

# DEVED 7373 Statistical Methods for Developmental Education Spring, 2018

DEVED 7373 is a required course for the doctoral degree in Developmental Education Administration

# **College of Education, Department of Educational Leadership**

3886

- **Office hours:** I will be readily available during the day to answer questions via email. Unless I am out-of-town, I will typically return emails within 24 hours. I am not available on Sundays.
- Course format: This course is fully online. This didactic class may include mini-lectures, Power Point presentations, peer-editing, demonstrations, whole class discussions, self-selected research, website searches, quizzes, exams, notes, article and journal critiques, and student presentations.
- Day and timeOur weekly modules open on SATURDAY morning. Assignments are dueclass meets:SATURDAY evening.

# **Course Description:**

This course is designed to familiarize doctoral students with the logic and dynamics of the research process in education. It will provide students with the opportunity to develop skills in posing research questions, designing studies, collecting and examining data, and interpreting and reporting research results in developmental education administration. Credit 3 (Graduate Catalog, 2016-2017)

Statistics is not an objective science (although some may not admit this). There are gray areas or areas where researchers legitimately disagree. I will tell you explicitly what my position is. In order to maintain consistency, my position on statistical matters will prevail for all assignments, exams, etc.

# **Required Textbooks**

- Abelson, R. P. (1995). *Statistics as principled argument*. New York, NY: Taylor & Francis Group.
- American Psychological Association. (2010). *Publication manual of the American Psychological Association*. (6th ed.).Washington, DC: Author.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2017). *Applied multivariate research: Design and interpretation* (3rd ed.). Los Angeles, CA: Sage.

\*Please note there is a student resource site for your text: https://study.sagepub.com/meyers3e/student-resources

#### **Required Software**

SHSU has licensed SPSS Statistics Premium for on-campus and home use by faculty and students. Please contact the IT@Sam Service Desk.

#### **Recommended Resource Textbooks**

- Cooper, H. M. (2011). *Reporting research in psychology: How to meet journal article reporting standards*. Washington, DC: American Psychological Association.
- Huck, S. W. (2012). Reading statistics and research (6th ed.). Boston, MA: Pearson.

## **Recommended Readings**

- American Educational Research Association. (2006). Standards for reporting on empirical social science research in AERA publications. *Educational Researcher*, *35*(6), 33-40. doi:10.3102/0013189X035006033
- Cohen, J. (1990). Things I have learned (so far). *American Psychologist, 45*, 1304-1312. doi:10.1037/0003-066X.45.12.1304
- Cohen, J. (1994). The earth is round (p < .05). *American Psychologist, 49*, 997-1003. doi:10.1037/0003-066X.49.12.997
- Fan, X. Statistical significance and effect size in educational research: Two sides of a coin. *The Journal of Educational Research*, 275-282.
- Fan, X., & Thompson, B. (2001). Confidence intervals for effect sizes. *Educational and Psychological Measurement, 61*, 517-531. doi:10.1177/0013164401614001
- Graham, J. M. (2008). The general linear model as structural equation modeling. *Journal of Educational and Behavioral Statistics*, 33, 485-506. doi:10.3102/1076998607306151
- Henson, R. (2006). Effect-size measures and meta-analytic thinking in counseling psychology research. *The Counseling Psychologist*, 34, 601-629. doi:10.1177/0011000005283558
- Skidmore, S. T., & Thompson, B. (2013). Bias and precision of some classical ANOVA effect sizes when assumptions are violated. *Behavior Research Methods*, 45, 536-546.doi:10.3758/s13428-012-0257-2
- Skidmore, S. T. (2009). What confidence intervals really do and why they are so important for middle grades research. *Middle Grades Research Journal*, *4*, 35-55.
- Skidmore, S. T. (2008, February). Experimental design and experimental validity threats: A primer. Paper presented at the Annual Meeting of the Southwest Educational Research Association, New Orleans, LA. (ERIC Document Reproduction Service No. ED 499991).
- Thompson, B. (2007). Effect sizes, confidence intervals, and confidence intervals for effect sizes. *Psychology in the Schools, 44*, 423-432. doi:10.1002/pits.20234
- Wilkinson, L., & the Task Force on Statistical Inference. (1999). Statistical methods in psychology journals guidelines and explanations. *American Psychologist*, 54, 594-604. doi:10.1037/0003-066X.54.8.594

APA Resources: http://www.apastyle.org/elecref.html and http://shsulibraryguides.org/APA

## YouTube Channel

https://www.youtube.com/user/TheJoyofStats

#### YouTube Videos

Skidmore, S. T. [Statistics Fun]. (2015, May 29). *Making a podcast with background music using Audacity* [Video file]. Retrieved from https://youtu.be/gwE1vqrwE28

Skidmore, S. T. [Statistics Fun]. (2015, May 18). Using the speak function [Video file]. Retrieved from https://www.youtube.com/watch?v=j5ciKsKL2Ck

- Skidmore, S. T. [Statistics Fun]. (2014, April 6). SPSS ANOVA [Video file]. Retrieved from https://www.youtube.com/watch?v=tPWZHcAM4A0
- Skidmore, S. T. [Statistics Fun]. (2014, February 26). *Correlation SPSS* [Video file]. Retrieved from https://www.youtube.com/watch?v=V6UCHb\_mYio

Skidmore, S. T. [Statistics Fun]. (2014, February, 19). *Dependent t* [Video file]. Retrieved from https://www.youtube.com/watch?v=TzBmhKxQSEI

Skidmore, S. T. [Statistics Fun]. (2014, February 8). Importing excel into SPSS and recoding nominal variables [Video file]. Retrieved from https://www.youtube.com/watch?v=KmYmBigzWUc

Skidmore, S. T. [Statistics Fun]. (2014, February 8). *One Sample t* [Video file]. Retrieved from https://www.youtube.com/watch?v=Lm7SIXU2ddY

Skidmore, S. T. [Statistics Fun]. (2014, February 8). *Independent t test* [Video file]. Retrieved from https://www.youtube.com/watch?v=aCDpyhn1aU0

Skidmore, S. T. [Statistics Fun]. (2014, January 31). *APA style table* [Video file]. Retrieved from https://www.youtube.com/watch?v=FPxobxukojU

Skidmore, S. T. [Statistics Fun]. (2014, January 28). Using the explore command [Video file]. Retrieved from https://www.youtube.com/watch?v=Fodibp6aL-I

Skidmore, S. T. [Statistics Fun]. (2014, January 28). *Frequency command for ordinally scaled variables* [Video file]. Retrieved from https://www.youtube.com/watch?v=\_2qd13Zix\_0

Skidmore, S. T. [Statistics Fun]. (2014, January 28). Frequency command for nominally scaled variables [Video file]. Retrieved from https://www.youtube.com/watch?v=QNKkB1Sz2D4

Skidmore, S. T. [Statistics Fun]. (2014, January 22). SPSS basics part 2: Descriptives [Video file]. Retrieved from https://www.youtube.com/watch?v=Iy1sePUhDdI

Skidmore, S. T. [Statistics Fun]. (2014, January 22). SPSS basics part 1: Descriptives [Video file]. Retrieved from https://www.youtube.com/watch?v=B6DhY\_JpuA

#### **Online Reading Sources:**

http://davidmlane.com/hyperstat/index.html http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm http://www.uvm.edu/~dhowell/fundamentals7/index.html http://wise.cgu.edu/ http://www.onlinestatbook.com/ http://www.readingstats.com/Sixth/index.htm http://www.socialpsychology.org/methods.htm#onlinetexts http://www.socialresearchmethods.net/kb/contents.php http://www.statsoft.com/textbook/stathome.html

# Additional readings of research articles as assigned

# **Course Objectives**

- I. Introductory terms and concepts
  - a. Differentiate between independent and dependent variables
  - b. Distinguish levels of data (i.e., nominal, ordinal, interval, and ratio)
- II. Design: Demonstrate knowledge of the major steps involved in conducting a quantitative research study

a. Identify the major threats to the internal validity of findings

- b. Identify the major threats to the external validity of findings
- III. Measurement: Understand the concept of psychometric properties of quantitative instruments (e.g., score reliability, score validity)
- IV. Statistical Analyses: Be able to choose an appropriate statistical analyses given a particular situation

a. Descriptives

- i. Create basic frequency distribution tables and figures
- ii. Central Tendency: Identify and compute basic measures of central tendency (e.g., mode, median, mean)
- iii. Dispersion: Identify and compute basic measures of variability (e.g., range, variance, standard deviation)
- iv. Shape: Identify and compute basic measures of distributional shape (e.g., skewness, kurtosis)
- b. Measures of Bivariate Relationship
  - i. Create and interpret scatterplots directly related to correlational procedures
  - ii. Identify, compute, and interpret statistical methods of determining parametric and nonparametric bivariate relationships (e.g., Pearson product-moment correlation coefficient, Spearman rank order correlation coefficients)
  - iii. Write, in appropriate APA 6th edition style, an interpretation of correlational results, both for Pearson r and for Spearman  $\rho$ .
- c. Measures of Difference
  - i. Identify, compute, and interpret statistical analytic methods of determining mean differences through the use of parametric and nonparametric *t*-tests (i.e., one-sample, independent samples, and dependent samples)
  - ii. Write, in appropriate APA 6th edition style, an interpretation of a parametric and nonparametric *t*-test result (i.e., one-sample, independent samples, and dependent samples)
  - iii. Identify, compute, and interpret statistical analytic methods of determining mean differences through the use of parametric and nonparametric analysis of variance
  - iv. Write, in appropriate APA 6th edition style, an interpretation of parametric and nonparametric analysis of variance results
- d. Statistical Significance: understand the benefits and limitations of inferential tests
- e. Practical Significance: identify and compute basic measures of practical significance
- V. Be a thoughtfully critical consumer and producer of research.

**IDEA Objectives:** In this course, our focus will be on these major objectives (as assessed by the IDEA course evaluation system): Essential:

• Learning to analyze and critically evaluate ideas, arguments, and points of view Important:

• Gaining factual knowledge (terminology, classifications, methods, trends)

Course Evaluation: Evaluation consists of professor-developed assessments, including exams, homework assignments, discussion boards, presentations, and/or written reports of the conducted analyses. Your professionalism (attendance, punctuality, attention during class) is also considered in the course evaluation.

- A = Exceeds Standards and demonstrates learning beyond the course and stated expectations. "A" work is earned by learners who extend learning beyond the minimum presented in class and demonstrate developed reasoning, written, and verbal communication skills. A student cannot earn an A if any assignments are turned in late or are missing, even if the student earns 90% of the total points.
- B = Meets Standards and demonstrates mastery of objectives assessed. "B" work is earned by learners who demonstrate responsibility by meeting all deadlines, attending class, completing homework assignments, and earning passing grades on assessments.
- <u>C= Inconsistent performance</u> that may be impacted by incomplete assignments, absences, or tardiness. "C" work is earned for submissions with several mechanical errors or issues related to quality and quantity standards.
- F= Failure to meet Standards as demonstrated by incomplete assignments, absences, tardiness, and failure to produce doctoral level work.

Regarding grading, work that 'meets expectation' for doctoral-level work will receive a B. Students earning A's will demonstrate work that exceeds expectations in quantity, quality, and levels of thought.

Grading Policy	
Assignment	Percentage of
Assignment	Grade
Weekly Participation (2pts/week)	30%
Homework (7pt each)	28%
Presentation	12%
Oral Exam	20%

- 1. <u>Weekly Participation</u>: Students are expected to be attentive in class and participate in class discussions or online discussion board sessions for online courses. Students should be punctual and should attend all classes or online synchronous sessions. Students are expected to turn in assignments when they are due.
- 2. Homework: There will be five homework assignments throughout the semester. I will ask you to work problems and interpret results. Remember statistics is about *thinking*. The computer and calculator are tools to help you more efficiently get to your results. However, the computer and calculator cannot think for you - thinking is entirely your responsibility! Homework assignments are designed to give you a deeper understanding of the following concepts.

# • Homework #1

Applied Skills Addressed: frequency table, crosstabs, central tendency, dispersion, and shape in SPSS (question, syntax, output, interpretation)

# • Homework # 2

Applied Skills Addressed: scatterplots, Pearson r, and  $\rho$  in SPSS (question, syntax, output, interpretation)

# • Homework # 3

Applied Skills Addressed: means test for two groups in SPSS (question, syntax, output, interpretation)

# • Homework #4

Applied Skills Addressed: means test for two or more groups in SPSS (question, syntax, output, interpretation)

# 3. Presentation:

- a. Each student will be expected to research, analyze, interpret, and present their findings to the class in the form of a presentation.
- b. The purpose of the assignment is to apply the skills learned in class and to develop competency in researching, analyzing, interpreting and presenting research findings.
- c. The presentation <u>MUST</u> include the following
  - i. Introduction (including lit review) and Research Questions
  - ii. Method: What? (design/plan), With Who? (sample), Where? (location of data collection), With What? (measures/data source), When? (time frame of data collection), How (analysis and rationale)
  - iii. Results: What did you find?
  - iv. Discussion: Interpretation and So What?
- *d.* Presentations <u>MUST</u> include a handout. The handout can be a power point presentation, Prezi, etc. *If you used synthesized (class) data for your presentation you must make this explicitly clear in your presentation.*
- 4. Oral Exam:

The oral final exam is cumulative. The question format may be multiple choice and/or short answer. The exam may involve students analyzing given data or their own data and describing results. The exam may include SPSS output and/or require students to interpret the output. You will not need to memorize formulas or write SPSS syntax for the exams. I am interested in conceptual and applied understanding of the topics covered. I will schedule individual oral exams with each of you.

The expectation for all course evaluations is that YOU are responsible for any and all material presented online as well as any material in the required weekly readings. In other words, keep up with your readings, and ASK questions if something is unclear.

## **Tentative Class Schedule**

# When there are changes to the schedule below you will be notified via your SHSU email.

Week	Description	Readings	Artifact
1 - 1/17 - 1/27 2 - 1/27 - 2/3	Unit 1 Begin with a question: A Review Research design, types of variables, data collection, scales of data, groups, relationships, strengths, and limitations	* pp. 9-17 MGG *Ch 1 Abelson *Ch 2 Abelson	*Study Development *Critique
3 - 2/3 - 2/10 4 - 2/10 - 2/17	Unit 2 God is in the details Descriptive statistics, chi-squared, tables and figures	*Ch 3A MGG *Ch 3B MGG *Ch19Howell	*HW#1
5 - 2/17 - 2/24 6 - 2/24 - 3/3 7 - 3/3 - 3/10	Unit 3 <u>It's all about relationships</u> GLM, parametric, and nonparametric	*Ch 4A MGG *Ch 4B MGG *Ch 3 Abelson	*HW#2
8 - 3/17- 3/24 9 - 3/24 - 3/31	Unit 4 <u>What's the difference? Two for t</u> Parametric and nonparametric	*Ch 10 Huck	*HW#3
10 - 3/31 - 4/7 11 - 4/7 - 4/14 12 - 4/14 - 4/21	Unit 5 <u>More differences</u> Parametric and nonparametric	18A.1-18A.3.3, 18A.6.2-18A.8.2 18B.1	*HW#4
13 - 4/21 - 4/28	Unit 6 Show and Tell	*Ch 6 Abelson	*Presentation
14 - 4/28 - 5/5	Unit 7 <u>Measuring Up</u>	*Henson (2001) *Linehan et al. (2006) *Ch 7 Abelson	*Reflection
15 - 5/5 - 5/9	Wrap up and Final Exam	*Ch 8 Abelson	*Final Exam

*Note*. Standard measurement codes: Course Objective, CO; SPA Standard alignment, S; Texas Education Standards/Competencies, TS; Diversity and Disposition Proficiencies, DDP; Conceptual Framework Indicator, CF; NCATE Standard, NCATE; ISTE NETS Technology Standards, NETS. Activity measurement codes: Cooperative learning team, CLT; Case study, CS; Certification standards exercise, CSE; Exam, E; Interview, I; Lecture, L; Participation or discussion board, PD; Question development, Q; Reading, R; Research Paper, RP; Reflection on Reading, RR; Speaker, S; Student presentation, SP; Survey, SU. Some codes may not be used this semester.

# **Student Guidelines**

# **Course Expectations:**

- □ Late assignment policy
  - Assignments are due as stated. Please do not ask to turn in an assignment after the due date. <u>Late work at the graduate level is considered unacceptable.</u>
  - If unforeseen emergencies present themselves you may petition the instructor in writing for consideration of *one* extenuating circumstance.
- □ Time requirement

- Students are expected to attend every class. If a student must be absent for class due to illness or emergency, that student must contact (email) the instructor.
- Students also are expected to arrive to class on time. Quizzes, when given, are typically at the beginning of class. If you are late, you will miss the quiz. You will not be able to make up the quiz unless you want to consider this your one extenuating circumstance for the semester.
- For online sessions, a student will be considered absent if he/she does not participate in weekly activities in a timely manner.
- $\Box$  Professionalism policy
  - Students are expected to strive toward the highest level of professionalism by adhering to and modeling professional, ethical, and legal standards.
  - It is imperative that students turn off or silence their cell phones prior to the start of class/online meetings. Students should refrain from reading or writing email messages or engaging in any other off-task behaviors at any point during class/online meetings. Please refrain from engaging in side conversations during class/online meetings unless directed to do so by the instructor. Finally, if you are in an online meeting, please be respectful and join the meeting from a quiet space (we should not be able to hear your television, music, barking dog, or other such noises from your microphone). Note that simply muting yourself is not the same thing as "joining the meeting from a quiet space".
- □ Learning
  - Students are expected to take responsibility for their own learning by

     (a) relating course content to their professional interests, (b) self-regulating their learning, and (c) seeking clarification and help as needed.

# **University Policies**

- SHSU Academic Policy Manual-Students
  - o Procedures in Cases of Academic Dishonesty #810213
  - o <u>Students with Disabilities Policy #811006</u>
  - o Student Absences on Religious Holy Days #861001
  - o Academic Grievance Procedures for Students #900823
  - <u>Use of Telephones and Text Messages in Academic Classrooms and Facilities</u> <u>#100728</u>
  - Graduate students are governed by the SHSU's policies related to student conduct. Any student with questions about grievances, ethical behavior, etc. should review the SHSU Graduate Catalog and the Texas State University System Rules and Regulations. See: <u>http://www.shsu.edu/~vaf\_www/aps/stualpha.html</u>
  - Visitors in the Classroom- Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance.
  - Student Syllabus Guidelines with link -<u>http://www.shsu.edu/sacs/compliancereport/narratives/documents/3.4.5-SHSU-Syllabus-Guidelines.pdf</u>
- □ The syllabus is subject to change pending notification.

# **College of Education Information**

### Accreditation

The programs within the SHSU College of Education have the distinction of receiving accreditation and national recognition from multiple accrediting bodies. All educator certification programs, including teaching and professional certifications, have received ongoing accreditation from the Texas Education Agency (<u>TEA</u>). Additionally, the educator preparation program has been accredited by the Council for the Accreditation of Educator Preparation (<u>CAEP</u>-formerly NCATE) since 1954. Many of the educator preparation concentration areas have also chosen to pursue national recognition from their respective Specialized Professional Associations (<u>SPA</u>), signifying the program is among the best in the nation. The programs within the Department of Counselor Education have also received accreditation from the Council for Accreditation of Counseling and Related Educational Programs (<u>CACREP</u>).

#### **Course and Program Evaluation**

Near the end of the semester, students are asked to take part in the University's adopted course evaluation system, IDEA. The assessments are completed online and instructions are emailed to each student. Students' assessments of courses are taken are systematically reviewed by the Dean, Associate Deans, Department Chairs, and individual faculty members. Only after the semester has completed are faculty members allowed to view aggregated results of non-personally-identifiable student responses.

The College of Education conducts ongoing research regarding the effectiveness of the programs. Students receive one survey in the final semester prior to graduation regarding the operations of the unit during their time here. A second survey occurs within one year following completion of a program, and is sent to students and their employers. This survey requests information related to students' quality of preparation while at SHSU. Students' responses to these surveys are critical to maintaining SHSU's programs' excellence.