EPSY 6358.01
Introduction to Research

Instructor: Ralph Carlson
Term: Summer II 2018
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Office Location: EEDU 1.208
Office Hours: Monday ~ Friday 2:30~4:30 Pm

Class Time and Location: Tuesday 4:40~9:40pm; EEDU 2.222

Textbook and/or Resource Material
Recommended Text:

Course Description and Prerequisites
This course will provide an overview of research methods used in educational settings. Both quantitative and qualitative methods will be covered. Ethical and legal issues associated with conducting research will be addressed. Students will demonstrate their knowledge and skills by completing a project.
Prerequisite: Admission to graduate school.

Methods of Instruction (teaching)

A. Direct (expository) teaching
   1. lecture method of presentation of content (topic or concept):
      gestalt → parts → gestalt
   2. modeling
   3. demonstrations
   4. guided practice
   5. independent practice
   6. small group/cooperative learning
   7. measurement and evaluation

B. Activities
   1. homework (independent practice)
   2. class discussion
   3. review

C. Methods of Learning for Students
   1. mnemonic system(s)
   2. elaboration of meaning
   3. actively thinking about one’s thinking
   4. management of self and information

D. Methods of Measurement and Evaluation
   1. grading of homework
   2. research proposal

This syllabus subject to change in order to better meet course objectives per discretion of instructor.
†CROSSWALK COURSE
This course satisfies: Intellectual, professional, and academic development for graduate students, masters and doctoral, and faculty.

Learning Objectives/Outcomes for the Course

Student Learning Outcomes

After instruction/teaching:

1. Students will be able to utilize and engage rational thought and data.
2. Students will know what some of the criteria might be for knowing/science.
3. Students will know what some of the characteristics are for knowledge/science.
4. Students will know and understand the logic system for hypothesis testing.
5. Students will be able to partition variance and covariance into its various sources and error term(s).
6. Students will understand what statistical significance means and what it does not mean.
7. Students will be able to specify the criteria and conditions for falsifying, debunking, or deleting their most cherished hypotheses, ideas, and theories (Sir Francis Bacon).
8. Students will be able to interpret effect size/practical/functional/substantive significance: partial eta squared and Cohen’s d.
9. Students will be able to use exploratory and confirmatory data analysis side by side (Tukey, 1977).

Course Technology
Tools: SPSS (Statistical Package for the Social Sciences)

Technical Knowledge Requirements
You are expected to be proficient with installing and using basic computer applications and have the ability to send and receive email attachments.

Major Requirements, Demonstration of Mastery and Evaluation

Assignments and Assessments

Develop and present a written proposal for a research study that includes:

1. statement of the problem
2. review of the literature (theoretical/empirical) directly and indirectly related
3. develop the research design and methodology, and statistical/data analysis

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UTRGV University Policies

UTRGV Policy Statements

The UTRGV disability accommodation, mandatory course evaluation statement and sexual harassment statement are required on all syllabi. Additional policy statements are optional, such as those covering attendance, academic integrity, and course drop policies.

STUDENTS WITH DISABILITIES: Required on all syllabi. Do not modify.
If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time.

Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu.

Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available:

Summer 2018 Mandatory Course Evaluation Period

June 6 - June 12                  Summer I Module 1
July 2 - July 9                   Summer I (standard - 5 week)
August 1 - August 7               Summer II Module 2
August 9 - August 16              Summer II (standard - 5 week)

Course Policies

Attendance Policy (Refer to UTRGV Policy)

This syllabus subject to change in order to better meet course objectives per discretion of instructor.
ATTENDANCE:
Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

SCHOLASTIC INTEGRITY: Recommended on all syllabi.
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE: Required on all syllabi. Do not modify.
In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

COURSE DROPS: Recommended on all syllabi; may be modified by the instructor as long as it is not inconsistent with UTRGV policy.
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

This syllabus subject to change in order to better meet course objectives per discretion of Instructor.
### Problem
How will your study contribute to the applied, basic/pure, theoretical levels of knowledge?

### Literature Review
1. Theory
2. Previous Empirical Research

### THREE DISCIPLINES IN RESEARCH

<table>
<thead>
<tr>
<th>I. Observation and Measurement</th>
<th>II. Research Design and Methodology</th>
<th>III. Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Interviews</td>
<td>1. Who are you going to observe? Units: teacher, students, classrooms, schools, etc.</td>
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<tr>
<td>B. Focus groups</td>
<td>2. How are they selected? (Randomly [gender, ethnicity, age(s), grade level(s), natural occurring])</td>
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<td>C. Documents</td>
<td>3. How are you going to observe or collect data? (Individually, groups, mail service, electronic)</td>
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<tr>
<td>D. Case studies, etc.</td>
<td>4. When are you going to observe once or repeated measures?</td>
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<td>E. Participant observer</td>
<td>5. Treatment or intervention</td>
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<td>SCALING</td>
<td>6. A. What is the dependent, criterion, or endogenous variable? For example: reading achievement as measured by... educational leadership as measured by... heart rate as measured by...</td>
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<tr>
<td>A. What level of scale?</td>
<td>B. What is the independent, predictor, or exogenous variables? For example: socioeconomic status as measured by... linguistic proficiency as measured by... gender; age; years of experience; educational level, etc.</td>
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<tr>
<td>1. Nominal</td>
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<td>2. Ordinal</td>
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<td>3. Interval</td>
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<td>4. Absolute/ratio</td>
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<td>B. Item Analysis:</td>
<td>7. There are two types of controls in research:</td>
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<td>1. Rasch,two parameter, or three parameter</td>
<td>A. Mathematical/Statistical</td>
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<td>2. Item discrimination</td>
<td>B. Experimental (a rigorous research design and methodology will reduce the ambiguity of the obtained results or effects, that is, reduce the number of plausible rival hypotheses that may explain the results or effects)</td>
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<td>3. Item difficulty</td>
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<td>4. Linear transformation</td>
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<td>5. Non-linear transformation</td>
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<td>C. True Score Theory</td>
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<td>1. Sources of measurement error</td>
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<td>2. SE measurement and SE difference</td>
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<td>D. Validity</td>
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<td>For example: Factor Analysis.</td>
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<td>What are the latent dimensions of the scale? Does your method of observation, scale, test, measure have fidelity with the phenomena?</td>
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1. Is the study making comparisons?
2. Is the study addressing trends, patterns, relationships?
   A. Exploratory data analysis
   B. Confirmatory data analysis
   C. Data analysis will address the uncertainty of the obtained results or effects and effect size.
1. Rigorous research design and methodology will reduce the plausible rival hypotheses that may explain your results.

2. Interpretation and meaning of the obtained results from a research study is derived from and based upon the research design and methodology used in the study.

3. As professionals and researchers we can be certain of our methods but not our results.

4. A clearly defined and delineated research design and methodology for a study will facilitate an independent replication of the study.

5. Rigorous research design and methodology will reduce the ambiguity of the obtained results.

6. Professionals and scientists must specify the criteria and conditions for falsifying, debunking, deleting, and discarding one’s most cherished theories, hypothesis, and ideas.

   – Sir Francis Bacon (1561-1626)
OUTLINE

- Criteria for Science/Knowing
  1. rational/logical (theoretical/mathematical distribution) (page 3)
  2. empirical (empirical/observed distribution) (page 4)
  3. pragmatic (page 6)

- Characteristics of Science
  1. self-corrective (page 7)
  2. repeatability and statistical significance (significance testing and repeatability are different concepts) (page 7)
  3. healthy sense of skepticism (page 8)

- Galileo Galilei (1564 – 1642)
  1. University of Pisa (1589 – 1592)
  2. University of Padua (1592 – 1609), lecturing on mathematics
  3. Inquisition (1633) in Spain and around the Mediterranean and in San Miguel de Allende, Mexico at the corner of calles Hernandez Macias and Pila Seca

- Issue: Hypothesis testing/statistical significance and effect size

- Bacon, Francis (1561 – 1626). (Professionals and scientists must specify the criteria and conditions for falsifying, debunking, deleting and discarding one’s most cherished theories, hypotheses, and ideas)

- Confidence intervals
- Bootstrap procedure
- Jackknife procedure

- Exploratory Data Analysis (John Tukey)
  1. History of outliers
  2. Box – and – Whisker plots
  3. Stem – and – leaf

- “Today, exploratory and confirmatory can – and should – proceed side by side.”

- Repeated Measures Analysis: normality of distribution and sphericity as assumptions and effects

- Adjusting for nested effects in nest/hierarchical Educational and Psychological Measures