This course supports the assessments for RFC1. The course covers 12 competencies and represents 2 competency units.

**Introduction**

Overview
In this course you will learn of the following approaches to conducting research:

- Qualitative Research
- Quantitative Research
- Action Research

You will learn about several different research techniques, their advantages and disadvantages, and when it is appropriate to use them.

Throughout this course, questions are posted to guide your reading of the learning resources. Even though they may look inconsequential, each question highlights an important concept that you need to know in order to prepare for the objective assessment. Use the questions to guide your readings. In many activities, resources such as chapters and multimedia presentations are repeated because many concepts appear in the same chapter or multimedia presentation, and you will just need to focus on the concepts being studied.

Please watch the following video introduction for the course:

**Competencies**

This course provides guidance to help you demonstrate the following 13 competencies:

- **Competency 508.1.1: Quantitative Research Paradigms**
  The graduate understands the components of quantitative research.

- **Competency 508.1.2: Qualitative Research Paradigms**
  The graduate understands the components of qualitative research.

- **Competency 508.1.3: Action Research Paradigms**
  The graduate understands the components of action research.

- **Competency 508.2.1: Purpose of Literature Review**
  The graduate understands the purpose of conducting a literature review and understands its relationship to educational or healthcare research and practice.

- **Competency 508.2.2: Topic Selection**
  The graduate understands how to select appropriate research topics and research paradigms.

- **Competency 508.2.3: Resource Identification, Evaluation, and Selection**
  The graduate identifies, evaluates, and utilizes information resources in order to investigate specific research topics.

- **Competency 508.2.4: Research Study Critique**
The graduate critiques the data analysis, results, and conclusions in a research study.

- **Competency 508.3.1: Research Questions**
The graduate understands how to develop measurable research questions.

- **Competency 508.3.2: Hypothesis Development**
The graduate interprets the results of a literature review and generates a hypothesis supported by those findings when appropriate.

- **Competency 508.3.3: Types of Variables and Data**
The graduate understands and uses different types of variables and data that can be collected during a research study.

- **Competency 508.3.4: Data Collection**
The graduate evaluates the relative merits of instruments for measuring specific motivation, performance, and learning style variables.

- **Competency 508.3.5: Basic Data Evaluation Concepts**
The graduate understands basic concepts involved in the evaluation of data.

**Teaching Dispositions Statement**
Please review the [Statement of Teaching Dispositions](#).

**Course Instructor Assistance**
As you prepare to successfully demonstrate competency in this subject, remember that course instructors stand ready to help you reach your educational goals. As subject matter experts, mentors enjoy and take pride in helping students become reflective learners, problem solvers, and critical thinkers. Course instructors are excited to hear from you and eager to work with you.

Successful students report that working with a course instructor is the key to their success. Course instructors are able to share tips on approaches, tools, and skills that can help you apply the content you're studying. They also provide guidance in assessment preparation strategies and troubleshoot areas of deficiency. Even if things don’t work out on your first try, course instructors act as a support system to guide you through the revision process. You should expect to work with course instructors for the duration of your coursework, and you are encouraged to contact them as soon as you begin. Course instructors are fully committed to your success!

**Preparing for Success**

The information in this section is provided to detail the resources available for you to use as you complete this course.

**Learning Resources**
The learning resources listed in this section are required to complete the activities in this course. For many resources, WGU has provided automatic access through the course. However, you may need to manually enroll in or independently acquire other resources. Read the full instructions provided to ensure that you have access to all of your resources in a timely manner.

**Automatically Enrolled Learning Resources**

You will be automatically enrolled for the following learning resource. Simply click on the link provided to access the learning materials.
VitalSource E-Texts

The following textbook is available to you as an e-text within this course. You will be directly linked to the specific readings required within the activities that follow. This e-text is available to you as part of your program tuition and fees, but you may purchase a hard copy at your own expense through a retailer of your choice. If you choose to do so, please use the ISBN listed to ensure that you receive the correct edition.


Pearson MyEducationLab

You will use these practice pre and post tests embedded throughout your Study Plan.

Other Learning Resources

You will use the following learning resources for this course.

Websites

- Research Methods Knowledge Base: Levels of Measurement

WGU Library E-Reserves

This course utilizes resources located in the WGU Library E-Reserves, with articles available for you to download. Follow these directions for accessing the WGU Library E-Reserves.

The following materials will be used in this course:


Pacing Guide

The pacing guide suggests a weekly structure to pace your completion of learning activities. It is provided as a suggestion and does not represent a mandatory schedule. Follow the pacing guide carefully to complete the course in the suggested timeframe.

- Pacing Guide: Foundations of Research
Note: This pacing guide does not replace the course. Please continue to refer to the course for a comprehensive list of the resources and activities.

Research Paradigms and Research Methods

This subject gives you a brief overview of how research is classified. It will then focus on the three types of research: quantitative research, qualitative research, and action research. It will introduce you to differences and characteristics of each as well as advantages and disadvantages. A good understanding of the differences among these three paradigms is critical to understanding of the topics discussed later in the course. The design of each component for a research study hinges on these differences.

Characteristics and Benefits of Research Paradigms

Research is classified in three ways:

1. This topic addresses the following competencies:
   - Classifying research into three paradigms according to the following:
   - Types of data collected (numerical or categorical)
   - The fundamental differences in research designs (such as experimental design for quantitative research, ethnography for qualitative research, and action research which may contain both quantitative and qualitative elements).
   - Data analysis (categorical or statistical): quantitative, qualitative action.

2. Classifying research by method (Open the link below)

   Figure 1. Classification of Research Method

3. Classifying research by purpose:
   - Basic and applied research
   - Evaluation research
   - Action research

   Figure 2. Research and development (also referred to as "R and D") (see Figure 2).

Three research paradigms are presented in your assigned readings: quantitative, qualitative, and action research. The benefits of each will be discussed, and one or more will be more attractive to you than the others. However, the choice of paradigms is not a matter of personal preferences; rather, it is a matter of the research question that is being answered.

- **Competency 508.1.1: Quantitative Research Paradigm**
  The graduate understands the components of quantitative research.

- **Competency 508.1.2: Qualitative Research Paradigm**
  The graduate understands the components of qualitative research.

- **Competency 508.1.3: Action Research Paradigm**
  The graduate understands the components of action research.

Introduction to Research Reading
While doing the reading below, take notes on the following:

- What are the purposes of each research paradigm?
- What situation is each paradigm most appropriate for?
- What are the differences between traditional research and action research?
- What type of data does quantitative research collect for analysis?
- What type of data does qualitative research collect for analysis?
- Which research paradigm states the hypothesis before the study begins?
- Which research paradigm employs an inductive strategy (i.e., problems and methods evolve as understanding of the subjects and the context deepens)?
- Which research paradigm tends to involve more subjects?
- Which type of research uses categorical data analysis?
- Which type of research uses statistical methods for data analysis?

Take the Chapter 1 Pretest.

https://lrps.wgu.edu/provision/33836473

Read the following in the text:

Educational Research: Competencies for Analysis and Applications

- chapter 1 ("Introduction to Educational Research")

Review the associated slides in the multimedia slideshow on quantitative research for chapter 1.

Take the Chapter 1 Posttest.

https://lrps.wgu.edu/provision/33836426

Quantitative Research

Quantitative research is the oldest of the research paradigms; therefore, most research concepts are related to quantitative research. It is important that you spend time studying all aspects of quantitative research. You will learn the underlying assumptions of quantitative research, the types of data it collects, the various fundamental designs that fall under this category, and the sampling techniques used in quantitative research. Open the link below for Figure 3 flowcharts the overall process of quantitative research.

- Figure 3. Process of Quantitative Research

Characteristics and Benefits of Quantitative Research

Quantitative research is the paradigm that is most likely to use numerical data in order to accept or reject a hypothesis. In quantitative research, the researcher typically works with a sample of data and manipulates an independent variable to look for changes in the dependent variable.

This topic addresses the following competencies:
Competency 508.1.1: Quantitative Research Paradigm
The graduate understands the components of quantitative research.

Quantitative Research Reading

While reading the materials below, take notes on the following:

- What are the advantages and disadvantages of quantitative research paradigm?
- What are the assumptions about quantitative research paradigm?
- Which scientific method does quantitative research employ, inductive (bottom up) or deductive (top down)?
- What situation is each quantitative research method most appropriate for?
- What type of data does quantitative research collect for analysis?
- When does quantitative research state the hypothesis?
- Which type of quantitative research controls the setting and manipulates one or more variables?
- How does quantitative research analyze data?
- Which research designs fall under the category of quantitative research?

Review the following in the *Educational Research: Competencies for Analysis and Applications* text:

- chapter 1 ("Introduction to Educational Research"), focus on pages 7-11

Review the associated slides in the multimedia slideshow on quantitative research for chapter 1.

Do your best to answer each of the preceding questions in your journal. Do not quit or become frustrated if you are unable to. Ask for help from either the course message board or the course instructor. Getting these beginning concepts down is very important for continued success through this course.

Sampling Techniques for Quantitative Research

Sampling is very important in quantitative research. A good sampling technique can ensure validity and reliability of research by controlling various threats. Because one of the purposes of quantitative research is to generalize the results obtained from a small sample to its larger population, you want to make sure that your sample represents the population as much as possible.

For this topic, you will learn various sampling techniques available for random sampling and non random sampling for quantitative research.

This topic addresses the following competencies:

- Competency 508.1.1: Quantitative Research Paradigm
  The graduate understands the components of quantitative research.
Quantitative Research Sampling Techniques Readings

Take the Chapter 5 Pretest

https://lrps.wgu.edu/provision/33838079

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 5 ("Selecting A Sample")

Review the following multimedia presentation:

- Chapter 5 multimedia presentation

Review the Lecture Notes and take notes on random sampling (probability sampling), including the following concepts:

- Simple random
- Stratified
- Cluster: simple and two-stage
- Systematic

Take notes on nonrandom sampling:

- Convenience (accidental or haphazard)
- Purposive
- Quota

Also take notes on the following questions:

- What is the purpose of random sampling?
- How does nonrandom sampling differ from random sampling?

Take the Chapter 5 Posttest

https://lrps.wgu.edu/provision/33838053

**Quantitative Research Methods**

There are a number of quantitative research methods from which to choose. The one that is best depends on the research question. There are methods that examine how much data or results are alike, such as correlational studies. Then there are methods that examine the extent to which data or results differ such as a t-test or an ANOVA.
This topic addresses the following competencies:

- **Competency 508.1.1: Quantitative Research Paradigm**
  The graduate understands the components of quantitative research.

**Quantitative Research Methods Readings**

As you read the materials below, answer the following questions:

- What is the purpose of survey/descriptive research?
- What are the major steps involved in designing and conducting a survey/descriptive study?
- How is survey/descriptive research classified?
- What are three different ways that data can be collected in survey/descriptive research?
- What is the purpose of causal-comparative research?
- What is the purpose of correlational research?
- What are the steps involved in conducting correlational research?
- What is the purpose of experimental research?
- What are the basic steps involved in conducting an experiment?
- What are the eight major threats to internal validity of an experiment?
- What are the six major threats to external validity of an experiment?
- How is causal-comparative research different from correlational research?
- How is causal-comparative research different from experimental research?

Take the Chapter 7 Pretest

[https://lrps.wgu.edu/provision/33836416](https://lrps.wgu.edu/provision/33836416)

Read the following in the *Educational Research: Competencies for Analysis and Applications* text:

- **Chapter 7 ("Survey Research")**

Also review the associated multimedia presentation:

- **Chapter 7 multimedia presentation**

Take the Chapter 7 Posttest

[Chapter 7 Posttest](#)

Take the Chapter 8 Pretest

[Chapter 8 Pretest](#)
Read the following in the *Educational Research: Competencies for Analysis and Applications* text:

- chapter 8 ("Correlational Research")

Also review the associated multimedia presentation:

- Chapter 8 multimedia presentation

Take the Chapter 8 Posttest

Chapter 8 Posttest

Take the Chapter 9 Pretest

Chapter 9 Pretest

Read the following in the *Educational Research: Competencies for Analysis and Applications* text:

- chapter 9 ("Casual-Comparative Research")

Also review the associated multimedia presentation:

- Chapter 9 multimedia presentation

Take the Chapter 9 Posttest

Chapter 9 Posttest

Take the Chapter 10 Pretest

Chapter 10 Pretest

Read the following in the *Educational Research: Competencies for Analysis and Applications* text:

- chapter 10 ("Experimental Research")

Also review the associated multimedia presentation:

- Chapter 10 multimedia presentation

Take the Chapter 10 Posttest

Chapter 10 Posttest
Take the Chapter 11 Pretest

Chapter 11 Pretest

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 11 ("Single-Subject Experimental Research")

Also review the associated multimedia presentation:

- Chapter 11 multimedia presentation

Take the Chapter 11 Posttest

Chapter 11 Posttest

Take the Chapter 12 Pretest

Chapter 12 Pretest

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 12 ("Descriptive Statistics")

Also review the associated multimedia presentation:

- Chapter 12 multimedia presentation

Take the Chapter 12 Posttest

Chapter 12 Posttest

Take the Chapter 13 Pretest

Chapter 13 Pretest

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 13 ("Inferential Statistics")

Also review the associated multimedia presentation:

- Chapter 13 multimedia presentation
Take the Chapter 13 Posttest

**Chapter 13 Posttest**

**Quantitative Research Sample Questions**

You can make the learning more meaningful by creating exam questions. Do not just repeat the question, but consider how the question might be posed in a multiple-choice item type, or as a matching, or a multiple-response (more than one correct answer) item type.

Share your proposed questions with your peers in the course message board.

While reading, study and define the following terms found in the reading.

You can also use Table 1 to take notes to compare various research methods.

<table>
<thead>
<tr>
<th>Research Methods</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>Type of data to be collected</td>
<td></td>
</tr>
</tbody>
</table>
Qualitative Research

Professionals in the field of education know that data are not always neat and problems are not always simply formulated. Sometimes they are quite messy and amorphous. For these, it seems that traditional research and quantitative methods simply will not do. However, many external agencies are asking for research-based answers to these problems. So then, what to do?

Ideally, the professional teacher will know and apply qualitative research techniques! You will learn the underlying assumptions of qualitative research, types of data it collects, the various fundamental designs that fall under this category, and the sampling techniques you can use for qualitative research.

Qualitative Research Methods

While there are a large number of qualitative research methods, typical ones includes questionnaires, interviews, observation, and ethnographies. In qualitative research, hypotheses emerge from the data instead of being formed prior to the investigation.

This topic addresses the following competencies:
Competency 508.1.2: Qualitative Research Paradigm
The graduate understands the components of qualitative research.

Reading about Qualitative Research Methods

As you read the materials below, take notes on the following questions:

- What are the main data collection methods for qualitative research?
- What is the purpose of narrative research?
- What are the major steps involved in designing and conducting a narrative research study?
- What are the key characteristics of narrative research?
- What is the purpose of ethnographic research?
- What are the major steps involved in designing and conducting an ethnographic research study?
- What are the key characteristics of ethnographic research?
- What is the purpose of case study research?
- What are the major steps involved in designing and conducting a case study?
- What are the key characteristics of case study research?
- What is triangulation in qualitative research?

Take the Chapter 14 Pretest

Chapter 14 Pretest

Read the following in the in Educational Research: Competencies for Analysis and Applications text:

- chapter 14 ("Qualitative Data Collection")

Also review the following multimedia presentation:

- Chapter 14 multimedia presentation

Take the Chapter 14 Posttest

Chapter 14 Posttest

Take the Chapter 15 Pretest

Chapter 15 Pretest

Read the following in the in Educational Research: Competencies for Analysis and Applications text:

- chapter 15 ("Narrative Research")
Also review the following multimedia presentation:

- [Chapter 15 multimedia presentation](#)

Take the Chapter 15 Posttest

[Chapter 15 Posttest](#)

Take the Chapter 16 Pretest

[Chapter 16 Pretest](#)

Read the following in the in Educational Research: Competencies for Analysis and Applications text:

- [chapter 16 ("Ethnographic Research")](#)

Also review the following multimedia presentation:

- [Chapter 16 multimedia presentation](#)

Take the Chapter 16 Posttest

[Chapter 16 Posttest](#)

Take the Chapter 17 Pretest

[Chapter 17 Pretest](#)

Read the following in the in Educational Research: Competencies for Analysis and Applications text:

- [chapter 17 ("Case Study Research")](#)

Also review the following multimedia presentation:

- [Chapter 17 multimedia presentation](#)

Take the Chapter 17 Posttest

[Chapter 17 Posttest](#)

Take the Chapter 18 Pretest

[Chapter 18 Pretest](#)
Read the following in the in Educational Research: Competencies for Analysis and Applications text:

- chapter 18 ("Qualitative Research: Data Analysis and Interpretation")

Also review the following multimedia presentation:

- Chapter 18 multimedia presentation

Take the Chapter 18 Posttest

Chapter 18 Posttest

Characteristics and Benefits of Qualitative Research

In qualitative research, the researcher is interested in making non-numerical, non-statistical conclusions about the data that they gather. Researchers are interested in more impressionistic understanding of the data as opposed to measures of correlation or association.

This topic addresses the following competencies:

- Competency 508.1.2: Qualitative Research Paradigm
  The graduate understands the components of qualitative research.

Qualitative Research Reading

While reading the material below, take notes on the following:

- What are the advantages and disadvantages of qualitative research paradigm?
- What are the assumptions about qualitative research paradigm?
- Which situation is each of the qualitative research methods most appropriate for?
- What type of data does qualitative research collect for analysis?
- What is the function of hypothesis in qualitative research?
- What is inductive strategy in qualitative research?
- Which scientific method does qualitative research employ, inductive (bottom up) or deductive (top down)?
- How does qualitative research analyze data?
- Which research designs fall under the category of qualitative research?

Review the following in the in Educational Research: Competencies for Analysis and Applications text:

- chapter 1 ("Introduction to Educational Research"). focus on pages 8, 12-16

Review the following multimedia presentation:

- Chapter 1 multimedia presentation
Carefully read the pages in chapter 1 about qualitative research and the various qualitative approaches. Also view the multimedia presentation and the lecture on the different approaches.

**Benefits of Qualitative and Quantitative Research**

Create a list of five benefits for both qualitative and quantitative research and share it with your peers through the message board.

**Action Research**

Often as an educator you will encounter situations where students either are not learning what you would like or are behaving inappropriately. How best will you handle this problem?

You may talk with your colleagues at lunch or perhaps have a meeting with your principal. You may brainstorm some solutions and agree to implement them. Are there ways that you can implement research principles without going through the detail or requirements of a formal study?

Yes, there likely are, and you will learn about that as your explore action research methods. You will learn the purpose of action research and how it differs from other research paradigms, types of data it collects, and its fundamental design.

**Characteristics and Benefits of Action Research**

For this topic, you will learn about action research techniques.

This topic addresses the following competencies:

- **Competency 508.1.3: Action Research Paradigm**
  The graduate understands the components of action research.

**Action Research Reading**

While reading the material below, take notes on the following:

- What are the advantages and disadvantages of action research paradigm?
- What is the purpose for action research?
- What situation is action research most appropriate for?
- Which types of data does action research collect for analysis?
- How does action research differ from other research?
- Who conducts action research?
- What are the steps for conducting action research?

Review the following in *Educational Research: Competencies for Analysis and Applications* text:

- pages 18-19 of [chapter 1 ("Introduction to Educational Research")](#)

Take the Chapter 20 Pretest

[Chapter 20 Pretest](#)
Review the following in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 20 ("Action Research")

Understand how action research differs from other traditional research.

Also review the following multimedia presentation:

- Chapter 20 multimedia presentation

Take the Chapter 20 Posttest

**Chapter 20 Posttest**

**Action Research Journaling**

Most educational professionals conduct some aspects of action research in their practice. Reflect in your journal on how you have applied aspects of action research in your teaching. If nothing comes to mind, consider the opportunities where you might have employed it but did not.

**Literature Review**

As a researcher, you will want to build on rather than duplicate the research of others. Likely you will not want to do what others did that did not work. You should have an interest in what is going on in your field, be able to write about it effectively, synthesize that information, and apply it to your efforts. To do that, you will write a literature review for your study.

**Resource Identification, Evaluation, and Selection**

When conducting a literature review, you will need to distinguish between primary and secondary sources. Credible researchers know appropriate resources such as journal articles and papers presented at conferences. They also are expected to make judgment about the credibility of sources.

This topic addresses the following competencies:

- **Competency 508.2.1: Purpose of Literature Review**
  The graduate understands the purpose of conducting a literature review and understands its relationship to educational or healthcare research and practice.

- **Competency 508.2.3: Resource Identification, Evaluation, and Selection**
  The graduate identifies, evaluates, and utilizes information resources in order to investigate specific research topics.

**Resource Reading**

While reading the materials below, take notes on the following:

- What factors help establish source reliability?
- What are the differences between primary and secondary sources?
● What sources are available for examination of literature on a given research topic?
● What are the rules and regulations related to copyright and plagiarism?

Review the following in the in *Educational Research: Competencies for Analysis and Applications* text:

● chapter 3 ("Reviewing the Literature"), focusing on pages 82-96

Review the following multimedia presentation:

● Chapter 3 multimedia presentation

Read the following in *Educational Research: Quantitative and Qualitative Approaches* in the WGU Library E-Reserves.

● pages 67 - 69 of chapter 3

Take the Chapter 3 Posttest

Chapter 3 Posttest

*Note: After following the steps for accessing the WGU Library E-Reserves, you should click on the folder entitled “Research Fundamentals.” Inside that folder, you will see four Johnson & Christensen documents, which are the Educational Research: Quantitative and Qualitative Approaches text excerpts.*

**Purpose and Function of Literature Review**

Research is the gathering and analysis of data to add to the body of knowledge in a given field. As a researcher, you will know to guide your practice. Literature reviews help readers of the research understand why it was conducted and what it might add to the already existing body of research.

This topic addresses the following competencies:

- **Competency 508.2.1: Purpose of Literature Review**
  The graduate understands the purpose of conducting a literature review and understands its relationship to educational or healthcare research and practice.

- **Competency 508.2.3: Resource Identification, Evaluation, and Selection**
  The graduate identifies, evaluates, and utilizes information resources in order to investigate specific research topics.

**Literature Review Reading**

While reading the materials below, take notes on the following:

- What is the purpose of a literature review?
- How can a literature review help clarify the relationship between research and practice?
• How might literature review results influence the research process?
• What are the steps for conducting a literature review?

Take the Chapter 3 Pretest

Chapter 3 Pretest

Read the following in *Educational Research: Competencies for Analysis and Applications* text:

• chapter 3 (“Reviewing the Literature”)

Review the following multimedia presentation:

• Chapter 3 multimedia presentation

Read the following in *Educational Research: Quantitative and Qualitative Approaches* in the WGU Library E-Reserves:

• pages 65-66 of chapter 3

Take the Chapter 3 Posttest

Chapter 3 Posttest

*Note: After following the steps for accessing the WGU Library E-Reserves, you should click on the folder entitled “Research Fundamentals.” Inside that folder, you will see four Johnson & Christensen documents, which are the Educational Research: Quantitative and Qualitative Approaches text excerpts.*

Share with your peers how you feel the literature review better prepared you to investigate your research.

Literature Review Journaling

Consider how what you are learning is and is not research. Is a literature review by itself research?

Ponder this and write your reflections in your journal. For guidance and direction, consult with your course instructor.

Selecting Topics and Stating Hypotheses

This subject introduces you to the characteristics of good research topics, research questions, and types of instruments for both quantitative and qualitative research. You will also learn hypothesis, null hypothesis, and the related concepts of type I and type II errors.

**Hypothesis**

A hypothesis is the best estimate (or an educated guess) of the outcome of a research study.
For this topic, you will learn the definition of hypothesis and null hypothesis and understand the role of hypothesis in different research paradigms. You will also learn type I and type II errors and how they relate to the null hypothesis.

This topic addresses the following competencies:

- **Competency 508.2.2: Topic Selection**
  The graduate understands how to select appropriate research topics and research paradigms.

- **Competency 508.3.1: Research Questions**
  The graduate understands how to develop measurable research questions.

- **Competency 508.3.2: Hypothesis Development**
  The graduate interprets the results of a literature review and generates a hypothesis supported by those findings when appropriate.

**Hypothesis Reading**

When reading, take notes on the following questions:

- What is a hypothesis?
- Types of hypothesis?
- What is meant by operational definition of variables?
- What is a null hypothesis?
- What are type I and type II errors?
- How do you determine if you should reject or accept the null hypothesis?
- How is a hypothesis used in a specified research paradigm?
- How is the hypothesis related to the null hypothesis?
- How do type I and type II errors relate to the null hypothesis?

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- pages 71-77 of chapter 2 (“Selecting and Defining a Research Topic”)
- pages 331–333 of chapter 13 (“Inferential Statistics”)

Review the following multimedia presentation:

- Chapter 2 multimedia presentation

**Hypothesis Message Board Activity**

Now that you have read about hypothesis, consider your instructional problem. If you were to evaluate the effectiveness of an instructional intervention, consider what your dependent variable would be and draft one or more hypothesis. To get feedback, share your results in the course message board.

**Selecting Topics**

There are several sources (theories, experience, library, etc.) you can rely on for indentifying a
problem for research. Which source is best for you will depend on what research design you plan to use. A well-stated topic will very likely reveal whether the study is qualitative or quantitative research. As a result, you can sometimes judge from a topic what type of research study it is. In order to do that, you will need to be very familiar with characteristics of research paradigms.

This topic addresses the following competencies:

- **Competency 508.2.2: Topic Selection**
  The graduate understands how to select appropriate research topics and research paradigms.
- **Competency 508.3.1: Research Questions**
  The graduate understands how to develop measurable research questions.
- **Competency 508.3.2: Hypothesis Development**
  The graduate interprets the results of a literature review and generates a hypothesis supported by those findings when appropriate.

Selecting Topics Reading

As you read the materials below, answer each of the five questions poised below in your journal:

- What are the characteristics of a good research topic?
- How are qualitative topics different from quantitative topics?
- What is a research question?
- What is meant by measurable? Measurability?
- How are qualitative research questions different from quantitative research questions?

Take the Chapter 2 Pretest

[Chapter 2 Pretest](#)

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- [chapter 2 ("Selecting and Defining a Research Topic")](#)

Review the following multimedia presentation:

- [Chapter 2 multimedia presentation](#)

Take the Chapter 2 Posttest

[Chapter 2 Posttest](#)

Read the following in *Educational Research: Quantitative and Qualitative Approaches* in the WGU Library E-Reserves:
Note: After following the steps for accessing the WGU Library E-Reserves, you should click on the folder entitled “Research Fundamentals.” Inside that folder, you will see four Johnson & Christensen documents, which are the Educational Research: Quantitative and Qualitative Approaches text excerpts.

**Types of Variables and Data**

As discussed previously, one of the main differences between the two research paradigms, quantitative and qualitative research, is the type of data each collects for analysis. Also, when you pose your research questions or formulate your hypothesis (if your design requires), you are actually defining two very important concepts, independent and dependent variables.

**Measuring Scales**

There are four measurement scales:

- **Nominal**
- **Ordinal**
- **Interval**
- **Ratio**

These four scales have levels, like steps going upward. Understanding these scales is important for the selection of appropriate techniques for data analysis, especially when selecting certain statistical techniques. Most statistical techniques have assumptions that require certain data type, such as a t-test which requires that your data need to be at interval or ratio level.

This topic addresses the following competencies:

- **Competency 508.3.3: Types of Variables and Data**
  
  The graduate understands and uses different types of variables and data that can be collected during a research study.

**Measurement Scales Reading**

While reading the materials below, take notes on the following:

- What are nominal, ordinal, interval, and ratio variables?
- Which of the four variables are quantitative variables?
- Which of the four variables is a qualitative variable?
- What are the benefits of quantitative versus qualitative data for research?
- How do you determine if a variable is measurable or non-measurable?

Take the Chapter 6 Pretest

[Chapter 6 Pretest](#)

Read the following in the in *Educational Research: Competencies for Analysis and...*
Applications text:

- chapter 6 ("Selecting Measuring Instruments"). focusing on pages 144-147

Review the following multimedia presentation:

- Chapter 6 multimedia presentation

Take the Chapter 6 Posttest

Chapter 6 Posttest

Read the following in *Educational Research: Quantitative and Qualitative Approaches* in the WGU Library E-Reserves:

- pages 38-41 of chapter 2

*Note: After following the steps for accessing the WGU Library E-Reserves, you should click on the folder entitled “Research Fundamentals.” Inside that folder, you will see four Johnson & Christensen documents, which are the Educational Research: Quantitative and Qualitative Approaches text excerpts.*

**Independent and Dependent**

The concepts of independent and dependent variables are most important in experimental design as well as other designs like causal-comparative research and correlational research. They must be defined accurately and precisely and used throughout a research study. Once the variables are defined, they should not be randomly changed.

This topic addresses the following competencies:

- **Competency 508.3.3: Types of Variables and Data**
  The graduate understands and uses different types of variables and data that can be collected during a research study.

**Variables Reading**

While reading the materials below, take notes on the following:

- What is an independent variable?
- What is a dependent variable?
- Which variable is the effect (outcome) variable, the independent or the dependent variable?
- Which is the cause (treatment) variable, the independent or the dependent variable?

Read the following in the in *Educational Research: Competencies for Analysis and Applications* text:
• chapter 6 (“Selecting Measuring Instruments”), focusing on page 147

Review the following multimedia presentation:

• Chapter 6 multimedia presentation

Considering the preceding questions, draft in your journal one or more research questions and for that question(s), answer each of the four bulleted items. If you need assistance, clarification or better understanding, you can either ask the course instructor or post to the course message board.

Data Collection

For this subject, you will learn about:

• types of measuring instruments of cognitive and affective tests, projective and nonprojective tests, and their relative merits of validity and reliability
• instruments and methods for collecting qualitative data; sources of instruments
• types of validity (content, criterion-related, construct, and consequential)
• forms of reliability (stability, equivalence, internal consistency, etc.)
• factors affecting validity and reliability

Criteria for Good Measuring Instruments

Only when you have good instruments can you produce useful data. Validity and reliability are criteria for determining good measuring instruments. There are various types of validity and different methods for establishing reliability.

This topic addresses the following competencies:

• Competency 508.3.4: Data Collection
  The graduate evaluates the relative merits of instruments for measuring specific motivation, performance, and learning style variables.

Instrument Reading

While reading the materials below, take notes of the definitions and how evidence can be established for the following types of validity:

• Content validity
• Criterion-related validity: concurrent and predictive
• Construct validity
• Consequential validity

Read the following in Educational Research: Competencies for Analysis and Applications text:

• pages 154-162 of chapter 6 (“Selecting Measuring Instruments”)

Take notes of the definitions and how evidence can be established for the following forms of
reliability:

- Stability-test-retest
- Equivalence: equivalent-forms
- Equivalence and stability
- Internal consistency
- Split-half
- Scorer/rater reliability

Also consider the following questions:

- If a test is reliable, does it mean that it is also valid?
- If a test is valid, does it mean that it is also reliable?
- What factors affect validity?

Measuring Instruments

You have already learned that data is classified according to measurement levels (nominal, ordinal, interval, and ratio) and quantitative variables (ordinal, interval, and ratio data) and qualitative variable (nominal data). How do we collect these different types of data? In this subject, you will learn various measuring instruments and sources of instruments. There are numerous instruments available, but they fall into two main categories.

Non-Projective Tests:

- Cognitive tests
- Achievement tests
- Aptitude tests
- Affective tests
- Attitude scales
- Likert scales
- Semantic differential scales
- Thurstone scale
- Guttman scale
- Interest inventories
- Personality inventories
- Value tests

Most educational tests are nonprojective tests which typically collect numerical data. For qualitative research, two data collection methods are commonly used: observations and interviews.

This topic addresses the following competencies:

- **Competency 508.3.4: Data Collection**
  The graduate evaluates the relative merits of instruments for measuring specific motivation, performance, and learning style variables.
Measurement Reading

While reading the materials below, take notes on the following:

- What are the purposes of cognitive and affective tests?
- What instruments do you use to collect qualitative data?
- What is the difference between a data collection instrument and a data collection method?
- What types of scales are used to collect data for affective variables?
- Where would you look for published or unpublished measurement instruments?

Also study and define the terms found in the reading.

Read the following in the Educational Research: Competencies for Analysis and Applications text:

- chapter 6 ("Selecting Measuring Instruments"), focusing on pages 149-171
- chapter 14 ("Qualitative Data Collection")

Review the following multimedia presentations:

- Chapter 6 multimedia presentation
- Chapter 14 multimedia presentation

Read the following:

- Lecture Notes on Standardized Measurement and Assessment
- Lecture Notes on Methods of Data Collection.

Data Analysis

You will learn various ways to analyze both quantitative and qualitative data using statistics and categorical analysis.

Qualitative Data Analysis

The analytic concepts for qualitative data analysis are relatively easy when compared to those for quantitative analysis, although the actual process of the analysis is more complex and time consuming. The main technique for qualitative data analysis is categorical analysis, a process of categorizing and coding pieces of data and grouping them into themes (classifying counting responses, looking for patterns, etc.). Qualitative data analysis consists of two phases: data analysis during data collection and data analysis after data collection.

Figure 6 in the link below is a graph showing Qualitative Data Analysis during Data Collection.

- Qualitative Data Analysis during Data Collection

This topic addresses the following competencies:
• Competency 508.3.5: Basic Data Evaluation Concepts
  The graduate understands basic concepts involved in the evaluation of data.

Qualitative Data Analysis Reading

While reading, take notes on the following:

  • What is the main technique for analyzing qualitative data?
  • What are the steps for analyzing qualitative data?
  • What are some data analysis strategies?

Review the following in the *Educational Research: Competencies for Analysis and Applications* text:

  • chapter 18 ("Qualitative Research: Data Analysis and Interpretation")

Also review the following multimedia presentation:

  • Chapter 18 multimedia presentation

Descriptive Statistics

There are two types of statistics: descriptive and inferential statistics. Simply put, descriptive statistics describe a set of data, and inferential statistics are used to infer the results for the larger population based on a small sample and to see if the results are indeed caused by the treatment.

There are various types of descriptive statistics. There are measures that tell one what a set of numbers tend to be. These are measures of central tendency such as mean, median, and mode. Then there are measures that tell you how a set of data tends to vary or be dispersed. These are measures such as range, variance, and standard deviation.

**Table 2**

<table>
<thead>
<tr>
<th>Commonly Used Statistical Procedures for Analyzing Quantitative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
</tr>
<tr>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>Meaningfully describe a set of data</td>
</tr>
<tr>
<td>Inferential Statistics/Tests of Significance</td>
</tr>
<tr>
<td>Purposes</td>
</tr>
<tr>
<td>1. Test significance of the differences between or among two or more mean scores.</td>
</tr>
<tr>
<td>2. Allow generalization.</td>
</tr>
</tbody>
</table>

This topic addresses the following competencies:
• **Competency 508.3.5: Basic Data Evaluation Concepts**
  The graduate understands basic concepts involved in the evaluation of data.

**Descriptive Statistics Reading**

When reading, take notes and be able to define the following types of descriptive statistics:

- **Frequencies**
- Measures of central tendency: mean, mode, median
- Measures of variability (the spread): range, quartile deviation, variance, standard deviation, the normal curve, and skewed distributions
- Measures of relative position: percentile ranks, and standard scores (z scores, t scores, and stanines)
- Measures of relationship: correlation and correlation coefficient
- Take notes on the two main methods for calculating correlation coefficient:
  - The Spearman Rho coefficient (for ranked data)
  - The Pearson r coefficient (for interval and ratio data)

Review the following in the *Educational Research: Competencies for Analysis and Applications* text:

- [chapter 12 ("Descriptive Statistics")](#)

Review the following multimedia presentation:

- [Chapter 12 multimedia presentation](#)

Figure 4 in the link below is a graphic representation of the major types of descriptive statistics.

- [Types of Descriptive Statistics](#)

**Inferential Statistics**

For the objective assessment you do not really need to know how an inferential statistics is calculated. Your focus should be on understanding the basic concepts, not on the calculation. All inferential statistics are called tests of significance.

This topic addresses the following competencies:

- **Competency 508.3.5: Basic Data Evaluation Concepts**
  The graduate understands basic concepts involved in the evaluation of data.

**Inferential Statistics Reading**

While reading, take notes on the following:

- What factors determine the choice of statistical procedures?
- What are the two assumptions for using a t-test and ANOVA?
- What is the purpose of t-test?
- What is the purpose of ANOVA?
- What is the difference between t-test and ANOVA?
- What is the purpose of factor analysis?
- What is the purpose of chi square?
- How is chi square different from t-test and ANOVA?
- What is the function of multiple regression?
- What is the purpose of analysis of covariance (ANCOVA)?
- What is standard error?
- What are two-tailed and one-tailed tests?

Review the following in the in *Educational Research: Competencies for Analysis and Applications* text:

- chapter 13 ("Inferential Statistics")

Also review the following multimedia presentation:

- Chapter 13 multimedia presentation

Deeper Understanding

Create a table in which the rows consist of t-test, ANOVA, factor analysis, chi-square, and regression analysis. Create a separate column for type of data, analysis of difference or correlation, and required number of participants. For each analysis for which you created a row, do the following (you will learn important points about when to apply what analysis and for what reasons):

1. Indicate if the data used is nominal, categorical, ordinal, or interval.
2. Determine if the analysis examined measures the difference between groups or the extent to which they are associated (correlated).
3. Record the required number of participants.

Figure 5 in the link belos is a graphic representation of some commonly used tests of significance.

- Commonly Used Tests of Significance

Research Study Critique

You have learned most of the important concepts for the Research Fundamentals domain, and you should be able to judge the adequacy of a research study now. Therefore, it is time for you to go back and review all the components for a research study and conceptually understand how to evaluate the quality and appropriateness of each component. As mentioned previously, the ability to do this is an essential component to your professional development.

Evaluating a Research Report

The savvy researcher is a keen reader of research. They understand factors that might influence their interpretation as well as potential sources of bias.
This topic addresses the following competencies:

- **Competency 508.2.4: Research Study Critique**
  The graduate critiques the data analysis, results, and conclusions in a research study.

### Evaluating a Research Report Reading

While reading the materials below, take notes on the following:

- Problem statement
- Review of the literature
- Hypotheses
- Participants
- Instruments
- Research design and procedures
- Results
- Discussion
- Abstract and summary
- Overall research approach

Take the Chapter 22 Pretest

[Chapter 22 Pretest](#)

Read the following in the *Educational Research: Competencies for Analysis and Applications* text:

- [chapter 22 ("Evaluating a Research Report")](#)

Also review the following multimedia presentation:

- [Chapter 22 multimedia presentation](#)

What factors might influence the interpretation of research results? What are the criteria for evaluating the following sections of a research report?

Take the Chapter 22 Posttest

[Chapter 22 Posttest](#)

### Final Steps

Congratulations on completing the activities in this course! This course has prepared you to complete the assessments associated with this course. If you have not already been directed to complete the assessments, schedule and complete your assessments now.