DOCUMENT RESUME

ED 464 097 TM 033 778

AUTHOR Kennedy, Robert L.; McCallister, Corliss Jean
TITLE Attitudes toward Advanced and Multivariate Statistics When Using Computers.
PUB DATE 2001-11-14
NOTE 22p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (30th, Little Rock, AR, November 14-16, 2001).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Uses in Education; *Graduate Students; Graduate Study; Higher Education; *Multivariate Analysis; *Statistics; *Student Attitudes

ABSTRACT

This study investigated the attitudes toward statistics of graduate students who studied advanced statistics in a course in which the focus of instruction was the use of a computer program in class. The use of the program made it possible to provide an individualized, self-paced, student-centered, and activity-based course. The three sections involved in this study were offered in the 2001 spring term. There were complete data for 19 students, most of whom were white females. Fifteen were in advanced statistics, and four were in multivariate statistics. The instrument used was the Statistics Attitude Survey (D. Roberts and E. Bilderback, 1980). Both chi square and Kendall's Coefficient of Concordance indicated that there were differences in the distribution of ranks between the pre-test and post-test survey results. Most of these differences occurred as increases in the rankings marked at each end of the scales. That is, after the course, more students felt more strongly that they agreed or disagreed with statements about some aspects of statistics. Comments from the open-ended evaluation forms may help explain some of the other study findings. It is concluded that offering the course using computers may help improve students' attitudes about certain aspects of statistics. The course syllabus used in the study is appended. (Contains 14 references.) (Author/SLD)

Attitudes Toward Advanced and Multivariate Statistics when Using Computers

Robert L. Kennedy

Department of Educational Leadership

University of Arkansas, Little Rock

2801 S. University, Little Rock, AR 72204-1099

(rlkennedy@ualr.edu)

Corliss Jean McCallister

The Anthony School

Little Rock, AR

Mid-South Educational Research Association

Twenty-ninth Annual Meeting

Double Tree Hotel

Little Rock, Arkansas

November 14, 2001

Abstract

The study investigated the attitudes toward statistics of graduate students who studied advanced statistics in which the focus of instruction was the use of a computer program in class. The use of the program made it possible to provide an individualized, self-paced, student-centered, and activity-based course. The three sections involved in this study were offered in the 2001 spring term. There were 19 participants for whom there was complete data. Fifteen were in advanced statistics and four were in multivariate statistics, with the majority being white females. The instrument used was the Statistics Attitude Survey (Roberts and Bilderback, 1980). Both chi square (10.55, p=0.03) and Kendall's Coefficient of Concordance W (0.04) indicated that there were differences in the distributions of ranks between the pretest and posttest survey results. Most of these differences occurred as increases in the rankings marked at each end of the scales. That is, after the course, more students felt more strongly that they agreed or disagreed with statements about some aspects of statistics. For example, students agreed more strongly that "Statistics will be useful to me when I describe my professional activities to other people." and "I find statistics to be very logical and clear." On the other hand, they disagreed more strongly that "When I solve a statistics problem, I am often unsure if I have a correct or nearly correct answer." and "Statistics is the most difficult course I have taken." Comments from open-ended evaluation forms may help explain the results of the survey: "given the freedom to learn at my own pace and style", "liked the structure of class", "class flexibility", "final projects", and "relaxed environment". It is concluded, then, that offering the course using computers may help improve students' attitudes about certain aspects of statistics.

Attitudes Toward Advanced and Multivariate Statistics when Using Computers

Students often have a certain amount of trepidation when entering any statistics class (Harrington, 1999; Sgoutas-Emch and Johnson, 1998; Zanakis and Valenzi, 1997), and perhaps even more when beginning an advanced statistics class. Their attitudes might have been based on prior experiences, rumors, or simply fear of the unknown. Whatever the reason, it is likely that at least some students are going to have to be "won over" in the study of statistics. As Gal and Ginsburg (1994) noted, many statistics teachers focus on transmitting knowledge, but many of their students may have trouble due to non-cognitive factors, such as negative attitudes or beliefs towards statistics which can impede learning, or hinder it to the extent to which they will develop useful intuitions and the ability to apply what they have learned. Since statistics courses tend to be some of the most rigorous and anxiety-provoking for college students, researchers have investigated techniques to help reduce students' anxiety and negative attitudes (Sgoutas-Emch and Johnson, 1998). Sgoutas-Emch and Johnson tried journal writing by a group of undergraduate students in their statistics course. Comparing their performance, attitudes, and anxiety towards the course with a control group, the results showed that the journal group showed improvement in their grades, lower anxiety before exams, and lower physiological reactions.

Another approach to improving these attitudes is the focus of this study, which investigated the attitudes toward statistics of graduate students who studied advanced statistics in which the focus of the instruction was the use of a computer program in class. Prior research has established that the use of technology in teaching is widespread. For example, Blake (2000) described a method for incorporating e-mail and the World Wide Web to teach an introductory media writing course. Students in the course left with very positive attitudes, rating it highly enjoyable and convenient, and saying that they would recommend the

course to their friends. Yeong (2001) found that virtual classrooms in Malaysia were viewed by students as "more creative, colorful and interesting."

Ellram and Easton (1999) presented a case study on developing and implementing a purchasing class over the Internet. The attitudes of the students was generally extremely positive and supportive despite a variety of problems with technology and other issues. The students realized there would be challenges with technology and did not hold the instructors accountable for the problems. The instructors said that they had not experienced such understanding and patience at either the undergraduate or graduate level.

Graham and McNeil (1999) described a project using the Internet for disseminating information about social geography. Despite some technological difficulties, students reacted favorably, overall. Robertson and Stanforth (1999) surveyed Family and Consumer Science students about their interest in Web-based distance education and found that their computer attitudes were not particularly positive, despite their experience in using computers. For this group of students, largely young females, access to computers did not have the expected positive impact on computer attitudes. The authors noted that the results had limited generalizability.

In a Web CT-based course, Sanders and Morrison-Shetlar (2001) used Web-enhanced instruction in an introductory biology course for non-majors. The students' attitudes toward the Web-based instruction were generally positive. Students were most comfortable with assessment via the Web. However, most preferred receiving a hard copy of the course syllabus rather than having to print one from the Web. They also preferred talking face-to-face as opposed to using chat rooms. They had mixed feelings about interacting through the bulletin board and getting class notes from the Web. Nevertheless, they overwhelmingly preferred using Web-enhanced instruction as opposed to not using it.

Holcomb and Ruffer (2000) proposed using extended projects involving a single, real multivariate data set to teach statistics. The assignments combined four trends in statistics education: computers, real data, collaborative learning, and writing. The authors administered a questionnaire to students at the end of each term. Almost all of the students agreed that the projects helped them understand statistical concepts and that the projects were helpful in learning how to make graphs and tables. A large majority agreed that consistently using the same data set helped them to see the range of statistical procedures that could be used to analyze data and that working in groups was helpful.

Potthast (1999) was also involved with groups, using small-group cooperative learning experiences to teach basic statistics. Not all of the students valued working in cooperative learning groups, however. Some, preferring to work alone, believing that other members of the group inhibited their progress. Others found the experiences beneficial. Harrington (1999) offered statistics using statistical computer packages and compared traditional versus programmed learning. Students rated this course well, other than difficulty with using the Data Desk statistics program, although they were not required to use it. Harrington had hoped that the students' computer skills would improve, but they did not report an increase in them.

Zanakis and Valenzi (1997) worked with an undergraduate business statistics class and noted that students also were anxious about using the computer to do statistical calculations. They suggested modifications to the statistics course to strengthen students' beliefs in statistics and reduce their test anxiety. To do this, they proposed changes to their business statistics course which included reduced methodology coverage, newspaper stories exemplifying data abuses, reduced weighting of tests in the course grade, more group work, and more emphasis on short, real-world cases.

As with Harrington, and Zanakis and Valenzi, the course that is the object of the present study used a computer program which made it possible to provide an

individualized, self-paced, student-centered, and activity-based course. The activities for both classes comprised conducting analyses of data given brief scenarios, as well as a final project, dubbed a "dissertation simulation" since it was designed to provide practice to the students in preparation for their dissertations. Other components of their grades included a midterm and final and a participation component. The syllabi for the courses are appended to this paper. The statistical analysis program used for both courses was NCSS 2000 (Hintze, 2000).

The three sections, two of advanced statistics and one of multivariate statistics, involved in this study were offered in the 2001 spring term. There were 19 participants for whom there was complete data. Fifteen were enrolled in advanced statistics and four were in multivariate statistics, with the majority in each class being white females. All of the students were either admitted to or considering applying for admission to the Higher Education or Educational Administration doctoral programs of the university. All were required to have had at least one prior course in statistics before being admitted to the classes.

The instrument used to measure the students' attitudes toward statistics was the Statistics Attitude Survey (Roberts and Bilderback, 1980). Both chi square (10.55, p=0.03) and Kendall's Coefficient of Concordance W (0.04) indicated that there were differences in the distributions of ranks between the pretest and posttest survey results. Note that Kendall's W, which measures the agreement between observers of samples, ranges between zero and one. A value of one indicates perfect concordance. A value of zero indicates no agreement or independent samples (Hintze, 2000). The 0.04 indicates that there is almost no agreement between the distributions of responses, confirming the changes from the pretest to the posttest.

Most of these differences occurred as increases in the rankings marked at each end of the scales. That

is, after the course, more students felt more strongly that they agreed or disagreed with statements about some aspects of statistics. For example, students agreed more strongly that "Statistics will be useful to me when I describe my professional activities to other people." and "I find statistics to be very logical and clear." On the other hand, they disagreed more strongly that "When I solve a statistics problem, I am often unsure if I have a correct or nearly correct answer." and "Statistics is the most difficult course I have taken." Comments from open-ended evaluation forms may help explain the results of the survey: "given the freedom to learn at my own pace and style", "liked the structure of class", "class flexibility", "final projects", and "relaxed environment". It is concluded, then, that offering the course using computers may help improve students' attitudes about certain aspects of statistics. It is clear that one limitation of the study is the small sample size, so any generalizations would need to be done with caution.

References

Blake, K. R. (2000, Spring). Using the world wide web to teach news writing online. Journalism & Mass Communication Educator, 55(1), 4-13.

Ellram, L. M. & Easton, L. (1999, Winter). Purchasing education on the Internet. Journal of Supply Chain Management, 35(1), 11-19.

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Sgoutas-Emch, S. A. & Johnson, C. J. (1998, March). Is journal writing an effective method of reducing anxiety towards statistics? Journal of Instructional Psychology, 25, 49-57.

Yeong, N. (2001, February 22). Reaping benefits of virtual classrooms. Computimes Malaysia, 1+.

Zanakis, S. H. & Valenzi, E. R. (1997, September/October). Student anxiety and attitudes in business statistics. Journal of Education for Business, 73, 10-16.

Cross Tabulation Report

Frequency Response

Counts Section

	Ranks					
PrePost2	**1**	**2**	**3**	**4**	**5**	**Total**
1	126	322	77	88	14	627
2	149	279	88	83	28	627
Total	275	601	165	171	42	1254

The number of rows with at least one missing value is 0

Chi-Square Contribution Section

	Ranks					
PrePost2	**1**	**2**	**3**	**4**	**5**	**Total**
1	0.96	1.54	0.37	0.07	2.33	5.27
2	0.96	1.54	0.37	0.07	2.33	5.27
Total	1.92	3.08	0.74	0.14	4.66	10.54

The number of rows with at least one missing value is 0

Chi-Square Statistics Section

Chi-Square	10.546374	
Degrees of Freedom	4	
Probability Level	0.032164	Reject Ho

Analysis of Variance Report

Response Response

Expected Mean Squares Section

Source Term	DF	Term Fixed?	Denominator Term	Expected Mean Square
A: Ranks	4	No	S	S+bsA
B: PrePost2	1	Yes	AB	S+sAB+asB
AB	4	No	S	S+sAB
S	320	No		S

Note: Expected Mean Squares are for the balanced cell-frequency case.

Analysis of Variance Table

Source Term	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power (Alpha=0.05)
A: Ranks	4	2735.648	683.9121	117.29	0.000000*	
B: PrePost2	1	0	0	0.00	1.000000	0.050000
AB	4	41.21212	10.30303	1.77	0.135227	
S	320	1865.939	5.83106			
Total (Adjusted)	329	4642.8				
Total	330					

* Term significant at alpha = 0.05

Treatment Ranks Section

PrePost2	Number Blocks	Median	Mean of Ranks	Sum of Ranks
1	5	2.666667	1.4	7
2	5	2.666667	1.6	8

Friedman Test Section

Ties	Friedman (Q)	DF	Prob Level	Concordance (W)
Ignored	0.200000	1	0.654721	0.040000
Correction	0.200000	1	0.654721	0.040000

Multiplicity 0

UNIVERSITY OF ARKANSAS AT LITTLE ROCK
College of Education
Department of Educational Leadership
(revised 1/16/01)

I.	Course Prefix and Number	EDFN 8305
II.	Course Title	Advanced Statistics
III.	Credit	3 hours
IV.	Semester and Year	Spring, 2001
V.	Instructor	Rob Kennedy, Ph.D., Professor of Educational Foundations and Higher Education
VI.	Office Location	Dickinson 410
VII.	Office Hours	By appointment
VIII.	Telephone	501-xxx-xxxx (UALR), 501-xxx-xxxx (home) rlkennedy@ualr.edu (e-mail)

IX. Course Description

Advanced methods of analyzing and interpreting educational data with computer applications; includes statistical concepts, models, estimation, hypothesis tests with continuous, discrete, and categorical data; multiple linear regression, correlation, analysis of variance and covariance.

X. Course Objectives

Given a research problem and data, select an appropriate statistical analysis, conduct the analysis, and interpret the findings.

XI. Texts, Readings, and Instructional Resources

Required Text (latest versions)

Hintze, J. L. (2000). NCSS 2000: Quick Start & Self Help, User's guide-I and II. Kaysville, UT: Number Cruncher Statistical Systems. The NCSS 2000 program requirements, according to Hintze: "Requires Windows 95, Windows 98, or Windows NT; 4 megs of memory; 12 mb of hard disk space, and an 80386 or above." The program is available only for Windows.

XII. Assignments, Evaluation Procedures, and Grading Policy

Course Requirements

Participation (25%)
Dissertation Simulation (25%)
Mid-term exam (25%)
Final exam (25%)

Grading scale:

A: 90-100
B: 80-89
C: 70-79
D: 60-69
F: 0-59

Evaluation Techniques/Concepts Used for Grading

Participation (25%)

For all or almost all statistical techniques there will be an annotated example in the text (See NCSS Help Menu.). You will be given one or more exercises to do in class for practice as part of your participation. You will explain and interpret your findings for these exercises.

Dissertation Simulation (25%)

For the dissertation simulation you will need to (1) develop a problem statement(s), (2) find or construct an appropriate instrument(s), (3) collect the data, (4) run the statistics, (5) interpret your findings, and (6) prepare and (7) present to the class the outcome. There are faculty and staff who will be happy to have you analyze data they have collected, if you are interested. Check with your instructor or others. Another source of information is the School Report Card, which is available from the Arkansas Department of Education in a spreadsheet format importable by NCSS. Individual district data is available from their web site.

Mid-term Exam (25%)

The mid-term exam will be hands-on and will consist of problems similar to the homework and/or classroom exercises and will be open book and open notes. The content will include the material covered up to the time of the exam. You will be given a problem statement and data and will be expected to "take it from there". You will need to determine the technique(s) needed to address the problem statement, enter the data, run the stats, interpret the results, and report your findings.

Final Exam (25%)

The final exam will be hands-on and will be similar in format to the mid-term as well as open book and open notes. The content will also include material covered up to the time

of the exam. Again, you will be given a problem statement and data and will be expected to "take it from there". You will need to determine the technique(s) needed to address the problem statement, enter the data, run the stats, interpret the results, and report your findings.

XIII. Class Policies

Students who demonstrate a commitment to the course through attendance, participation, reading, studying, and otherwise applying themselves to the course will benefit in direct proportion to that effort. In other words, "You get out of it what you put into it."

Additionally, note that because the lab in which we will be working contains a large amount of very expensive equipment, please do not bring in food or drink. If you need to eat during class time, then you are welcome to visit the break lounge near the elevators.

If you must be available for communication, please set your cellular phone, pager, beeper, or other device on vibrate so that it does not annoy or distract the other students in the class should it activate. If you do need to take the call, please step out into the hallway to converse.

XIV. Class Schedule

Jan. 17/18 Introduction, overview, picture, pretest
Homework: Review Help/Contents/Descriptive Statistics/[All sections]
Help/Contents/Regression and Correlation Analysis/Correlation Matrix.

Jan. 24/25 Descriptive and correlational statistics demo and practice
Homework: Help/Contents/Descriptive Statistics/[All sections],
Help/Contents/Regression and Correlation Analysis/Correlation Matrix
Review Help/Contents/Regression and Correlation Analysis/Multiple Regression.

Jan. 31/1 Multiple regression demo and practice.
Homework: Help/Contents/Regression and Correlation Analysis/Multiple Regression
Review Help/Contents/Analysis of Variance and T-Tests/One-Sample [Includes Paired] T-Test.

Feb. 7/8 One-Sample and Paired T-tests demo and practice.
Homework: Help/Contents/Analysis of Variance and T-Tests/One-Sample [Includes Paired] T-Test
Review Help/Contents/Analysis of Variance and T-Tests/Two-Sample T-tests.

Feb. 14/15 Two-Sample T-tests demo and practice.
Homework: Help/Contents/Analysis of Variance and T-Tests/Two-Sample T-tests
Review Help/Contents/Analysis of Variance and T-Tests/Analysis of Variance

Feb. 21/22	Analysis of variance demo and practice. Homework: Help/Contents/Analysis of Variance and T-Tests/Analysis of Variance Review Help/Contents/Analysis of Variance and T-Tests/General Linear Models Analysis of Variance.
Feb. 28/1	Analysis of covariance demo and practice. Homework: Help/Contents/Analysis of Variance and T-Tests/General Linear Models Analysis of Variance Review Help/Contents/Graphics/Bar Charts, Box Plots, Pie Charts, and Scatter Plots.
March 7/8	Graphics demo and practice. Homework: Help/Contents/Graphics/Bar Charts, Box Plots, Pie Charts, and Scatter Plots. Prepare for Mid-term exam.
Mar. 14/15	Open date for lab work, practice.
Mar. 21/22	Mid-term exam. Evaluation. Homework: Develop problems, instruments, collect data.
Mar. 28/29	Spring Break! No class.
April 4/5	Dissertation simulation: Present problem statements, instruments, techniques, and data collection and analysis plans. Homework: Continue with dissertation simulation.
Apr. 11/12	Dissertation simulation: Present problem statements, instruments, techniques, and data collection and analysis plans. Homework: Continue with dissertation simulation.
Apr. 18/19	Dissertation simulation: Present problem statements, instruments, techniques, and data collection and analysis plans. Presentations of dissertation simulations. Homework: Continue with dissertation simulation. Prepare dissertation simulation examples for class.
Apr. 25/26	Presentations of dissertation simulations. Homework: Prepare dissertation simulation examples for class.
May 2/3	Presentations of dissertation simulations. Homework: Prepare for final exam over dissertation simulations.
May 8	4:00 pm - 6:00 pm. Final Exam over dissertation simulations. Evaluations. Posttest.
or	
May 9	6:00 pm - 8:00 pm. Final Exam over dissertation simulations. Evaluations. Posttest.

SPECIAL NOTE ABOUT INDIVIDUAL DIFFERENCES

To insure that we are all aware of individual differences, I wish to cite here from the NCATE accreditation manual:

Cultural Diversity: Cultural diversity refers to the cultural backgrounds of students and school personnel, including their ethnicity, race, religion, class, and sex.

Exceptional Populations: Exceptional populations are comprised of students who possess physical, mental, or emotional exceptionalities which may necessitate special attention by school personnel.

Global Perspective: A global perspective is the recognition of the interdependence of nations and peoples and the interlinking political, economic, and social problems of a transnational and global character.

Multicultural Perspective: A multicultural perspective is a recognition of (1) the social, political, and economic realities that individuals experience in culturally diverse and complex human encounters and (2) the importance of culture, race, sex and gender, ethnicity, religion, socioeconomic status, and exceptionalities in the education process.

The requirements for this class are flexible and designed to accommodate individual differences. All students are evaluated relative to the criteria presented within this syllabus, not relative to other persons. There are no restrictions on the number of A's, B's, or other grades to be awarded. All students who meet the requirements for the class will receive the appropriate grade, regardless of any of the above-noted individual differences.

Source of the above definitions: National Council for Accreditation of Teacher Education. (1990). NCATE standards, procedures, and policies for the accreditation of professional education units. Washington, D.C.: Author, 62-65.

Disabled Student Services

It is the policy of UALR to accommodate students with disabilities, pursuant to federal and state law. Any student with a disability who needs accommodation, for example, in seating, placement, or in arrangements for examinations, should inform the instructor at the beginning of the course. The chair of the department offering this course is also available to assist with accommodations. Students with disabilities are also encouraged to contact the Office of Disability Support Services, which is located in the Donaghey Student Center, Room 103, telephone 569-3143.

Source of the above information: UALR Graduate Bulletin.

UNIVERSITY OF ARKANSAS AT LITTLE ROCK
College of Education
Department of Educational Leadership
(revised 1/16/01)

I.	Course Prefix and Number	EDFN 8308
II.	Course Title	Applied Multivariate Data Analysis
III.	Credit	3 hours
IV.	Semester and Year	Spring, 2001
V.	Instructor	Rob Kennedy, Ph.D., Professor of Educational Foundations and Higher Education
VI.	Office Location	Dickinson 410
VII.	Office Hours	By appointment
VIII.	Telephone	501-xxx-xxxx (UALR), 501-xxx-xxxx (home) rlkennedy@ualr.edu (e-mail)

IX. Course Description

Complex designs used in educational research and the multivariate methods for analyzing such designs: multivariate analysis of variance and covariance, canonical correlation, discriminant function analysis, factor analysis, cluster analysis, logit analysis, log linear analysis, and time series analysis.

X. Course Objectives

Given a research problem and data, conduct an appropriate analysis and interpret the findings.

XI. Texts, Readings, and Instructional Resources

Required Text (latest version)

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Final exam (25%)

Grading scale:

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Evaluation Techniques/Concepts Used for Grading

Participation (25%)

For all or almost all statistical techniques there will be an annotated example in the text. You will be given one or more exercises to do in class for practice as part of your participation. You will explain and interpret your findings for these exercises.

Dissertation Simulation (25%)

For the dissertation simulation you will need to (1) develop a problem statement(s), (2) find or construct an appropriate instrument(s), (3) collect the data, (4) run the statistics, (5) interpret your findings, and (6) prepare and (7) present to the class the outcome. There are faculty and staff who will be happy to have you analyze data they have collected, if you are interested. Check with your instructor or others. Another source of information is the School Report Card, which is available from the Arkansas Department of Education in a spreadsheet format importable by NCSS. Individual district data is available from their web site.

Mid-term Exam (25%)

The mid-term exam will be hands-on and will consist of problems similar to the homework and/or classroom exercises and will be open book and open notes. The content will include the material covered up to the time of the exam. You will be given a problem statement and data and will be expected to "take it from there". You will need to determine the technique(s) needed to address the problem statement, enter the data, run the stats, interpret the results, and report your findings.

Final Exam (25%)

The final exam will be hands-on and will be similar in format to the mid-term as well as open book and open notes. The content will also include material covered up to the time of the exam. Again, you will be given a problem statement and data and will be

expected to "take it from there". You will need to determine the technique(s) needed to address the problem statement, enter the data, run the stats, interpret the results, and report your findings.

XIII. Class Policies

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Additionally, note that because the lab in which we will be working contains a large amount of very expensive equipment, please do not bring in food or drink. If you need to eat during class time, then you are welcome to visit the break lounge near the elevators.

If you must be available for communication, please set your cellular phone, pager, beeper, or other device on vibrate so that it does not annoy or distract the other students in the class should it activate. If you do need to take the call, please step out into the hallway to converse.

XIV. Class Schedule (tentative)

multivariate analysis of variance/covariance
discriminant analysis
logistic regression
loglinear modeling
clustering techniques
factor analysis
canonical correlation
time series analysis

January 18 Introduction, overview, picture, pretest
Homework: Help/Contents/Multivariate Analysis/MANOVA (Multivariate Analysis of Variance)

January 25 MANOVA (Multivariate Analysis of Variance) demo and practice
Homework: Help/Contents/Multivariate Analysis/Discriminant Analysis

February 1 Discriminant Analysis
Homework: Help/Contents/Regression and Correlation Analysis/Logistic Regression

February 8 Logistic Regression
Homework: Help/Contents/Multivariate Analysis/Loglinear Models

February 15 Loglinear Models
Homework: Help/Contents/Clustering Techniques

February 22 Clustering Techniques

Homework: Help/Contents/Multivariate Analysis/Factor Analysis

March 1	Factor Analysis Homework: Help/Contents/Regression and Correlation Analysis/Canonical Correlation
March 8	Canonical Correlation Homework: Help/Contents/Time Series Analysis and Forecasting
March 15	Time Series Analysis Homework: Prepare for Mid-term exam.
March 22	Mid-term exam. Evaluation.
March 29	Spring Break! No class.
April 5	Dissertation simulation: Present problem statements, instruments, techniques, and data collection plans. Homework: Continue with dissertation simulation.
April 12	Dissertation simulation: Present problem statements, instruments, techniques, and data collection plans. Homework: Continue with dissertation simulation.
April 19	Dissertation simulation: Present problem statements, instruments, techniques, and data collection plans. Presentations of dissertation simulations. Homework: Prepare dissertation simulation examples for class.
April 26	Presentations of dissertation simulations. Homework: Prepare dissertation simulation examples for class.
May 3	Presentations of dissertation simulations. Homework: Prepare for final exam over dissertation simulations.
May 10	6:00 pm - 8:00 pm. Final Exam over dissertation simulations. Evaluations. Posttest.

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To insure that we are all aware of individual differences, I wish to cite here from the NCATE accreditation manual:

Cultural Diversity: Cultural diversity refers to the cultural backgrounds of students and school personnel, including their ethnicity, race, religion, class, and sex.

Exceptional Populations: Exceptional populations are comprised of students who possess physical, mental, or emotional exceptionalities which may necessitate special attention by school personnel.

Global Perspective: A global perspective is the recognition of the interdependence of nations and peoples and the interlinking political, economic, and social problems of a transnational and global character.

Multicultural Perspective: A multicultural perspective is a recognition of (1) the social, political, and economic realities that individuals experience in culturally diverse and complex human encounters and (2) the importance of culture, race, sex and gender, ethnicity, religion, socioeconomic status, and exceptionalities in the education process.

The requirements for this class are flexible and designed to accommodate individual differences. All students are evaluated relative to the criteria presented within this syllabus, not relative to other persons. There are no restrictions on the number of A's, B's, or other grades to be awarded. All students who meet the requirements for the class will receive the appropriate grade, regardless of any of the above-noted individual differences.

Source of the above definitions: National Council for Accreditation of Teacher Education. (1990). NCATE standards, procedures, and policies for the accreditation of professional education units. Washington, D.C.: Author, 62-65.

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Source of the above information: UALR Graduate Bulletin.

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