedback through the return of all assignments, exams, etc. at the next class meeting.
- Openness to your ideas, questions, confusion, frustration, etc. But please don't whine!
- Practical advice in how to conduct quantitative research.

Late Submissions and Redos--To maximize your learning experience, redos and late submissions will be allowed but a few ground rules apply:

- The opportunity to redo an assignment will ONLY be allowed if it was submitted by the original due date.
- Late assignments are excused when proper notification has been given to the professor.
- Redos are NOT allowed on late assignments.
- SPSS Practice Assignments will not be accepted late.

RESPECT

Students are expected to respect all individuals, regardless of characteristics or background, and endeavor to accommodate communications and actions to learning differences arising from cultural, linguistic and disability origins.

Course Schedule

Class		Topic	Assignment DUE
1	Jan 11	Introduction to Course Overview of Inferential Statistics	M & V: 1
2	Jan 18	Data & Variables	M & V: 2 View SPSS Videos: Recode, Frequencies & Desc Statistical Analysis Reflection
3	Jan 25	Data Screening & Descriptive Statistics	M & V: 3 Nicol & Pexman: 1-3 View Q2 Video: Data Screening & Descriptive Stats View SPSS Videos: Explore Causal → Select Cases Practice #1: Variables (bring to class) Qualtrics Survey Plan
4	Feb 1	Writing Quantitative Results & Chapter 4 Review Practice #2 (draft 1)	Read Dissertation Chapter 4 & complete analysis. Nicol & Pexman: 5, 9, 6 APA Manual 4.41-4.49, and all of 5 Practice #2: Descriptives-draft 1 (bring to class)
5	Feb 8	Effect Size, Power, and CI Review Review Practice #2 (draft 2)	View Q2 Video: Effect Size, Power & CI Practice #2: Descriptives-draft 2 (bring to class) Quantitative Writing Reflection
6	Feb 15	Writing Chapter 3 Review Practice #3 Working with Qualtrics Survey data	Read Dissertation Chapter 3 & complete analysis. Qualtrics Survey Data (bring to class) Practice #3: Effect Size & CI (bring to class)
7	Feb 22	Factorial ANOVA	M & V: 4 Nicol & Pexman: 9 View Q2 & SPSS Videos: Factorial ANOVA
8	March 1	Review Practice #4 Review Qualtrics Report Proposal Outline Conferences	Practice #4: Factorial ANOVA (bring to class) Qualtrics Survey Results/Report Draft (bring to class) Proposal Outline (bring to class)
	March 8	Spring Break—No class	
9	March 15	ANCOVA	M & V: 5 Nicol & Pexman: 11 View Q2 & SPSS Videos: ANCOVA Qualtrics Survey Report (Final)
10	March 22	Review Practice #5 Review Chapter 3	Practice #5: ANCOVA (bring to class) Chapter 3 (bring to class)
	March 29	No Class	
11	April 5	Multiple Regression	M & V: 7 Nicol & Pexman: 7, 17 View Q2 & SPSS Videos: Multiple Regression
12	April 12	Review Practice #6 Final Project Data	Practice #6: Multiple Regression (bring to class) Final Project Data (bring to class)
13	April 19	Logistic Regression	M & V: 11 Nicol & Pexman: 18 View Q2 & SPSS Videos: Logistic Regression
14	April 26	Review Practice #7 Review Final Project Writing Chapter 5	Practice #7: Logistic Regression (bring to class) Final Project draft (bring to class) Read Dissertation Chapter 5 & complete analysis
15	May 3	Presentations	Final Project (bring to class) & Presentation

Qualtrics Survey Plan

You need to create and administer a survey using Qualtrics. Please do not get bogged down in developing your own survey questions; I would prefer that you utilize an existing instrument. You may develop your own demographic questions. Your survey must:

- address 1-2 research questions (one must be inferential);
- include some demographic items;
- generate at least one subscale;
- be completed by a minimum of 20-30 individuals.

While I will not review your actual survey, the Qualtrics Survey Plan will summarize your work. This plan must include the following:

- Research question(s) being evaluated (2 pts).
- Description of the survey that identifies: the variables measured, the items measuring each variable, and the scale for specific items (5 pts).
- Description of the subscale(s) calculation (3 pts).

Qualtrics Survey Plan (example)

Research Question:

1. Does overall skill using laptops for instruction significantly relate to teacher comfort with technology?

Survey Description:

The **Teacher Comfort with Technology Survey (TCTS)** was created to measure comfort and anxiety with using technology in the classroom. The TCTS consists of 12 items. Items 3-12 are from the Teacher Technology Integration Survey developed by Vannatta and Banister (2010). The first two items addressed grade level and gender. Item 3 measured overall skill of teachers using laptops for instruction. Items 4-12 measured teacher comfort and/or anxiety with using technology for instruction.

Variable	Items	Scale
Grade level	1	1=elem; 2=middle; 3=HS
Gender	2	1=male; 2=female
Overall skill using laptops for instruction	3	1=novice; 2=beginner; 3=intermediate; 4=advanced; 5=expert
Teacher comfort with technology	4-12	4-pt. Likert: 1=SD, 2=D, 3=A, 4=SD

Subscale Calculation:

The subscale of **Teacher Technology Comfort** is based upon items 4-12. Since three of the items were worded negatively (anxious, confusing), these three items were reverse coded so that higher numeric responses indicated greater comfort. After reverse coding, the overall mean of the nine items was calculated.

Qualtrics Survey Report

Using the Qualtrics Survey that you created, you now need to download the data, transfer it to SPSS, analyze your results, and write a report appropriate for your data.

Your **report** must include the following:

- description of how survey data was used to address research question;
- description of sample participants;
- calculation and summary of subscales (variables);
- descriptive statistics for each item;
- organization of descriptive statistics in at least one table; and
- written representation and discussion of the results.

Criteria	Point Value
Analysis	
Correct calculation of subscales	5
Appropriate descriptive statistics for the various item types	3
Appropriate inferential statistics utilized for research question	3
Output submitted	2
Report	
Purpose of study	
Description of sample (size, demographics)	2
Description of how variables/subscales were measured using survey items	3
Descriptive statistics summarized (items & subscales)	5
Presentation of research question/purpose for each analysis	2
Inferential results presented	5
Tables and Graphics	
• Used appropriately	3
• APA Format (alignment, decimals, headings)	5
Text	
• Highlights results and makes appropriate conclusions	4
• APA Format	4
• Writing mechanics, grammar	4
TOTAL	50

Proposal Outline Template

Abbreviated Problem Statement (2 pts)

In 2-3 identify the problem (not purpose) that needs remediation and would be addressed in your study.

Research Question or Alternative Hypothesis (2 pts)

List the research question or alternative hypothesis for your study. Includes variables, relationship to be examined, and sample.

Independent Variable (2 pts)

List the independent variable; indicate whether it is categorical or quantitative; identify how this variable is being measured and quantified.

Dependent Variable (2 pts)

List the dependent variable; indicate whether it is categorical or quantitative; identify how this variable is being measured and quantified.

Possible Confounding Variables (1 pt)

Identify at least two variables that could possibly impact the dependent variable.

Research Design (2 pts)

List the research design.

Participants (2 pts)

Identify the group of individuals who would participate in your study. How many? Where are they from?

Instrumentation (2 pts)

Identify any instruments you would use to collect data. How instruments will be administered?

Chapter 3

Design

- Identifies the research design being applied _____ (2)
- Describes how your study fits this design _____ (3)

Participants

- Describes sample—size and characteristics _____ (3)
- Describes sampling method _____ (2)

Instrumentation

- Describes instrument(s) used to collect data _____ (4)
(purpose, content, administration, scoring)
- Describes methods for ensuring validity and reliability _____ (4)

Procedures

- Clearly describes procedures used to collect data _____ (5)
so that others may replicate this study

Null Hypotheses or Research Questions—clearly listed _____ (2)

Proposed Data Analysis

- Describes variables in research questions _____ (3)
- Describes how data will represent variables _____ (4)
- Describes descriptive & inferential stats to be used _____ (6)
for each research question

Assumptions

- Describes at least 2 assumptions of the study _____ (2)

APA Format (citations, margins, spacing, pg # placement, headings) _____ (3)

Mechanics, Grammar, Spelling, Clarity, Use of Transitions _____ (4)

References

- Appropriate citation type applied correctly _____ (2)
- Margins, Indentation, Heading & Page number placement _____ (1)

Total _____ **(50)**

Final Project

Based upon 1-3 research question that you have developed for you proposal, you need to create a data set (at least $n=30$) that is appropriate for your studied variables. You may want to include some demographic variables as well. Using this data, you need to conduct and present the appropriate descriptive and inferential statistics. There are four parts that must be submitted for this project:

- Part 1: Final Project Worksheet (5 pts)
- Part 2: Data presented in a table, spreadsheet or SPSS data file (screen shot is fine) (5 pts)
- Part 3: SPSS Output (10 pts)
- Part 4: Written summary of results presented in text and tables following APA format (30 pts)
 - Presents purpose of study
 - Describes sample (size and characteristics).
 - Describes instrumentation (administration, content, subscale calculation).
 - Presents appropriate descriptive statistics for RQ.
 - Presents appropriate inferential statistics for RQ with effect sizes or confidence intervals.
 - Text highlights results in table.
 - Draws appropriate conclusions based upon results.

Project Example

Worksheet

Research Question	Do the leadership practices differ by gender?
Independent Variable	Gender
Type (circle):	<u>Categorical</u> Quantitative
Dependent Variable	Model the Way, Shared Vision, Challenge the Process, Enable Others, Encourage the Heart
Type (circle):	Categorical <u>Quantitative</u>
Relationship examined (circle):	Mutual <u>Causal</u>
Descriptive Methods	Frequencies of gender. Means and standard deviations of all IVs by gender.
Inferential Method(s)	t test of independent samples effect size (Cohen's d)

Data

	Gender	model	vision	challenge	enable	encourage
1	2	8	8	9	9	9
2	2	9	8	8	9	10
3	1	8	8	9	9	9
4	2	8	8	8	9	8
5	2	9	9	10	9	10
6	2	8	7	8	9	9
7	2	7	8	7	9	7
8	2	9	9	9	10	7
9	2	8	10	8	9	9
10	2	8	7	7	9	8
11	2	8	9	9	9	9

Output

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
model	1	54	8.19	.905	.123
	2	57	8.34	.827	.109
vision	1	54	7.68	1.234	.168
	2	57	7.88	1.258	.167
challenge	1	54	7.78	1.106	.151
	2	57	8.06	1.198	.159
enable	1	54	8.48	.753	.102
	2	57	8.85	.677	.090
encourage	1	54	7.97	1.391	.189
	2	57	8.54	.922	.122

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
model	Equal variances assumed	.002	.965	-.953	109	.343	-.157	.164	-.482	.169
	Equal variances not assumed			-.951	106.774	.344	-.157	.165	-.483	.170
vision	Equal variances assumed	.000	.989	-.862	109	.391	-.204	.237	-.673	.265
	Equal variances not assumed			-.862	108.868	.390	-.204	.237	-.673	.265
challenge	Equal variances assumed	.000	.983	-1.266	109	.208	-.278	.219	-.712	.157
	Equal variances not assumed			-1.269	108.931	.207	-.278	.219	-.711	.156
enable	Equal variances assumed	.057	.813	-2.656	109	.009	-.360	.136	-.629	-.091
	Equal variances not assumed			-2.648	106.287	.009	-.360	.136	-.630	-.091
encourage	Equal variances assumed	5.455	.021	-2.566	109	.012	-.572	.223	-1.013	-.130
	Equal variances not assumed			-2.539	91.320	.013	-.572	.225	-1.019	-.124

Results Summary

This study examined gender differences in leadership practices. The Leadership Practices Inventory (LPI), developed by Kouzes and Posner (2012), was administered online to 111 professionals, 57 of which were female. Among the convenient sample, the majority were Caucasian (78.4%), had obtained a master's degree or higher (88.2%), and worked in the field of education (78%). Participant average age was approximately 43 years. The LPI consists of 30 items that measure five leadership practices: Model the Way, Shared Vision, Challenge the Process, Enable Others, and Encourage the Heart. Leadership subscales are calculated from six respective LPI items. All items apply a 10-point frequency scale ranging from 1=almost never to 10=almost always.

Descriptive statistics were conducted for each leadership practice by gender and indicate that females reported higher levels of leadership for each practice (see Table 1). The leadership practice of Enable Others was highest scoring practice for both males and females. In addition, Shared Vision was the lowest scoring practice for both groups. T-test of Independent Samples was conducted to examine gender differences for the five leadership practices. Results indicate that the two leadership practices of Enable Others ($p=.009$) and Encourage the Heart ($p=.13$) are significantly different between genders, with females scoring significantly higher than males. Effect sizes for gender on these variables are large.

Table 1

Descriptive Statistics for Leadership Subscales by Gender

	Male ($n=54$)		Female ($n=57$)		t	p	Cohen's d
	M	SD	M	SD			
Model the Way	8.19	0.91	8.34	0.83	-0.95	.343	.18
Shared Vision	7.68	1.23	7.88	1.26	-0.86	.391	.16
Challenge the Process	7.78	1.11	8.06	1.20	-1.27	.208	.24

Enable Others	8.48	0.75	8.85	0.68	-2.67	.009	.51
Encourage the Heart	7.97	1.39	8.54	0.92	-2.54	.013	.49

Final Project Worksheet

Name		
Research Question		
Independent Variable Type (circle):	Categorical	Quantitative
Dependent Variable Type (circle):	Categorical	Quantitative
Relationship examined (circle):	Mutual	Causal
Descriptive Methods		
Inferential Method(s)		

Final Project Presentation

Based upon your Chapter 3 and final project, you need to create and conduct a 10-15 minute PowerPoint (or some other software) presentation. The following headings and criteria should be used to guide your presentation.

• Title (1 slide)	_____	(1)
• Purpose of Study (1 slide)	_____	(1)
• Research Questions or Hypotheses (1 slide)	_____	(1)
• Design (1 slide)	_____	(1)
▪ Identify specific research design		
▪ Describe why it is appropriate for your study		
• Participants (1 slide)	_____	(1)
▪ Describe sample and size		
• Instrumentation (2+ slides)	_____	(3)
▪ Describe purpose, content, administration		
▪ Describe how variables are calculated		
• Data Analysis (1 slide)	_____	(2)
▪ Identify methods used		
• Results (2+ slides)	_____	(5)
▪ Descriptive and Inferential		
• Conclusions (1-2 slides)	_____	(4)
• Implications/Recommendations (1-2 slides)	_____	(1)
Stays within 10 minute limit	_____	(2)
Slides are accurate and visually appropriate	_____	(2)
Voice tone, eye contact, clarity, pace	_____	(2)
Total	_____	(25)

College of EDHD Outcomes

Educational personnel must be well prepared with regard to content knowledge and practical skills as well as understanding of learners and the influences on them. Educators must understand the factors that impact educational success, be sensitive to cultural, linguistic and socio-economic factors as expressed in the diverse individuals they encounter, work to construct inclusive environments in which all can succeed, skillfully utilize the educational and technological tools available to them, collaboratively engage with colleagues and the community, and systematically reflect and act on the effectiveness of their practice. They must exhibit appropriate professional dispositions, concern themselves with the ethics of their actions, be accountable for their performance and be committed to ongoing improvement of their own personal capabilities. The BGSU goal is to empower our educator candidates to act in various capacities to positively impact the future of learners, clients and colleagues. Toward that end, we hold the following statements as guiding core concepts:

P

An effective educator is broadly and thoroughly prepared.

R

An effective educator is a reflective practitioner.

E

An effective educator is actively engaged within the larger education community.

P

An effective educator is foremost a professional with a lifelong commitment to learning and to all learners.



University Policies

Codes of Conduct and Academic Honesty Policy: The instructor and students in this course will adhere to the University's general Codes of Conduct defined in the *BGSU Student Handbook*. Specifically, the Code of Academic Conduct (Academic Honesty Policy) requires that students do not cheat, fabricate, plagiarize or facilitate academic dishonesty. For details, refer to: <http://www.bgsu.edu/student-handbook/code-of-conduct.html>

Disability Policy: Any student who requires accommodation based on the impact of a disability should contact the instructor privately to discuss specific needs. In accordance with the University policy, if the student has a documented disability and requires accommodations to obtain equal access in this course, he or she should contact the instructor at the beginning of the semester and make this need known. Students with disabilities must verify their eligibility through the Office of Disability Services for Students, 419-372-8495. For more information, refer to: <http://www.bgsu.edu/disability-services/students.html>

Religious Holidays: It is the policy of the University to make every reasonable effort allowing students to observe their religious holidays without academic penalty. In such cases, it is the obligation of the student to provide the instructor with reasonable notice of the dates of religious holidays on which he or she will be absent. Absence from classes or examinations for religious reasons does not relieve the student of responsibility for completing required work missed. Following the necessary notification, the student should consult with the instructor to determine what appropriate alternative opportunity will be provided, allowing the student to fully complete his or her academic responsibilities. (As stated in *The Academic Charter*, B-II.G-4.b.)