The course of study is in two parts: The first part covers the objective exam (RFO3) and the essay assessments (RFE3). The second part covers the project assessment (RFP3). Complete the RFO3 and the RFE3 before beginning the RFP3.

This Course of Study presents the required sequence of learning steps and activities to help you develop competence in the subject area of Research Fundamentals. Your competence will be determined as you complete a series of performance assessments (RFE3 and RFP3) and then take the RFO3 objective exam. Depending on your educational background and work experience, this Course of Study can take up to 17 weeks. Following this document sequentially is an important part of your assessment preparation. This tool is also designed to help you become an independent learner by providing multiple learning methods. These steps may be completed more quickly than shown below as determined in consultation with your mentor.

Welcome to the Research Fundamentals Domain. As you progress in your graduate program and acquire professional competence, research fundamentals is an important skill set that distinguishes you. Not only may you have the responsibility to add to what is known about educational research, you are required to be an informed consumer as well. Being able to distinguish between sound and poor educational practice is critical in the leadership roles you will assume. This course of study will play an important part in your acquisition of the necessary competence not only for graduation but for future practice.

The mentor for this Course of Study is Dr. Mingming Jiang. Dr. Jiang earned her Ph.D. in curriculum and instruction at the State University of New York at Albany. She specializes in instructional theory, design, and technology. She has been a mentor at WGU for nearly ten years. She has ample experience in instructional design and technologies. With a passion for research fundamentals, she has been facilitating the Research Fundamentals domain community for the past few years. Before she joined WGU, Dr. Jiang helped design and deliver more than 50 web-based courses for the SUNY Learning Network and published in various journals on online learning and instruction. Prior to her work as an instructional designer, Dr. Jiang taught in various universities for nine years as an assistant or adjunct professor on the subjects of English, literature, and learning and technology.

Course of Study Mentor: Vince Shrader
Email: vshrader@wgu.edu
Telephone: 866-895-9660, x2048

Questions are posted for each week to guide your reading of the learning resources. Even though they look quite boring to you, each question does highlight an important concept that you need to know in order to prepare for RRO3 and RFE3. Use the questions to guide your readings.
In many activities, resources such as chapters and PowerPoint presentations are often repeated because many concepts appear in the same chapter or PowerPoint presentation and you will just need to focus on the concepts being studied.

**Competencies Covered:**

**Competency 107.1.1: Research Strategy**
The student develops a research strategy for critiquing & improving some aspect of a training/teaching approach, clarifying what data to collect & how to analyze it.

**Competency 107.1.2: Data Evaluation & Summary**
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

**Competency 107.2.1: Research Study Critique**
The student critiques the data analysis, results, & conclusions in a research study.

**Competency 107.3.1: Topic Selection & Resource Identification**
The student selects an appropriate research topic & identifies print & electronic information resources that enable an appropriate examination of that topic.

**Competency 107.3.2: Source Evaluation**
The student evaluates the reliability of primary & secondary source information.

**Competency 107.3.3: Literature Review**
The student conducts a literature review on a key theory or practice issue.

**Competency 107.3.4: Hypothesis Development**
The student interprets results of reviewed information & generates a position supported by those findings.

**Competency 107.4.1: Instrument Evaluation**
The student evaluates & selects the relative merits of instruments for measuring specific motivation, performance, & learning style variables.

**Required Learning Resources**


APA Style Manual.

Additional Learning Resources:
http://www.southalabama.edu/coe/bset/johnson/lectures/lec2.htm
Pearson PowerPoint Slides which you can access through the active links in the Reading Activities for each week.
Week # 1  
Preparing for Success

To successfully complete the assessments for this domain, you need the appropriate resources to help with your learning. You should also prepare a calendar to schedule times devoted to your studies. Share your calendar with family and friends so they are aware of your obligations.

Acquire Learning Resources

Arrange to obtain the learning resources listed below so there will be no delays in your studies. These items are essential for you, as this document will guide you week by week in the use of these materials. Some of these items must be shipped to you, so be sure that your mailing address information is current. If you click your name on your AAP, you can check your contact information.

☐ Order Your Textbooks

The textbooks that you will need to order for this course are listed below. You will need to order these early in order to avoid any delays in getting them when required throughout this 11 week course.


APA Style Manual.

Note: The WGU Bookstore has these books available for immediate purchase and delivery. You may shop at other online bookstores, but be sure to order early and use the correct ISBN to get the correct edition.

☐ Download WGU Library e-Reserve Readings

The WGU Library has an electronic reserve or e-Reserve of selected articles available for this course of study. Access the library from your portal resource tab, select e-Reserves and search by author for the chapters in each activity below. Download and print each chapter:

☐ Login to the Research Fundamentals Learning Community

The Research Fundamentals Learning Community complements this course of study and will be the gathering place to communicate with your Course of Study mentor and student peers during the next 17 weeks. You will also be participating in activities throughout this course of study that will require you to post and comment on selected topics as well as receive assistance as you prepare for the
objective exam. Complete the following activities to become better acquainted with the learning community.

☐ Take the Pre-Assessment
As noted above, your competence in this area will be determined through a combination of performance assessments (RFE3 and RFP3) and the competency examination (RFO3). There is a pre-assessment available to help you prepare for that examination:

1. On the AAP under the “Pre-assessment Available” column RFO3, click “Yes”.
2. Click on the request to take the PARF Pre-assessment. Please set aside approximately two hours to take the pre-assessment. Do not use any notes, textbooks, or other learning resources. Remember that the purpose of the preassessment is to determine: (a) if you are ready to take the competency examination and (b) what specific areas you need to spend additional time studying.

If you take longer than the recommended amount of time, or if you utilize resources that will not be permitted during the actual examination, the purpose of taking a pre-assessment is defeated. Moreover, taking the pre-assessment more than two or three times significantly dilutes the value that can be gained from this tool, so do not attempt to take the pre-assessment until you honestly feel that you are ready to proceed. Once you have taken the pre-assessment, ask your mentor to review with you the preassessment detail. The two of you can analyze the results by looking at the topic sections and percentage scores, and your mentor can guide you with regard to what specific areas to concentrate on, when you will be ready to attempt the competency examination, and so on.

Getting Started & Orientation to the Research Fundamentals Domain
What is research? Research is defined as the systematic application of the scientific method to the study of problems (Gay, Mills, & Airasian, 2006). The scientific method is an orderly process consisting of the steps in Figure 1. Most research including educational research follows the five main steps.

![Figure 1. The Scientific Method](image)
Competency 107.3.1: Topic Selection & Resource Identification
The student selects an appropriate research topic & identifies print & electronic information resources that enable an appropriate examination of that topic.

The Scientific Method

We rely on the scientific method to test our understanding of educational phenomena and to add to the body of knowledge. As professional practitioners we are expected to know and understand the scientific method.

☐ Reading

Also review the associated PowerPoint presentation which can be found here (Chapter 1)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_1.pdf

While reading, take notes on:
- What is the scientific method?
- How is the scientific method used in education?
- What are the major steps involved in conducting a research study?
- How is research classified?
- What are the different research methods and approaches?
- What are the limitations of the scientific method in education?
- What are the differences between quantitative and qualitative research studies?

☐ Taking the Preassessment
RFO3 has a preassessment that helps determine if you are ready for the assessment. You have three free attempts and will be charged for a fee for each additional attempt. You can take the preassessment before you start the Course of Study to check your prior knowledge in the domain and then after you have carefully gone through the Course of Study a couple of times to test your understanding and identify weak areas for further reading. It is highly recommended that you obtain a score that is at least more than 5 points above the cut score before you try the RFO3.

To take the preassessment, follow the steps below:
1. Log into your Student Portal
2. Open your AAP
3. Click on the Yes link under Preassessment available for RFO3
4. Click on the link: Click here to refer for this pre-assessment
5. Your mentor will approve the referral
6. Take the preassessment when it is available
7. After the preassessment, you have access to the results and coaching report of the test in your AAP by clicking on the link Pass or Not Pass for the preassessment below your AAP.
Referral for RFE3
Refer yourself for RFE3 performance assessment in your AAP. This will open up the performance tasks in Task Stream.

Week #: 2
Research Paradigms and Research Methods
This topic 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 mixed method research/action research. It will introduce you to their differences and characteristics as well as their advantages and disadvantages. Even though this comparison may sound boring to you for the moment, a good understanding of the differences among these three paradigms is critical to understanding of the topics discussed later in the Course of Study. Actually the design of each component for a research study hinges on these differences.

Research is classified in three ways. First, we classify research into three paradigms according to 1) types of data they collect (numerical or categorical), 2) the fundamental differences in research designs (such as experimental design for quantitative research, ethnography for qualitative research, and action research for mixed method), and 3) data analysis (categorical or statistical). This classification results in three research paradigms: quantitative and qualitative and mixed method research (See Figure 2).

Second, we classify research by method (See Figure 2)

![Figure 2. Classification of Research by Method]
Third, we classify research by purpose: Basic and applied research, evaluation research, action research, research and development (also known as R&D) (See Figure 3).

Figure 2. Classification of Research by Purpose

This introduction gives you an overview of types of research and different research methods. In the weeks that follow, you will learn components of a research study and how each of the research paradigms determines the nature of each component.

**Competency Title:**

**Competency 107.1.2: Data Evaluation & Summary**
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

**Competency 107.2.1: Research Study Critique**
The student critiques the data analysis, results, & conclusions in a research study.

**Characteristics and Benefits of Each of the Research Paradigms.**

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.
Reading
Gay, Mills & Airasian: Chapter 1

Also review the associated PowerPoint presentation which can be found here (Chapter 1)
https://web5.wgu.edu/aap/content/educational_research%20chapter_1.pdf

URLs:
The two web sites listed below provide good descriptions of the differences between different research approaches (Note: the textbooks refer to research designs as either approaches or methods. In addition, research paradigms may also be referred to as research approaches.)

Lecture Notes on the Different Approaches
http://www.southalabama.edu/coe/bset/johnson/lectures/lec2.htm

Concept Map on the Different Approaches
http://www.southalabama.edu/coe/bset/johnson/clickmaps/ch2/fr_ch2.htm

- While reading, take notes on:
  - What are the characteristics of each research paradigm?
  - 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, that is, 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?

Week #: 3
Quantitative Research
Quantitative research started before the other research paradigms; therefore, most research concepts are related to quantitative research. It is important that you spend time studying all aspects of quantitative research. In this week, you will learn the underlying assumptions of quantitative research, the type of data it collects, the various fundamental designs that fall under this category, and the sampling techniques used in quantitative research.

Competency 107.1.2: Data Evaluation & Summary
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.
Characteristics and Benefits of Quantitative Research

Quantitative research started before the other research paradigms; therefore, most research concepts are related to quantitative research. It is important that you spend time studying all aspects of quantitative research. In this week, you will learn the underlying assumptions of quantitative research, the type of data it collects, the various fundamental designs that fall under this category, and the sampling techniques used in quantitative research.

☐ Reading
Gay, Mills & Airasian: Chapter, 1 (pp. 7-11)

Also view the associated PowerPoint slides on quantitative research which can be found here (Chapter 1)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_1.pdf

URLs:
Revisit the web sites for quantitative research:
Lecture Notes on the Different Approaches
http://www.southalabama.edu/coe/bset/johnson/lectures/lec2.htm

Concept Map on the Different Approaches
http://www.southalabama.edu/coe/bset/johnson/clickmaps/ch2/fr_ch2.htm

While reading, take notes on:
- What are the advantages and disadvantages of quantitative research paradigm?
- What are the assumptions about quantitative research paradigm?
- What 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?
- What research designs fall under the category of quantitative research?

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.
Reading
Gay, Mills & Airasian: Chapters 7, 8, 9, 10, 11, 12, 13
Also review the associated PowerPoint presentations which can be found here (Chapters 7, 8, 9, 10, 11, 12, and 13)

- https://web5.wgu.edu/aap/content/educational_research_%20chapter_7.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_8.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_9.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_10.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_11.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_12.pdf
- https://web5.wgu.edu/aap/content/educational_research_%20chapter_13.pdf

Take notes on your reading
- 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 8 major threats to internal validity of an experiment?
- What are the 6 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?

While reading, study and define the following terminologies:
- Descriptive research
- Correlational research
- Causal-comparative research
- Experimental research
- Correlation coefficient
- Pearson r
- Prediction study
- Interaction
- Group design
- Inferential statistics
- Independent variable
- Dependent variable
- Control
- Treatment
- Internal validity
- External validity
You can also use Table 1 to take notes to compare various research methods.

**Table 1**
Comparison of Quantitative Research Methods (Approaches)

<table>
<thead>
<tr>
<th>Research methods</th>
<th>Survey (Descriptive) Research</th>
<th>Correlational Research</th>
<th>Causal-Comparative Research</th>
<th>Experimental Research</th>
<th>Single-Subject Experimental Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of data to be collected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments/methods used for data collection</td>
<td></td>
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</tr>
<tr>
<td>Steps/Process</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Techniques used for data analysis</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Design variations (Such as post test only control group for experimental design)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. This table is created for you to take notes while reading. It is not in APA Style. APA Style tables do not have vertical and middle horizontal lines. See APA Manual.
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.

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

**Reading**
Gay, Mills & Airasian: Chapter 5
Also review the associated PowerPoint presentations which can be found here (Chapters 5)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_5.pdf
Lecture Notes on Sampling

While reading, take notes on the following techniques and be able to define them.

<table>
<thead>
<tr>
<th>Random sampling (probability sampling)</th>
<th>Nonrandom sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple random</td>
<td>Convenience (accidental or haphazard)</td>
</tr>
<tr>
<td>Stratified</td>
<td>Purposive</td>
</tr>
<tr>
<td>Cluster –simple and two-stage</td>
<td>Quota</td>
</tr>
<tr>
<td>Systematic</td>
<td></td>
</tr>
</tbody>
</table>

Also take notes on:
What is the purpose of random sampling?
How does nonrandom sampling differ from random sampling?

Week #: 4

**Qualitative Research**

In this week, 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.

**Competency 107.1.2: Data Evaluation & Summary**
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.
Characteristics and Benefits of Qualitative Research

In this week, 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.

☐ Reading
Gay, Mills & Airasian: Chapter, 1 (pp. 8, 12--16)
Also review the associated PowerPoint presentation which can be found here (Chapter 1)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_1.pdf

While reading, take notes on:

- What are the advantages and disadvantages of qualitative research paradigm?
  What are the assumptions about qualitative research paradigm? What 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?
- What scientific method does qualitative research employ, inductive (bottom up) or deductive (top down)?
  How does qualitative research analyze data?
- What research designs fall under the category of qualitative research?

Qualitative Research Methods

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

☐ Reading
Gay, Mills & Airasian: Chapters 14, 15, 16, 17, 18

Also review the associated PowerPoint presentations which can be found here (Chapters 14, 15, 16, 17, and 18)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_14.pdf
https://web5.wgu.edu/aap/content/educational_research_%20chapter_15.pdf
https://web5.wgu.edu/aap/content/educational_research_%20chapter_16.pdf
https://web5.wgu.edu/aap/content/educational_research_%20chapter_17.pdf
https://web5.wgu.edu/aap/content/educational_research_%20chapter_18.pdf

Take notes on your reading

- 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?
Sample Techniques for Qualitative Research

For this topic, you will learn various sampling techniques available for qualitative research. These methods include random, systematic, stratified and cluster sampling.

☐ Reading
Text: Gay, Mills & Airasian: Chapter 5

Also review the associated PowerPoint presentation which can be found here (Chapters 5)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_5.pdf

Lecture Notes on Sampling

While reading, take notes on the following techniques and be able to define them:
• Criterion
• Intensity
• Homogeneous
• Snowball
• Random purposive

☐ RFE3: Assessment
Complete the RFE3: 107.1.1&2 Quali./Quanti. Print off the completed rubric and refer to the feedback. Make necessary revisions as needed.
Week #: 5

**Action Research (Mixed Method)**

In this week, you will learn the purpose of action research—how it differs from other research paradigms, types of data it collects, and its fundamental design.

**Competency 107.1.2: Data Evaluation & Summary**

The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

**Characteristics and Benefits of Action Research**

In this week, you will learn the purpose of action research—how it differs from other research paradigms, types of data it collects, and its fundamental design.

- **Reading**
  Gay, Mills & Airasian: Chapters 1 (pp. 18-19) and 20
  Also review the associated PowerPoint presentations which can be found here (Chapter 20)
  [https://web5.wgu.edu/aap/content/educational_research_%20chapter_20.pdf](https://web5.wgu.edu/aap/content/educational_research_%20chapter_20.pdf)

- **URL:**
  What is Action Research?
  http://carbon.cudenver.edu/~mryder/itc_data/act_res.html

  While reading, take notes on:
  - 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?
  - What 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?

- **RFE3: Assessment**
  Complete the RFE3: 107.1.1 Action Research Print off the completed rubric and refer to the feedback. Make necessary revisions as needed.

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Week #: 6

**Selecting Topics and Literature Review**

This topic introduces you to the characteristics of good research topics, research questions, and literature review.

**Competency 107.3.1: Topic Selection & Resource Identification**

The student selects an appropriate research topic & identifies print & electronic information resources that enable an appropriate examination of that topic.
Selecting Topics

Here you will learn characteristics of a good research study, and what makes a good research question. In addition, you will learn how qualitative topics differ from quantitative ones. The successful researcher understands how to apply these concepts to their professional practice.

☐ Reading
Gay, Mills & Airasian: Chapter 2
Also review the associated PowerPoint presentations which can be found here (Chapter 2)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_2.pdf

While reading, take notes on:
- What are the characteristics of a good research topic?
- What process a researcher would go through in selecting a research topic?
- How are qualitative topics different from quantitative topics?
- What is a research question?
- How are qualitative research questions different from quantitative research questions?

Reasons for Literature Review

A literature review is a summary and interpretation of the literature on your topic. It is a comprehensive survey of publications in your field of interest. A literature review should be a survey of what others have done or have found on your topic.

Instruction Text: Sources should include scholarly articles from reputable sources like refereed journals and publications. A review of the literature is done for several reasons:
- To learn more about your topic if you are not the subject matter expert
- To find out what other researchers or educators have learned about your topic
- To modify or adjust your research proposal based on what has been learned from others
- To learn more about how others have tried to solve the problem you have identified
- To learn current trends and issues

Competency 107.3.1: Topic Selection & Resource Identification
The student selects an appropriate research topic & identifies print & electronic information resources that enable an appropriate examination of that topic.

Competency 107.3.3: Literature Review
The student conducts a literature review on a key theory or practice issue.

☐ Reading
Gay, Mills & Airasian: Chapters 3
Also review the associated PowerPoint presentations which can be found here (Chapter 3)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_3.pdf
While reading, take notes on:
- What is the purpose of literature review?
- How is literature review related to other parts of a research plan?
- How might literature review results influence the research process?

Resource Identification, Evaluation & Selection

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

Reading
Gay, Mills & Airasian: Chapters 3
Also review the associated PowerPoint presentation which can be found here (Chapter 3)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_3.pdf

While reading, take notes on:
- What are the steps for conducting a literature review?
- 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?

Week #: 7

Measures, Variables, and Data

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. In this week, you will learn these important concepts in research.

Competency 107.1.2: Data Evaluation & Summary
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

Competency 107.3.4: Hypothesis Development
The student interprets results of reviewed information & generates a position supported by those findings.

Independent and Dependent Variables

As discussed in Week 1, 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.

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.

Reading
Gay, Mills & Airasian: Chapter 6, p.147

Also view the associated PowerPoint presentation which can be found here (Chapter 6)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_6.pdf

While reading, take notes on:
- 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?

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 Error and Type II Error and how they relate to the null 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 Error and Type II Error and how they relate to the null hypothesis.

Reading
Gay, Mills & Airasian: Chapter 2, pp 71-77

Also review the associated PowerPoint presentation which can be found here (Chapter 2)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_2.pdf

When reading, take notes on the following questions:
- What is a hypothesis?
- Types of hypothesis?
- What does it mean by operational definition of variables?
- What is a null hypothesis?
- What are Type I Error and Type II Error?
- 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?

**Measurement Scales**

There are four measurement scales/variables: nominal, ordinal, interval, and ratio variables. These four scales have levels, like steps going upward (for a graphical representation, visit [http://www.socialresearchmethods.net/kb/measlevl.php](http://www.socialresearchmethods.net/kb/measlevl.php)). Understanding of 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 t test which requires that your data need to be at interval or ratio level (see more discussion in Week 9).

**Reading**

Gay, Mills & Airasian: Chapter 6, pp 144-147
Also review the associated PowerPoint presentation which can be found here (Chapter 6)

[https://web5.wgu.edu/aap/content/educational_research_%20chapter_6.pdf](https://web5.wgu.edu/aap/content/educational_research_%20chapter_6.pdf)

Graphical Representation of the four measurement scales:


While reading, 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 qualitative variable?
- What are the benefits of quantitative vs. qualitative data for research?

**Week #: 8**

**Data Collection**

For this topic, you will learn:

- Types of measuring instruments of cognitive and affective tests, projective and non-projective 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

**Competency 107.4.1: Instrument Evaluation**

The student evaluates & selects the relative merits of instruments for measuring specific motivation, performance, & learning style variables.
Measuring Instruments

In Week 8, you learned that data are classified according to measurement levels (nominal, ordinal, interval, and ratio variables) and quantitative variable (ordinal, interval, and ratio data) and qualitative variable (nominal data). But how do we collect these different types of data? In this week, you will learn various measuring instruments and sources of instruments. There are numerous instruments available but they fall into two main categories:

In Week 7, you learned that data are classified according to measurement levels (nominal, ordinal, interval, and ratio variables) and quantitative variable (ordinal, interval, and ratio data) and qualitative variable (nominal data). But how do we collect these different types of data? In this week, you will learn various measuring instruments and sources of instruments. There are numerous instruments available but they fall into two main categories:

A. Non-Projective Tests:
   1. Cognitive tests
      a. Achievement tests
      b. Aptitude tests
   
   2. Affective tests
      a. Attitude Scales
      b. Likert scales
      c. Semantic Differential Scales
      d. Thurstone Scale
      e. Guttman Scale
      f. Interest Inventories
      g. Personality Inventories
      h. Value Tests

B. Projective Tests

Most of our educational tests are non-projective tests which typically collect numerical data.

For qualitative research, two data collection methods are commonly used: observations and interviews.

Reading
Gay, Mills & Airasian: Chapters 6, pp. 149-171 and Chapter 14

Also review the associated PowerPoint presentations which can be found here (Chapters 6 and 14)

https://web5.wgu.edu/aap/content/educational_research_%20chapter_6.pdf (Chapter 6)

https://web5.wgu.edu/aap/content/educational_research_%20chapter_14.pdf (Chapter 14)
Lecture Notes on Standardized Measurement and Assessment
http://www.southalabama.edu/coe/bset/johnson/lectures/lec5.pdf

Lecture Notes on Methods of Data Collection

While reading, 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 terminologies the following:

Data
- Norm-referenced Data
- Criterion-referenced Data
- Affective Instruments
- Test
- Assessment
- Measurement
- Performance Assessment
- Constructs
- Cognitive Tests
- Standardized Tests
- Cognitive Instruments
- Aptitude Instruments

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.

Reading
Gay, Mills & Airasian: Chapter 6 (pp. 154-162)

Ereserves

While reading, take notes of the definitions and how evidence can be established for the following:
A. Types of Validity
1. Content validity
2. Criterion-related validity: Concurrent V. and Predictive V.
3. Construct validity.

B. Forms of Reliability
1. Stability-Test-retest
2. Equivalence – Equivalent-forms
3. Equivalence and stability
4. Internal consistency
5. Split-half

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?

Week #: 9
Data Analysis
After data is collected, it must be organized and analyzed before being presented in a meaningful way to answer research questions. In this week, you will learn various ways to analyze both quantitative and qualitative data using statistics and categorical analysis.

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 (Table 2).

Table 2
Commonly Used Statistical Procedures for Analyzing Quantitative Data

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>Inferential statistics/Tests of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Purposes</td>
</tr>
<tr>
<td>Meaningfully describe a set of data</td>
<td>Purposes</td>
</tr>
</tbody>
</table>

Competency 107.1.2: Data Evaluation & Summary
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

Descriptive Statistics
There are two types of descriptive statistics. There are measures of central tendency that tells one what a set of number tend to be. These are measures 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.

**Reading**
Gay, Mills & Airasian: Chapter 12

Also review the associated PowerPoint presentation which can be found here (Chapter 12)
[https://web5.wgu.edu/aap/content/educational_research_%20chapter_12.pdf](https://web5.wgu.edu/aap/content/educational_research_%20chapter_12.pdf)

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, skewed distributions
- Measures of relative position: Percentile ranks, standard scores (z scores, t scores, and stanines).
- Measures of relationship: correlation and correlation coefficient r. Two main methods for calculating correlation coefficient: 1) the Spearman Rho coefficient (for ranked data) and 2) the Pearson r coefficient (for interval and ratio data).

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

Figure 4. Types of Descriptive Statistics
Inferential Statistics

All inferential statistics are called tests of significance. A test of significance is a statistical test used to determine whether or not there is a significant difference between or among two or more group means at a selected probability level. The purpose is to generalize the results from a small sample to its larger population. The probability level is a level of significance, a criterion used to determine whether to accept or reject the null hypothesis based on the analysis.

For RFO3, 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. A test of significance is a statistical test used to determine whether or not there is a significant difference between or among two or more group means at a selected probability level. The purpose is to generalize the results from a small sample to its larger population. The probability level is a level of significance, a criterion used to determine whether to accept or reject the null hypothesis based on the analysis (We discussed null hypothesis in Week 6).

There are two commonly accepted levels of significance:
- $P < .05$ (alpha = .05), which means there are 5 times in 100 that you could expect a difference by chance.
- $P < .01$ (alpha = .01), which means there is 1 in 100 that you could expect a difference by chance. This is a higher confidence level.

The probability level determines the probability of committing Type I Error (rejecting a null hypothesis that is really true). At a (alpha) = .05, you have a 5% probability of making a Type I Error. Or in other words, there is a 95% chance that the difference resulted from the independent variable, not random error. If you select a (alpha) = .01, then you only have 1% probability of making Type I Error, however, you do increase the chance of committing Type II Error (not rejecting a null hypothesis when you should) (Gay et al, pp. 332-333).

☐ Reading
Gay, Mills & Airasian: Chapter 13

Also review the associated PowerPoint presentation which can be found here (Chapter 13)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_13.pdf

While reading, take notes on:
- What factors determine the choice of statistical procedures?
- What are the two assumptions for using 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?

The following is a graphic representation of some commonly used tests of significance.

Figure 5. Commonly Used Tests of Significance.

- **RFE3: Assessment**
  Complete the 107.1.2-02 Statistics Print off the completed rubric and refer to the feedback. Make necessary revisions as needed.

**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 and Figure 7).
Figure 6. Qualitative Data Analysis during Data Collection

Figure 7. Qualitative Data Analysis after Data Collection
**Reading**
Gay, Mills & Airasian: Chapter 18

Also review the associated PowerPoint presentation which can be found here (Chapter 18)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_18.pdf

While reading, take notes on:
- What is the main technique for analyzing qualitative data?
- What are the steps for analyzing qualitative data?
- What are some data analysis strategies?

**Week #: 10**

**Research Study Critique**
You have learned most of the important concepts for this 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.

**Competency 107.2.1: Research Study Critique**
The student critiques the data analysis, results, & conclusions in a research study.

**Evaluating a Research Report**
You have learned most of the important concepts for this 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.

**Reading**
Gay, Mills & Airasian: Chapter 22

Also review the associated PowerPoint presentation which can be found here (Chapter 22)
https://web5.wgu.edu/aap/content/educational_research_%20chapter_22.pdf

While reading, take notes on:
- What factors might influence the interpretation of research results?
- What are the criteria for evaluating the following sections of a research report?
  - Problem statement
  - Review of the literature
  - Hypotheses
  - Participants
  - Instruments
  - Research design and procedures
  - Results
Discussion
Abstract and summary
Overall research approach

☐ RFE3: Assessment
Complete the 107.1.1 Research Plans Print off the completed rubric and refer to the feedback. Make necessary revisions as needed.

Conclusion
Congratulations! You have completed part I of the course of study. However, it is necessary for you to go through the course of study a couple of times before concepts can sink in and be retained in your memory. Research concepts are foreign to most of us; therefore, simply understanding them is not enough for RFO3. Some memorization is important. When ready, take the preassessment again and see how much you have improved from the first attempt. If the score is not ideal, the coaching report of your preassessment results (which can be accessed by clicking on the Pass or Not Pass link for the preassessment at the end of your AAP screen) will show you your weak areas. Review the learning resources for those areas and try the preassessment again. After you have obtained ideal results, send a referral for RFO3.

Part II of this Course of Study (COS) prepares you for the RFP3 performance assessment. It presents the required sequence of learning steps and activities to help you develop competence in the subject area of Research Proposal. Your competence will be assessed as you complete a performance assessment. As with any learning activity, steps may be completed more quickly than outlined below, or they could take the full amount of time indicated. Pacing is provided (Week One, Week Two, etc.) as a guide to the amount of time you should take to develop the competencies necessary and prepare to complete the required assessment.

WEEK #: 11
Overview of Research Proposal
After you have completed RFO3 and RFE3, you are ready to develop a research proposal which will be built upon all the competencies you have obtained so far. A research proposal has most of the components for a complete research study except the results and conclusion sections. The purpose of a proposal is usually for getting approval before you conduct the research. Because someone else, from government or private funding or Institutional Review Board, will review the proposal, all the elements in the proposal should be clearly written to avoid confusion or rejection. Through the proposal, you are telling the reviewer why you want to conduct the research (the purpose and importance), how you will conduct the research (the design and procedure), how you will collect and analyze data (data collection and data analysis), and what the expected results are.

In RFO3 and RFE3, you learned that research is defined as the systematic application of the scientific method to the study of problems (Gay, Mills, & Airasian, 2009). The scientific method is an orderly process consisting of the steps in Figure 8. Any research including educational research follows the five main steps.
This scientific method will be the basis for your research proposal with some variations depending on the research method you choose for your proposal. Based on the scientific method, certain components are commonly included in a research proposal (Table 1).

### Table 3
**Components of Research Proposal**

<table>
<thead>
<tr>
<th>Abstract</th>
<th>Statement of the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Questions</td>
<td>Literature Review</td>
</tr>
<tr>
<td>Hypothesis (or Predictions)</td>
<td>Methodology</td>
</tr>
<tr>
<td>Subjects or Participants</td>
<td>Data Collection and Instruments</td>
</tr>
<tr>
<td>Research Design</td>
<td>Procedure</td>
</tr>
<tr>
<td>Data Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Note. Text in normal font type represents main headings which are centered; text in Italic represents subheadings which are flushed to the left. This heading structure is in line with APA Style and should be used in your research proposal.

**Competency 107.2.1: Research Study Critique**
The student critiques the data analysis, results, & conclusions in a research study.

### Selecting a Topic

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 (see Weeks 2, 3, and 4). There are, however, some commonly used words that relate to a certain type of research. For example, if a topic investigates opinions or attitudes, it is very likely a survey or descriptive research. If it is investigating the relation between two variables, it is a
correlational study. If it is investigating the effect of a method or type of instruction, it is most likely an experimental research. If the purpose of a study is to investigate if a method or type of instruction would fix a daily classroom problem, well, you have probably guessed it: it is action research! Knowledge of those special words or phrases helps identify whether a topic is appropriate for qualitative research, quantitative research or action research.

Many programs have a domain titled Instructional Design which requires students to identify an instructional problem. If you have an ID domain in your program and have completed the assessments, you must have identified an instructional problem with which you are familiar with in your work environment. For the ID domain assessments, you are supposed to develop an instructional intervention to address the identified problem. For your RFP3, you can propose to conduct research to investigate if your intervention is effective in solving the problem.

Meet with your mentor to discuss your type of research. You want to have a topic that will follow you through to your Capstone. Each program capstone is slightly different. Based on your choice, you will either complete the RFP or the RFP-AR. These are two separate programs in Task Stream and you will need to be enrolled in only one of them.

**Reading**
Gay: Chapter 2
Ruszkiewicz: Chapters 1, 2, & 3

Also review the associated PowerPoint presentations which can be found here (Chapter 2) [https://web5.wgu.edu/aap/content/educational_research_%20chapter_2.pdf](https://web5.wgu.edu/aap/content/educational_research_%20chapter_2.pdf)

Take notes on your reading
- What are the characteristics of a good research topic?
- How can it relate to your school, district, and wider community?
- What are the stages of a research project?

Be able to define the following terms:
- Analyze
- Evaluate
- Keywords
- Classify
- Explain survey
- Compare and contrast
- Prove or disprove
- Technical writing
- Discus
- Review of the literature
- Meta-analysis

**Referral for RFP3**
Refer yourself for the RFP3 performance assessment in your AAP. This will open up the performance task in Task Stream. Make sure you talk to your capstone chair concerning the type of RFP3: action research or traditional research before you send the referral because you need to indicate that in the referral form in order to be enrolled in the right program. When you chose the type of research, keep in mind your capstone. Capstones in some programs require a traditional...
research method like experimental design, correlation design, causal comparative design or a qualitative research method, while others require action research. The MED Programs require a formative or summative evaluation. It is important that you consult with your capstone chair about the choice of a research type for your RFP3 because many components in RFP3 can be the backbone of a capstone prospectus for many capstones.

☐ RFP3/RFP3-AR: Assessment
Write the RFP3 Problem Statement & Research Questions OR write the RFP3-AR: Introduction Review the instructions, rubric & job aid.

Week #: 12
Literature Review Part I
In RFO3 and RFE3 Course of Study, you learned that a literature review is a summary and interpretation of the literature on your topic. It is a comprehensive survey of publications in your field of interest. A literature review should be a survey of what others have done or have found on your topic. Sources should include scholarly articles from reputable sources like referred journals and publications. A review of the literature is done for several reasons:

- To learn more about your topic if you are not the subject matter expert
- To find out what other researchers or educators have learned about your topic
- To modify or adjust your research proposal based on what has been learned from others
- To learn more about how others have tried to solve the problem you have identified
- To learn current trends and issues

Your literature review will consist of several journal articles, research studies, dissertations, and other sources. In this week you will begin to assemble sources, evaluate them and get them ready for a literature review. This will form the base for the literature review in your capstone which you will understandably augment and expand as you learn more about your topic. You will need at least 10 references to cite when you write your literature review for RFP3. This may mean you will review 20 or more sources to find 10 that are scholarly and reliable. In your final capstone, you are required to have a minimum of 25 sources. Some departments may require more. Check with your mentor or capstone chair.

Competency 107.3.1: Topic Selection & Resource Identification
The student selects an appropriate research topic & identifies print & electronic information resources that enable an appropriate examination of that topic.

Competency 107.3.2: Source Evaluation
The student evaluates the reliability of primary & secondary source information.

Conducting Research Using the WGU Library Resources
As a student at an online University, it is imperative that you understand how to use an on-line library. The WGU Central Library offers access to abstracts and full-text articles from periodical journals, magazines, and newspapers through First Search, Ingenta, and ProQuest ABI/Inform indexes.
**Reading**

Gay, Mills & Airasian: Chapter 3 (pp. 82-91)
Ruszkiewicz, Chapter 6

Be able to define the following commonly used terms
- Boolean operators
- Search engine
- Annotated bibliography
- Listserves
- Academic directories
- Field research
- Databases
- Academic integrity

**Using the WGU E-Library**

When you use the WGU library to research a topic, you may find that you are only given the abstract. You can get the full text article for these papers and published articles. When you are working on the Research Fundamentals domain, you will need to get the full text article for your literature review. Listed below is all the information needed to obtain the full text articles.

There are two ways to obtain full text articles:
- Do a search in ERIC, the largest computer database containing published and unpublished education literature. Many of the sources that show up in ERIC also have full text available. ERIC is the best starting point in your search for education literature.
- Do a search in WilsonSelectPlus, a database in FirstSearch, which has all full text articles.

Sign up for an account to receive free full-text articles.

Order the article through Interlibrary Loan (ILLiad) where the article is sent to you through the interlibrary loan department at the University of New Mexico. With ILLiad, you must open your own account.

**Procedure for Setting Up an Account to Obtain Full Text Articles**

**Interlibrary loan, using ILLiad**

From the student portal click on Library.
1. Click on the ILLiad (interlibrary loan) link either from the Library home page or from
2. Find Books or Find Articles.
3. Follow the links to the ILLiad Home Page.
4. Click on New Users to open up your own account.
5. Fill out your personal information following the directions. Now you can go back to the
6. ILLiad Home Page and order the materials you need by filling out a form for each source.

**Procedures for Accessing ERIC or WilsonSelectPlus (full text articles)**

1. From the student portal click on Library.
2. Click on Find Articles
3. Click on FirstSearch (a collection of 50+ databases)
4. Follow the links and at the prompt, enter:
5. username: wgu
6. password: elibrary
7. At the FirstSearch screen, go to Jump to Database and select: ERIC or WilsonSelectPlus
8. When you get to the ERIC or WilsonSelectPlus screen, enter your keywords in the boxes. Try
9. many different terms and combinations of terms. The computer is literal and will just
10. look for the specific term(s) you type.
11. When you bring up the list of citations, click on the titles to read the information and then click
12. on HTML full text to get the full articles. If you are in ERIC, you will need to look for the link to the full text for that item. Not all items in ERIC have full text available.

Questions? Check the FAQ first!
Contact Barbara Rosen, WGU Librarian
wguclr@unm.edu (505) 277-7176
Office hours: 8:00am-5:00pm MST, Monday-Friday

Search for Sources
Develop a list of key words to start your search. If your keywords generate too many sources, modify your key words to be more specific. If they did not result in enough sources, modify your key words until they generate enough. It is very likely that you may not find sources that directly relate to your subject matter. You may need to search for sources that are indirectly related to your subject matter and then go from there.

- Scan the results to see which ones are related to your topic.
- Check to see which sources have full text articles.
- Obtain as many as possible primary sources, articles in refereed journals, and scholarly and published research studies or books. Avoid too many sources from the Internet.
- After you have obtained the items that are related to your topic, modify your keywords and search again until you have enough sources.
- As mentioned before, you will need at least 10 references to cite when you write your literature review for RFP3. This may mean you will review 20 sources to find 10 that are scholarly and reliable. In your final capstone, you are required to have more than 25 sources. Some departments require more. Check with your mentor or capstone chair.

Reading
Ruszkiewicz: Chapters 10

CARS Evaluation
After you have obtained enough sources, you must evaluate your sources for reliability. CARS evaluation tool is a recommended tool for that and can be found at:
http://www.dushkin.com/online/webresearch/cars.mhtml
A table should be created for the report of the results of your CARS evaluation. List the items in the left column and the criteria in the top row. Write your evaluation comments for each item under each criterion. Save what you have developed for use for Task 2 that you will complete in Week 3.

Example:

Table 9
Results of CARS Evaluation

<table>
<thead>
<tr>
<th>Titles</th>
<th>Credibility</th>
<th>Accuracy</th>
<th>Reasonableness</th>
<th>Support</th>
</tr>
</thead>
</table>

Note. You can turn on the vertical lines and all the horizontal lines when you are working with the table so that you can see rows and columns. After you have finished the table, you can turn the lines off except the top, the second, and the bottom horizontal lines so that you have only three horizontal lines and no vertical lines, as shown in this example. You do this in the table menu Properties/Boarders and Shading.

Week #: 13

**Literature Review Part II**

A literature review is a summary and interpretation of the literature on your topic. It is a comprehensive survey of publications in your field of interest. A literature review should be a survey of what others have done or have found on your topic. Sources should include scholarly articles from reputable sources like refereed journals and publications.

A review of the literature is done for several reasons:

- To learn more about your topic if you are not the subject matter expert
- To find out what other researchers have learned about your topic
- To modify or adjust your research proposal based on what has been learned from others
- To learn more about how others have tried to solve the problem you have identified
- To review current trends and issues

**Competency 107.3.3: Literature Review**
The student conducts a literature review on a key theory or practice issue.

In Week 12, you gathered enough sources and evaluated their credibility, accuracy, reasonableness, and support. In this week you are going to review them and annotate them, that is, to create “a listing of the sources that includes a summary or description of the main points covered in an article” (Ruszkiewicz, 2006, p. 92). This is the first step toward writing up your literature review.
Conducting Annotated Bibliography

Before you write up the final APA style literature review, it is important that you annotate all the sources that you have obtained. The following are some recommended steps that you can use to create an annotated bibliography.

A good annotated bibliography will lay a solid foundation for your final literature review.

**Reading**

Gay, L.R., Mills, G.M. & Airasian, Chapter 3 (pp. 91-92)
Ruszkiewicz, Chapters 8, 9, 10, 11

Be able to define the following commonly used terms

- Boolean operators
- Search engine
- Annotated bibliography
- Listserves
- Academic directories
- Field research
- Databases
- Academic integrity

Recommended Steps to Annotate All the Sources

1. Create a word document and save it.
2. Type up the full APA citation (consult Chapter 4 of APA Style Manual, 5th ed.) for one of your obtained sources (an article or a book) and save.
3. Read the source, take notes summarizing the content (focus) and describing the usefulness, limitations, and intended audience.
4. Summarize any conclusions/findings the author(s) may have made and describe your reaction to the item.
5. During your reading, if you find something interesting, write down and use quotation marks at the beginning and end of the quote, indicating page number where you got the quote. Never quote a passage without adding the quotation marks and page number.
6. Type up your notes under the citation and save the document.
7. Double check to make sure you have enough information for the source.
8. Insert a couple of blank lines and then type up the citation for the second source.
9. Repeat 3, 4, 5, 6, 7, 8
10. Do the same for each of the selected sources.
11. When finished, check for spelling errors or content errors.
12. Save the document and print it out.
13. And you have an annotated bibliography.

The process described above is only one way of doing an annotated bibliography. There are certainly other ways. In chapter 3 of Gay textbook, the process is labeled as "Abstracting". You can also visit the following websites for more information about annotated bibliography.

http://www.library.mun.ca/guides/howto/annotated_bibl.pdf
RFP3: Assessment

Start the RFP3: Literature Review. Print the instructions & rubric for the Literature Review. Refer to these as you write your literature review.

Week #: 14

Literature Review: Part III

A literature review is a summary and interpretation of the literature on your topic. It is a comprehensive survey of publications in your field of interest. A literature review should be a survey of what others have done or have found on your topic. Sources should include scholarly articles from reputable sources like refereed journals and publications.

A review of the literature is done for several reasons:
- To learn more about your topic if you are not the subject matter expert
- To find out what other researchers have learned about your topic
- To modify or adjust your research proposal based on what has been learned from others
- To learn more about how others have tried to solve the problem you have identified
- To review current trends and issues

In Week 12, you gathered enough sources and evaluated their credibility, accuracy, reasonableness and support. In Week 3, you reviewed and annotated all the selected sources. This week, you are going to synthesize the same sources by writing up your literature review for your last task for RFP3. You will do this by using the annotated bibliography you created in Week 13. Before you start to write your literature review, it is important you understand the differences between an annotated bibliography and a literature review.

Competency 107.3.3: Literature Review

The student conducts a literature review on a key theory or practice issue.

Writing your Literature Review

Before you write, let's review the difference between an annotated bibliography and a literature review. An annotated bibliography is a list of citations with a brief descriptive and evaluative paragraph, the annotation (Cornell University Library Website). It serves as the starting point for your literature review, which is a synthesis of all the selected sources you have annotated in the annotated bibliography. Your annotated bibliography is a list of items with notes under each item; your literature review should be organized into subtopics, reporting the findings you summarized from your sources on what worked and what did not and why. When you do that, you will be reporting what are the best
practices (e.g., use of technologies or problem-based learning) and what factors (e.g., gender, skill levels) that have affected human behaviors (such as test scores, student retention) and what barriers (such as lack of enough instructional time, small sample size, not having enough computers, etc) affected the success of a program or intervention. In your review, you will cite the sources to support your statement of findings. A good example of a full literature review can be found in the Gay textbook (9th ed.) on pp. 32-36.

**Reading**
Gay, L.R., Mills, G.M. & Airasian, Chapter 3 (pp. 92-96)
Ruszkiewicz: Chapters 12, 13 & 14

You can browse the following sites for more information on how to conduct literature review:

Olin & Uris Libraries. Cornell University Library website: 
http://www.library.cornell.edu/olinuris/ref/research/skill28.htm#what

OWL at Purdue. (n.d.). Purdue University OWL Website:
http://owl.english.purdue.edu/owl/resource/614/01

Handouts and Links. University of North Carolina at Chapel Hill"Writing Center Website: 
http://www.unc.edu/depts/wcweb/handouts/literature_review.html

**Writing Your Literature Review**
Suggested steps
1. Review your annotated bibliography (You should have completed this in Week 3) to correct any content or spelling errors, etc.
2. Cut out each citation with your notes for the item
   Read the notes for each citation carefully and categorize it with a meaningful label, for example, Effective use of problem-based learning in teaching writing to 4th graders
3. Sort and group the citations to create subtopics
4. You will need to read and re-read the notes so that you can classify all citations into two to four categories.
5. Each category will become your subsection in the literature review
6. Synthesize the resources for each group of sources
7. When you write, summarize and paraphrase your sources
8. Include an introduction at the beginning and a summary at the end
9. For each theme/subtopic, provide ample evidence from the sources to support your theme.
Writing Tips

- Be sure to use your own writing to summarize and reflect on the sources
- Provide in-text citations that are complete and accurate according to APA format
- Example of in-text citation:

  In this week you are going to review them and annotate them, that is, to make a list “of the sources that includes a summary or description of the main points covered in an article” (Ruszkiewicz, 2006, p. 92). This is the first step toward writing up your literature review.

- Note that the period is placed after the closing parenthesis when the quote is not a complete sentence.
- Quote your sources as appropriate within your writing
- Cite at least two sources for each paragraph. Do not cite one source per paragraph which is the style of annotated bibliography. A great way to synthesize sources is to cite more than one source at one time when the sources have similar findings. Example: (Ruszkiewicz, 2006; Gay, Mills & Airasian, 2009)
- The references are separated by a semicolon.
- Provide guidance in your writing to help the reader move from one sentence to the next. Do not simply throw in a bunch of ideas that are not related to the point you want to make in a paragraph. Keep in mind that the reader may not be familiar with your literature. The art of your writing is to walk the reader step by step through your report of your findings by using transitions and linking words to connect sentences, paragraphs, and sections.
- Be careful not to write a long paragraph without citing any sources.
- Make sure you do not discuss your own problem or project in this review of literature.
- Create a list of APA Style references at the end of the review.

☐ Complete your Literature Review

Performance Task: Complete your Literature Review for RFP3. Review the instructions, rubric & job aid.

Week#: 15

Overview of Research Plan and Research Methods

After you have stated your research problem and completed your literature review, you need to select a research method. Refer to Week 1: Research Paradigms and Research Methods in RFO3 and RFE3 Course of Study and review the various research methods under each of the three research paradigms (Figure 9).
**Competency 107.1.1: Research Strategy**

The student develops a research strategy for critiquing & improving some aspect of a training/teaching approach, clarifying what data to collect & how to analyze it.

**Research Proposal**

A research proposal has most of the components for a complete research study except the results and conclusion sections. The purpose of a proposal is usually for getting approval before you conduct the research. Because someone else, from government or private funding or Institutional Review Board, will review the proposal, all the elements in the proposal should be clearly written to avoid confusion or rejection. Through the proposal, you are telling the reviewer why you want to conduct the research (the purpose and importance), how you will conduct the research (the design and procedure), how you will collect and analyze data (data collection and data analysis), and what the expected results are.

**Reading**

Gay, Mills & Airasian: Chapter 4

**Brainstorming Ideas for Your Research proposal**

Chapter 4 discusses the importance of a research plan and its components. While reading, you should take notes. A table, Research Starter Table, is provided to help you brainstorm your research plan. It is highly recommended that you fill out the table with your ideas, based on the knowledge you obtained when preparing for RFO3 and RFE3, for each component. Print out the Research Starter Table [here](#).
You will continue to revise the table in the weeks that follow.

**Experimental Research**

When you want to investigate if a type of instruction or an instructional strategy is effective in improving students’ test scores in a certain subject, experimental research is an appropriate method.

A well designed true experimental research can establish a cause-effect relationship. However, in many situations, especially in education, a true experimental design may not be possible. To overcome this limitation, some variations are available to meet different research needs. Read the chapters on this topic about the various group designs as well as the steps involved in conducting such research.

- **Reading**
  Gay, Mills & Airasian: Chapters 10 & 11 and examples on pp. 267-277 and 291-301

It is fair to say that majority of research concepts are related to experimental research. A good understanding of how to design an experimental research will help you with other research methods. The following is a list of questions that you need to consider when designing an experimental research study. Take note while reviewing the chapters and revise the Research Starter Table if you plan to design an experimental research study.

- Are you going to have a control group?
- How many groups will you have?
- How are you going to assign students into groups?
- What group design is most appropriate for your research topic and purpose? (See Gay et al., pp. 253-262)
- What is the difference between single variable design and factorial design?
- What is the difference between true experimental design and quasi experimental design?
- What are the advantages and disadvantages of using a pretest?
- What is your independent variable?
- What is your dependent variable?
- How are you going to control any extraneous variables?
- How do you control major threats to internal and external validity of your experiment?

**Survey Research**

(This is also referred to as descriptive research in the 8th edition of the Gay et al. textbook).

According to Gay et al., survey research “determines and reports the way things are; it involves collecting numerical data to test hypothesis or answer questions about the current status of the subject of study.” (Gay et al., 2009, p. 9) There is no manipulation of variables or control of laboratory setting. The purpose is to “gather information about a
group’s beliefs, attitudes, behaviors, and demographic composition.” (Gay et al., 2009, p. 176)

Because survey research typically relies on self report from participants, its results are less desirable than those from an experimental research. However, in education, survey research using questionnaire is a popular tool for gathering data about the participants’ attitude, motivation, current skills level, or demographic information. Thus, it is often used in action research or formative evaluation or even in experimental research.

**Reading**
Gay, Mills & Airasian: Chapter 7 and the example of survey research on pp189-192

If you plan to design survey research, complete the Research Starter Table and consider the following:
- What is the purpose of survey research?
- In what situation is survey research appropriate?
- What are the procedures involved in constructing a questionnaire?
- What type of data will a questionnaire collect?
- What data analysis techniques are used in survey research?

**Correlational Research**

The purpose of a correlational research is to find out if there is a strong relationship between two variables. It does not ascertain effectiveness of a new type of instruction or strategy, rather, it is often used to explore the relation between an independent variable and a dependent variable, especially when it is early in the research stage and experimental research is too costly or not possible. Very often, correlational research serves as a spring board for future experimental research.

The relation between two variables is represented by the correlation coefficient $r$, with a value ranging from -1 to 1. The $r$ value indicates how strong the association or relation is between two variables. When $r$ is 0, there is no relation at all. The closer the $r$ is to -1 or 1, the stronger the relation between the two variables. If you use a computer program to run a correlation analysis with multiple variables, it will produce a correlation matrix with a correlation coefficient for each possible pair of variables.

**Reading**
Gay, Mills & Airasian: Chapter 8 and example of correlational research on pp. 210-215

If you plan to design correlational research, complete the Research Starter Table and consider the following:
- What is the purpose of correlational research?
- In what situation is correlational research appropriate?
- How is it different from survey research?
- What type of data do you collect for correlational research?
- How is data collected for correlational analysis?
When do you use Person r as the method for computing a coefficient?

When do you use Spearman rho as the method for computing a coefficient?

Does a high correlation between two variables indicate a causal relation?

What are the major steps involved in basic correlational research?

What data analysis techniques are used in correlational research?

Causal-Comparative Research

Causal-comparative research is a unique method that uses existing data to examine causal relations between variables. The established groups already differ on some variables and causal-comparative research attempts to “identify the major factor that has led to this difference” (Gay et al., 2009, p. 218). It is similar to correlation research in that it does not manipulate any variables and is used to help identify variables that you can further explore by conducting an experimental research. It differs from correlational research in that it attempts to establish cause-effect relation while correlational study does not.

Instruction Text: Causal-comparative focuses on the differences between groups; correlational research on relations among variables (Gay et al., 2009, p. 218). The major difference between causal-comparative research and experimental research is that the independent variable in the experimental research is manipulated. The advantage of causal-comparative research is that you can use existing data to identify some important variable that might help improve students’ performance in a subject area without the hassle and cost of experimental research. The limitation of causal-comparative study is that the researcher has limited control over the groups and thus cannot establish true cause-effect relation nor generalize the results to the larger population. Actually, the sample is its population.

Reading

Gay, Mills & Airasian: Chapter 9 and the example on pp. 226-235

If you plan to design a causal-comparative research, complete the Research Starter Table and consider the following:

- What is the purpose of causal-comparative research?
- In what situation is causal-comparative research appropriate?
- How does it differ from correlation research or experimental research?
- Why is causal-comparative research called ex post facto?
- What are the limitations of causal-comparative research?
- What are the steps involved in conducting a causal-comparative research?
- What are sources of weakness in a causal-comparative study?
- What are the three control techniques for overcoming problems of initial group differences on an extraneous variable?
- What data analysis techniques are commonly used in causal-comparative studies?
- How would you interpret results from a causal-comparative research?
Qualitative Data Collection

This topic reviews some of the most commonly used qualitative research methods: Narrative research (formerly known as “historical research” in the 8th edition of Gay et al.), ethnographic research, and case-study research. It also reviews action research. You may shudder at the thought of spending a year in the classroom or a village conducting ethnographic research or digging archived materials in a library for narrative research, tools for collecting qualitative data are indispensible in action research and most of our capstones. Therefore, it is important that you get very familiar with all the qualitative data collection tools. Action research uses many of the tools for qualitative research.

In RFO3 and RFE3, you learned that qualitative research is exploratory and understanding oriented, relying heavily on verbal description. The researcher is the critical source of data collection and interpretation; the researcher is “the primary data collection instrument” (Gay et al, 366). The researcher collects data mainly through the following data collection methods or instruments:

- Observing
- Participant observation
- Non-participant observation
- Recording observation
- Interviewing
- Unstructured interviews
- Structured interviews
- Focus groups
- E-Mail interviews
- Questionnaires
- Examining Records
- Archiving documents
- Journals
- Maps
- Videotape and Audiotape
- Artifacts

☐ Reading
Gay, Mills & Airasian: Chapter 14

URLs:
Lecture Notes on qualitative

If you are planning to use any tools to collect qualitative data, put them down in the instruments section of your Research Starter Table and also consider the following:

What is a protocol for observations? Why is it important? What topics should be included in a protocol?
- What are the guidelines for recording information and organizing field notes?
- What are the guidelines for interviews?
- What are the guidelines for developing a questionnaire?
- What strategies can be used for ensuring the validity of qualitative research?
- What is data triangulation in qualitative research?
Narrative Research, Ethnographic Research, and Case Study Research

Narrative research tells stories about people’s lives and uses interviews and many other forms of artifacts such as photographs, memory boxes. The data will be synthesized into a narrative account.

Ethnographic research is a method for studying “cultural patterns and perspectives of participants in their natural setting” (Gay et al., 2006, p. 404). The researcher typically will stay in a natural setting for a long period of time observing participants’ perspectives and cultural patterns. The method could be used to observe students’ behaviors in a class or teachers’ teaching patterns in a school. The advantage is you will gain rich insight into a learning site. The disadvantage is the amount of time it takes! It is probably the most time consuming research method of all.

Case study research focuses on one single entity which could be an individual, an organization, a class, a school, or a school district. The researcher will define the unit of study. According to Gay et al., a case study research allows the researcher to answer questions like what happened, how or why something happened. It also allows researcher to study process, such as how a program has been implemented (Gay et al., 2009). Case study is more flexible and manageable than the other two qualitative research methods and elements of it are used in action research since the latter is a mixed method combining elements from both qualitative and quantitative research.

Reading
Gay, Mills & Airasian: Chapters 15, 16, 17 and examples at the end of each chapter.

While reading, consider the following:
- What are the steps involved in conducting qualitative research?
- What data collection techniques are appropriate for each of the three qualitative research methods?

Purpose of Action Research

Action research has become an increasingly popular research method. In RFO3 and RFE3, you learned the purpose and characteristics of action research. For RFP3, you will review it in more detail to learn the steps and common techniques used in conducting action research.

Instruction Text: Experimental design is a powerful research method for establishing cause-effect relation and an ideal design to ascertain the effect of an instructional strategy or method on a dependent variable. However, in many real life situations, randomly assigning students into either the experimental group or control group is just not possible. Teachers normally do not randomly assign students into different groups for fear of depriving some students of potential benefits of a teaching method. It is also believed that human behaviors are more complex than numerical numbers can possibly describe. In addition, traditional research using experimental design is somewhat detached from daily classroom problems. As a result, action research has become an important method for practitioners to reflect on and investigate daily classroom issues.
without many of the constraints of experimental design. Action research is “a dynamic and responsive model” that can be adapted to “provide teacher researchers with provocative and constructive ways” of thinking of their work” (Gay et al., 2009, p. 489).

☐ **Reading**
Gay, Mills & Airasian: Chapter 20 and example at the end of the chapter (pp. 497-505)

If you plan to design an action research study, complete the Research Starter Table and consider the following four steps involved in conducting action research:

1. Identify an area of focus
2. Collect data
3. Analyze and interpret data
4. Develop an Action plan

Data collection for action research can use various instruments or methods since it is a mixed method approach. Data can be collected using an objective test as a pre and post test, observations, surveys, interviews, teacher reflections or journals, students’ writing samples, etc. RFP3 action research requires at least three sources of data for data triangulation “to obtain a more complete picture of what is being studied and to cross-check information” (Gay et al, p. 377). However, you do not need to use all the available data collection tools! The more tools you propose to use, the more errors might occur! For each data collection tool, you need to describe how you will analyze the data collected from it. Never include a data collection instrument in the data collection section without a plan for analyzing its data in the data analysis section.

☐ **Assessment:**
Write your research design section for your RFP3.

**Week #: 16**

**Data Analysis**

In your RFP3, you are required to describe how you will analyze the data to be collected. Even though you will not actually collect the data, you need to describe your plan for data analysis. This topic is extremely important but difficult. Here you need to clearly and precisely describe what techniques you will use to analyze your data. I recommend that you repeat your purpose here first and then describe how you will organize the data after it is collected. For qualitative data, you will likely organize the data into meaningful categories to display some patterns or themes. For quantitative data, you may choose one of the following: correlation analysis, ANOVA or ANCOVA, t-test, or Chi-square (see Figure…). Describe what you expect to find out from the analysis and what the expected results will reveal.

Key questions you need to answer in this section:
- What is the purpose of the research?
- How are you going to organize the data after it is collected?
- What method(s) will you use to analyze the data?
- What is the rationale behind the use of a particular analysis method(s)?
- What results would you expect the data analysis method(s) will produce?
• How would you interpret the expected results?

If your Data Analysis has not answered these questions, the section is still missing some information and you need to revise it.

Competency 107.4.1: Instrument Evaluation
The student evaluates & selects the relative merits of instruments for measuring specific motivation, performance, & learning style variables.

How to choose the appropriate data analysis techniques?

It is a daunting task to pick the appropriate analysis techniques for the right data. All the learning prior to this week has been preparing you for this task and yet, it has proved to be a difficult task for most students. To do it right, you need to have a clear idea of the type of research method you have chosen, type of data you propose to collect.

Instruction Text: The main purpose of the research Start Table is to allow you to grasp all these critical elements and align them up in a straight line, that is, each element fits well in the design. If you got one element wrong, an expert such as your capstone chair will be able to tell that the line of elements is not straight. It is crooked and you need to straighten it. Refer to Week 9 of RFO3 and RFE3 and review carefully the concepts discussed in that week. Table 2 below is created to give some quick tips of what analysis techniques can be used for a particular instrument or method. The figures from RFO3 and RFE3 in Week 9 are also copied here for quick reference.

☐ Reading
Gay, Mills & Airasian: Chapters 12, 13, 18 and examples

Table 10
Instruments/Methods, Data Types, and Data Analysis Techniques

<table>
<thead>
<tr>
<th>Instruments/Method</th>
<th>Data Type</th>
<th>Variable</th>
<th>Data Analysis Technique</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Objective Test (pre and post test)</td>
<td>Quantitative, numerical</td>
<td>Interval</td>
<td>T test ANOVA ANCOVA Correlation</td>
<td>T test is for two groups only; ANOVA is for two or more groups. ANCOVA is to partial out the initial group differences; Correlation is to find out relation between variables.</td>
</tr>
<tr>
<td>Questionnaire (using Likert Scale)</td>
<td>Quantitative, numerical</td>
<td>Ordinal</td>
<td>Descriptive Chi Square (test of significance)</td>
<td>Chi Square, an inferential statistical technique, is used for nominal</td>
</tr>
<tr>
<td>Questionnaire (Questions)</td>
<td>Qualitative</td>
<td>Nominal</td>
<td>Categorical analysis</td>
<td>Coding Classifying Finding patterns</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>----------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Field Notes from observations or interviews</td>
<td>Qualitative</td>
<td>Nominal</td>
<td>Categorical analysis</td>
<td>Coding Classifying Finding patterns</td>
</tr>
<tr>
<td>Journals, writing samples</td>
<td>Qualitative</td>
<td>Nominal</td>
<td>Categorical analysis</td>
<td>Coding Classifying Finding patterns</td>
</tr>
</tbody>
</table>

Note. This table is NOT in APA Style. APA Style tables do not have vertical and middle horizontal lines. See APA Manual.

Figure 10. Commonly Used Tests of Significance.
Figure 11. Qualitative Data Analysis during Data Collection

Figure 12. Qualitative Data Analysis after Data Collection
Week #: 17

Writing the Proposal

By now, you should have completed the Research Starter Table. For MED students, you can start writing the proposal. For non-MED students, you may want to discuss with your capstone chair if the plan looks good because it may well become the basis for your capstone prospectus. After you have finalized your research plan, you may start to write each section.

Competency 107.1.1: Research Strategy
The student develops a research strategy for critiquing & improving some aspect of a training/teaching approach, clarifying what data to collect & how to analyze it.

Competency 107.1.2: Data Evaluation & Summary
The student, given the raw data from a research study, calculates descriptive statistics, evaluates the significance of the findings using inferential statistics, & writes a summary of the findings that includes a table or graph.

How to write each component

This week it is time to put the various components of a proposal. The steps to do this is explained below.

☐ Write a Research Proposal
Use the plan you have in the Research Starter Table and start to write your research proposal. Follow the suggestions or comments for each section below. Use the following outline with headings in line with APA Style: 1) main headings are centered; 2) second level headings are flushed to the left in Italic; 3) third level headings are indented followed by a period and the paragraph text. Submit components for each task as required.

Research Proposal Outline

Abstract (main headings are centered)

The abstract should give the reader a complete, self-contained summary describing the problem under investigation, participants, research design, instruments for data gathering and techniques for data analysis. After reading the abstract for the proposal, the reviewer should have a good idea of your research plan and the major components. Examples can be found in many of the example papers in Gay et al. in the first opening paragraph or on p. 523.

Introduction (main headings are centered)

Suggested length of 2–3 paragraphs. Examples can be found on p. 100, p. 524 in Gay et al., 2009.

Problem Statement

Introduction (second level headings are flushed to the left in Italic)
Always add a short introduction to a main section.
You should have a topic defined in Week 2 or in your ID domain project if you have that domain.
If you still plan to work on that topic, you can use what you have defined and write your problem statement. Make sure you provide background information on the problem and describe educational significance of the problem.

Research Questions
Make a list of your research questions. Don't list too many questions, just two or three for RFP3. They should be well stated and answered by the data you propose to collect. Generally, questions for a qualitative research require more than a simple yes and no answer, while those for a quantitative research study could simply be yes-and-no questions. Examples of research questions for correlation study and a causal-comparative study can be found on p. 211 and p. 227 in Gay et al. An example for qualitative case study research can be found on p. 438. Compare the different ways the questions are asked.

Literature Review

Introduction
Always add a short introduction to a main section.
Break your literature into sections using themes/topics as subheadings.
Good examples of literature review can be found in some of the example studies at the end of some chapters.

Hypothesis
Hypothesis is for quantitative research. If your design is qualitative or action research, you may make predictions instead of formal hypotheses.
The statement of hypothesis should indicate the following elements: 1) the variables, 2) the participants, 3) the expected relations. State the expected relationships between defined variables clearly in your hypotheses. Make sure that they are testable within a reasonable time frame. The hypothesis always determines the nature of your research design, which in turn determines your data analysis.

Here is a model that is recommended by Gay, Mills, and Airasian (2009):

P who get X do better on Y than P who did not get X (or get some other X)
P = participants
X = the treatment, the causal or independent variable, and
Y= the observed outcome, the effect or dependent variable (p. 73).

The variables should be stated in measurable terms. For example, if your X (the treatment or independent variable) is a new approach of instruction, then you need to define what is the new approach, is it an approach using computers for instruction? Or is it an approach using problem-based instruction? If your Y is student success, then you need to define what student success is. Is it students' score above 80% on the post test? Is it their score on a final project that is evaluated using a rubric? In short, any variables you state in the research project should be well defined and measurable.

An example of hypothesis:
Students (P) in the experimental group who receive computer-based instruction (X) will score higher on the post test (Y) than students in the control group who receive lecture-based instruction do.

Read Chapter 2 for more examples.

Methodology

Introduction
Always add a short introduction to a main section.
Participants
Describe your participants and how you will select them. First provide a definition of the population and then select a sampling technique: random or using existing groups. Answer the following questions in your description:
1. From which larger group (the population) are you going to select your participants?
2. How are you going to select the participants (sampling techniques)?
3. How many participants are you going to include in your study (sample size)?
4. What are their characteristics (their grade/age, skill level, cultural background, motivation, etc.)

Research Design
In many ways, this subsection is similar to what you have in an abstract. It should describe the basic structure of your study (Gay et al., 2009, pp 108-109), the rationale behind the use of the design, and the purpose of the research. Not all research reports include this section; however, it is a good habit to include it in the proposal.

Questions you need to answer in this section:
What is your research design?
State it straightforwardly that it is, for example, a true (or quasi-) experimental research with pre and post test control group. Do not beat around the bush!

What is your independent variable? What is your dependent variable?
Define these in measurable terms. It is not enough to say students will perform better. You need to say, for example, students will score higher on the post test.

How will your subjects be assigned to groups? Are you using random assignment or using exiting groups?
State whether you will use random assignment or use existing groups and how you will decide which group will receive treatment.

How will you collect data?
State if you will use a pre and post test to collect data. Some studies also indicate how threats of validities are controlled (see sample on p. 291 in Gay et al., 2009).

Data Collection Instruments
Discuss type of instruments/methods to be used (Examples of instruments are pre and post test, survey, interview protocol, and observation log; examples of methods are interview and observation.)

Discuss type of data it will collect (Quantitative or qualitative. If you are collecting quantitative data, it would help if you can indicate type of variables: nominal, ordinal, interval or ratio because type of variable will determine what statistical techniques you can use.), etc.

List the instruments you will use for collecting data and describe the nature of each of the instruments and type of data to be collected. For example, if you use a multiple-choice post test, the chances are that your data type would be numerical. If you use observation or interview, your data will be qualitative or categorical data consisting of field notes. It is highly recommended that you use the tile of each instrument as a subheading like the following:


*Pre and post test.* Your discussion starts right after the period. Third level headings are indented followed by a period and the paragraph text.

*Observation.* Your discussion goes here.

*Interview.* Your discussion goes here.

For an experimental design, you do not need to use many instruments. It is suggested that a pre and post test be used. If you are interested in finding out how learners reacted to your new instruction, survey or interview will work. For action research, you will need to use at least three data collection tools such as pre and post test, observation, questionnaire, etc.

*Research Procedure*

This section describes the steps in conducting the study, from obtaining permission, administering pretest at the beginning and to the post-test at the end. The description should provide details about the instructional procedures, for example, what the students in the experimental group will do during the instruction and what the control group students will do, etc.

*Data Analysis*

This section is important but difficult. Here you need to clearly describe what techniques you will use to analyze your data. I recommend that you repeat your purpose here first and then describe how you will organize the data after it is collected. For qualitative data, you will likely organize the data into meaningful categories to display some patterns or themes. For quantitative data, you will likely choose one of the following: correlation analysis, ANOVA, t-test, or Chi-square. Describe what you expect to find out from the analysis and what the expected results will reveal.

Some key questions you need to answer in this section:
1. What is the purpose of the research?
2. How are you going to organize the data after it is collected?
3. What method(s) will you use to analyze the data?
4. What is the rationale behind the use of a particular analysis method?
5. What results would you expect the data analysis method(s) will produce?
6. How would you interpret the expected results?

If your Data Analysis has not answered these questions, the section is still missing some information and you need to revise it.

An example of data analysis description for a correlational research can be found on p. 213 in Gay et al. Examples for qualitative research can be found on pp. 418-419 and pp. 438-439. Compare the different ways the questions are asked.

If you are design an action research, you need to include the following components in your research proposal.

*Statement of Resource*

Briefly describe what resources you will need to enact your plan.

Do you have the financial resources to acquire all that is needed for your investigation?

*Project Timeline*

Provide a detailed timeline for your project specifying dates and duration of project activities and highlighting milestones to project success. A graphical representation
would be most appropriate

**Action Plan and Conclusion**
Summarize your planned research proposal and discuss your plan for action after your data has been collected. Include your own personal reflection and evaluation of your study and the findings

For all research designs:

Include your data collection instrument(s) in an appendix.

Include all in-text citations and references in APA format.

**Conclusion**
Congratulations on completing all the learning activities for Research Fundamentals! As you can appreciate Research Fundamentals covers a broad range of topics. Your studies included the basics of a Quantitative, Qualitative and Action Research Fundamentals; Topic Selection and Literature Reviews; Resource Identification; Research Critique; and, Research Questions and Hypothesis Development. As a professional, you should comprehend how these topics are interrelated. During your Research Fundamentals studies, you read and viewed a great deal of pertinent resources to apply your new knowledge. Share this experience with your peers and colleagues.

Consider what learning strategies helped you learn the material? Write these down and share with your students when teaching. You now need to demonstrate your competency in Research by passing the objective exam and performance assessments.

**Feedback**
If you wish to provide feedback on this Course of Study, please contact Dr. Alec Testa at atesta@wgu.edu.