Quantitative Research Methods

Course Description

The course is designed to provide the student with the knowledge and skills needed to read, analyze and synthesize educational research, and to give the student experience in the development and conduct of a research project. Course content includes instruction in preparation of a research proposal, identification of a research problem, sampling techniques, research design, instrumentation, data collection, and data analysis.

Prerequisites: EDLD 6333, EDLD 6392, EDLD 6384

Rationale

Doctoral students must be knowledgeable and competent in the methodology of educational research in order to complete a doctoral dissertation. This course will provide the student with the opportunity to gain both theoretical and practical knowledge needed to conduct an educational research study. It will also provide the student with the opportunity to review and synthesize professional literature in areas of interest.

Course Objectives/Learning Outcomes

After successful completion of the course, the student should be able to demonstrate knowledge and understanding of:

1. The basic skills required to comprehend and analyze educational research studies in a variety of educational settings.
2. The different types of research design and their appropriate usage.
3. The statistical techniques which are appropriate to use in different research designs.
4. The basic research skills needed to plan and conduct a research study.
5. Ethical standards and considerations in conducting research in an educational setting.
6. The methodology for writing a literature review for a research topic.

State Adopted Proficiencies for Teachers and/or Administrators/Counselors - NA
TExES Competencies – NA
Carnegie Project on the Educational Doctorate (CPED) Principles:

4. Provides field-based opportunities to analyze problems of practice and use multiple frames to develop meaningful solutions.

5. Is grounded in and develops a professional knowledge base that integrates both practical and research knowledge, that links theory with systemic and systematic inquiry

6. Emphasizes the generation, transformation, and use of professional knowledge and practice.

Textbooks


Recommended Reading


Frey, B.B. (2015). 100 questions (and answers) about tests and measurement. LA, CA: SAGE


Salkind, N.J. (2012). 100 questions (and answers) about research methods. LA, CA: SAGE


**Must read article:**

**Course Topics**

**Unit 1 - The Scientific Research Process**
- Styles of Research
- The Scientific Methods of Problem Solving
- Logical Reasoning
- Applied & Basic Research
- Characteristics of Scientific Research
- Research Strategies and Variables
- Research Quality
- MaxMinCon Principle
  *Gall, Gall, & Borg: chapters 1-2*

**Unit 2 – An Overview of Research Designs**
- Experimental Research
- Ex Post Facto Research
- Other Types of Research
- Confounding/Extraneous Variables
- Selected Pre-experimental, True-experimental, & Quasi-experimental Designs
- Factorial Designs, Repeated Measures Designs
- Questionnaire Survey
- The Interview as a Research Tool
  *Gall, Gall, & Borg: chapters 9-12 (required), 13-19 (recommended)*

**Unit 3 - Instrumentation**
- Validity (face, content, criterion-related, construct)
- Reliability (test-retest, equivalent forms, internal consistency, Spearman-Brown Prophecy Formula, KR 20 & KR 21 Formulas, procedures to compute Cronbach’s Coefficient Alpha)
- Scaling (Likert, Thurstone, Semantic Differential)
- Commonly Used Tests in Educational Research
- Data Collection Methods
  *Gall, Gall, & Borg: chapter 5, pp. 116-126*
Unit 4 - Exploratory Factor Analysis
- Factor Extraction and Rotation
- Factor Analysis vs. Component Analysis
- Sample Size Estimation
  Gall, Gall, & Borg: chapter 11, p. 275; Course Packet, Unit 4

Unit 5 - Item Analysis
- Item Difficulty, Item Discrimination, Distractor Analysis

Unit 6 - Sampling
- Target vs. Accessible Population
- Probability vs. Non-probability Sampling
- Sample Size Estimation, Using SPSS
  Gall, Gall, & Borg: chapter 5, pp. 113-116

Unit 7 - An Overview of Data Collection and Data Analysis
- Descriptive Statistics vs. Inferential Statistics
- Univariate vs. Multivariate Statistics
- Parametric vs. Non-Parametric Statistics
  Gall, Gall, & Borg: chapters 6-8

Instructional Methods and Activities
- Lecture/discussion
- Practice problems
- Homework assignments
- Data analysis exercises
- Developing the dissertation proposal

Evaluation and Grade Assignment

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<td>Homework Assignments</td>
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<td>Dissertation Topic Paper</td>
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The Collaborative Institutional Training Initiative (CITI) is the program utilized by TAMU-CC to ensure training is received by all faculty members, staff, and students engaged in human subject research. Go to http://research.tamucc.edu/compliance/citi-training.html and complete the CITI Human Subjects Basic Refresher Course. Provide the instructor with a copy of the completion certificate. Due: __________________

Grading Scale:
90 – 100    A
80 - 89    B
70 - 79    C
60 - 69    D
< 60    F

Incomplete, I. “An incomplete notation may be given to a student who is passing but has not completed a term paper, examination, or other required work for reasons beyond the student’s control other than lack of time.”

Course Schedule and Policies

1. Course schedule follows the course topics.
2. Late assignments are not accepted except in extenuating circumstances at the discretion of the instructor. Students who find that they are unable to be at an examination session because of illness or extenuating circumstances should contact the instructor as soon as the condition becomes apparent to arrange fair and practical extensions.
3. The instructor expects complete honesty in the completion of test and assignments. Plagiarism, “the act of taking the work/writings of another person and passing them off as one's own,” is not tolerated.
4. Cell phone use for personal business is not allowed in class.

Grade Appeals

As stated in University Rule 13.02.99.C2.01, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.
Disability Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall, Room 116. If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Academic Integrity/Plagiarism

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in failing the course.

Dropping a Class

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. This term, 4.7.2017 is the last day to drop a class and an automatic grade of “W” will be assigned to the student.

Classroom/Professional Behavior

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, and the like.
Statement of Civility (can be in place of classroom/professional behavior)

Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state, and federal government. We expect that you will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

Statement of Academic Continuity

In the event of an unforeseen adverse event, such as a major hurricane and classes cannot be held on the campus of Texas A&M University–Corpus Christi, this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

Dissertation Topic Paper

The primary purpose of this learning activity is to begin developing your doctoral dissertation proposal. Specifically, you are asked to identify the problem and formulate the research questions. In other words, you are expected to produce a “rough” draft of chapter 1 of the dissertation proposal. In EDLD 6397 – Dissertation Research, you will write the first draft of the three-chapter (introduction, review of literature, method) dissertation proposal. A typical chapter 1 for a quantitative study consists of the following:

1. Title of the study
2. Background and Setting
3. Statement of the Problem
4. Theoretical Framework
5. Purpose of the Study
6. Research questions
7. Operational Definitions (the measurement of major variables)
8. Glossary of terms
9. Delimitations, Limitations, and Assumptions
10. Significance of the Study
11. References

The dissertation topic paper, at the least, must include items #1 to 6, 11, and 12.

Format: Typed, double-spaced, (APA style), Due: _____________________
Qualitative dissertations vary in style and content based on the kind of research conducted. Some researchers present their information in a traditional format, while others use experimental approaches in presenting information. Neither approach is incorrect as long as all the pertinent information is presented so that the readers can determine academic rigor and trustworthiness of the work.

TRADITIONAL FORMAT OF QUALITATIVE RESEARCH

Chapter 1 – Introduction of the entire dissertation with presentation of dissertation topic, rationale for the study, research purpose and questions, operational definitions, methodology, theoretical framework, limitations of the study, and positionality statement. There are no specific page limits on this chapter, but usually qualitative dissertations do not have any more than 15-25 pages in the first chapter. Sections in Chapter 1 include:

Title of the Dissertation
Make sure the title is descriptive of the topic and the methodology. You can use a working title for now and finalize it later. People use colons to address this issue although it can become very long sometimes. Keep the title as brief and informative as possible.

Background of the Study
This section should include contextual information on the research topic to familiarize the reader about the subject matter of the study. This section can also include a narrative that demonstrates the salient issues of the topic from where the researcher launches into introducing the topic and transitions to the rationale for the study.

Statement of the Problem
In this section the writer describes the reasons why studying the topic is relevant from substantive perspectives and methodological perspectives. In other words, if there is a need to understand how participants experience a phenomenon and such work is minimal in the existing literature, then the researcher can use both substantive and methodological rationales for the study. Of critical importance is to identify a gap in the existing literature and make an argument for how the current study will contribute to the gap. It answers the questions of what is being done in the study, telling the reader why this study is important and timely.

Purpose of the Study and Research Questions
The researcher needs to describe the focus/goal/objective of the study and how the student plans to solve the problem that described earlier. It is important to note that the purpose of the study needs to include appropriate contextual details, construct that will be studied, number of participants, and the exact role of the study (i.e. to identify, explore, discover, evaluate, etc.).

Two to three research questions are appropriate in qualitative research. The research questions should reflect the ways in which the terms in the research purpose are operationalized. In other
words, if a term used in the research purpose has three components, then the research questions need to inquire into those three components, as part of the study.

**Operational Definitions**
In qualitative research, the researcher is expected to operationalize the construct that they will by studying by articulating definitions and indicators of the construct. For example, if the researcher is interested in exploring the *learning experiences* of participants in a *technology-integrated* classroom, the researcher is expected to articulate what *learning experiences* will be looked at and what qualifies as a *technology-integrated* classroom. These definition and qualifications need not be simply limited to “increase in test scores,” but can be definitions such as “the ways in which researchers engage with content, master course objectives, participate in class discussion, and participate in peer groups.” Whatever the operational definition is, the researcher is expected to measure the construct being studied based on the parameters set in the operational definition, and to support his/her operational definitions that will be used throughout the study with a reference of the author of each specific definition.

**Methodological Framework**
Qualitative research is grounded in its own methodological and epistemological framework. This is the grand theory that offers an organizing principle to the study and informs the reader how the researcher is going to approach the study. Thus, the researcher needs to identify whether the research is going to be informed by interpretivism theories, critical theories, or deconstructive theoretical critiques. While it is not expected to offer elaborate details of this theoretical framework in chapter 1, the researcher is still expected to orient the reader to the primary tenets of the framework with reference to key theorists and the general questions that can be asked out of the framework.

Along with the methodological framework, the researcher should also mention the methodology that s/he will employ in her/his study and how he/she will intent to use it. This can be case study, phenomenology, ethnography, etc., and what method of data collection (interviews, participant observation, journal, etc.), and data analysis (content analysis, constant comparative, narrative analysis, use of software, etc.).

**Theoretical Framework**
The researcher is expected to offer a theoretical framework that informs the subject matter of the study. This can be the framework of social learning, or community of practices, or other theoretical frameworks that closely relate to the topic of the study. Like methodological framework, the researcher does not have to outline all the tenets of this framework in the first chapter (delineate in chapter 2), but an introduction to the primary tenets of the framework, key scholars, and relevance for the study will suffice.

**Limitations of the Study**
The researcher needs to be aware of the limits of the study and clearly delineate what they are. One common mistake students make is that they state, “The study is not generalizable,” or “The study is subjective,” as limitations. These are not limitations of qualitative study because the purpose of qualitative studies is not to generalize. Thus stating lack of generalizability is not a legitimate reflection on limitations. Similarly, qualitative researchers do not purport to be value
neutral. They always situate who they are in context of the research so that the readers know how and why the researcher makes the conclusion that s/he does.

Some limitations to consider might be ethical issues, risk and benefits to the researcher, participants, to the field. Others can be the scope of the research. Additionally, methodological limitations such as verifying and triangulating information can be identified as an issue if the researcher has limited access to the information or the participant. In other words, limitations need to be grounded within the paradigm of qualitative inquiry or within the paradigm of substantive scope of the study.

**Positionality Statement**
Sometimes it makes sense that researchers write their subjectivity statement or briefly introduce the readers to the researcher’s relationship to the topic, built-in investments, and assumptions that the researcher brings to the study, and expected outcomes. Sometimes researchers include this statement in chapter one and at other times in chapter three, the methodology chapter. It is up to the student to consider what will offer the best logical flow of information.

**Significance of the Study**
In this section the researcher will explain why this study is important and make a significant contribution to the field of education.

**Chapter Summary**
In this chapter summary, researchers are expected to offer a brief recount of what they had introduced in the chapter. Then, it is advisable that the researchers orient the reader to the rest of the dissertation and a brief outline of the content in each of the chapters. This becomes especially relevant if the student’s dissertation is non-traditional.

**A FINAL NOTE**
Although the chapter outline here is a traditional outline of qualitative dissertations, the researcher is free to manipulate some of the ordering of information and use creative approaches to incorporate all of the information. For example, the researcher can start with a small narrative and then incorporate the rest of the elements of chapter one. Or, the researcher can begin introducing her/his positionality to orient the reader to the topic. There is some freedom in the ordering of information but by the end of chapter one, the reader should be familiar with the researcher’s topic, purpose of the study, research questions, methodology, theoretical frameworks, and limits of the study.

**Reference**