

# Applied Quantitative Research Methods from the Social Studies

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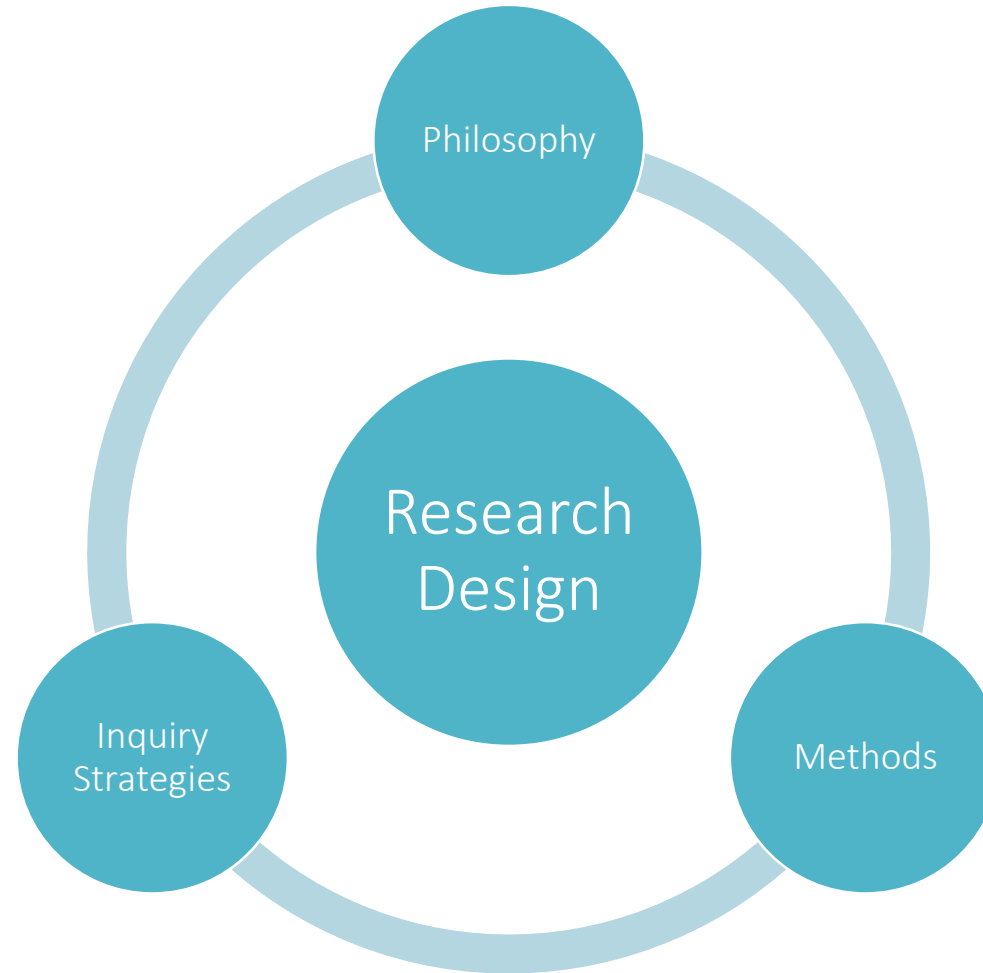
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# Outline

1. Introductions (of self and current experiences with quantitative research)
2. Quantitative Research Design: Not Just Statistics!
  - a. Philosophy
  - b. Inquiry Methodology
  - c. Methods
    - a. Of Data Collection
    - b. Of Data Analysis (← statistics)
3. Reporting (selling) quantitative research

# Creswell's Approach to Research Design



# Component One: Philosophy

# Epistemological Underpinnings: What is possible (and interesting) to study?

## Positivism

Objective study of what can be observed and measured.

## Post-Positivism

Objective study is an ideal that we can never perfectly meet, due to error and personal biases. (But we can try to approach.)

## Constructivism

Individual constructions of knowledge and experience are the most important to study

# What are some other goals for our research?

	a. Post-Positivism	b. Constructivism
1. “Traditional”	1.a.	1.b.
2. Pragmatic	2.a.	2.b.
3. Advocacy/ Participatory	3.a.	3.b.

# Component 2: Modes of Inquiry

# Inquiry Strategies and Purposes of Research

Descriptive: What do we see? When/for whom do we see it?



Predictive: Adding Temporal Order



Intervention: Designing with Intent to Change



Explanatory: Delineating Processes



# Inquiry and Quantitative Research

Purpose	Quantitative Inquiry Type
Descriptive	“Survey Research” Descriptive Designs
Predictive	Descriptive/Correlational (with longitudinal data)
Intervention	Experiment Quasi-Experiment
Explanatory	Experimental, Descriptive/Correlational

# How Do I Know Which One I'm Doing?

1. Availability of previous work: Work from the “top” stages builds to work on the “bottom” stages
2. Availability of theories: Increase in importance as we move toward the bottom. (Specific use of theories in quantitative research)
3. Specific aspects of research questions or hypotheses: See Torney-Purta's presentation yesterday
  - a. **Independent variables: Person, context (including intervention), process**
  - b. **Dependent variables: Meaning, Identity, Agency, Processes**
  - c. Intervening Variables: Mediators (determining processes), Moderators (For whom/in what context?)
  - d. Control variables

# Component Three: Methods

Collecting Data

Analyzing Data

# Collecting Data

## Know your research questions first!!

1. Know your independent and dependent variables and how you want to operationally define them. (What questions should I ask? To whom should I ask them?)
2. Think of important other information required (to describe the sample or, possibly, to use as controls)
3. Ensure you have enough variance in your study in key areas (e.g. to conduct subgroup analyses).
4. Have enough people to do what you want to do (or, adjust your plan to fit what you can reasonably collect)
5. Other advanced considerations (e.g., a true nested design in multilevel modeling research, abilities to link across datasets)
6. Consider your “unit of analysis” (Students? Classrooms? Schools?)

**Bottom line: Quantitative research requires you have a very detailed plan going in.**

# Collecting Data

1. Individual items **\*\*CAUTION\*\***
2. Scales/Tests
  - a. Self-created
  - b. Pre-existing
3. Interviews (with self-created or pre-existing protocol)
4. Observations (with self-created or pre-existing protocol)

# How do I Judge a Particular Measure?

Reliability: How consistently will this measure capture what I'm looking for?

1. Most common for scales: Internal consistency (Cronbach's Alpha), then test-retest reliability
2. Observational protocols: measures of inter-rater reliability (Cohen's Kappa)

Validity: What evidence can I give that this is measuring what I say it is?

1. Correlations to scores on other scales (most often same or related constructs)
2. Expert judgment of the content of a scale or protocol
3. (Face validity)
4. Is there evidence that this works in the population to which I want to generalize?

# Analysis questions: General

1. What descriptive statistics can I report?
2. What types of work (if any) do I need to do to provide evidence for the quality of my scales?
3. For major analyses:
  - a. Am I comparing groups on outcomes? Or, do I need the flexibility to include continuous independent variables?
  - b. Do I need to consider controls? If so, how?
  - c. How can I handle mediators/moderators in ways that a) my data can handle and b) I am comfortable with?
  - d. Are my outcomes continuous or categorical?
  - e. POSSIBLY ADVANCED: Do I need multilevel modeling techniques in order to capture nested data?
  - f. POSSIBLY ADVANCED: Do I want to take a variable-centered or person-centered approach?

# Reporting on Quantitative Research



# Reporting Results in the Post-Positivist Mentality

1. Provide enough detail that someone else could come and replicate your work
2. Provide evidence for your claims (e.g., validity evidence, reliability coefficients)
3. Be thoughtful (conservative) in generalizing your findings.
4. Report both statistical and practical significance (i.e., p-values and effect sizes)
5. Acknowledge your limitations. What could be done better?

# Making Research Accessible

1. Follow up in plain language or graphically
2. Consider simplified ways of presentation for certain audiences or to complement the technical reporting
  - a. *Causal-comparative versus correlational approaches*
  - b. *Practical implication (example: state longitudinal data set)*

# Conceptualizing Quantitative Research

1. What is my purpose of doing this research? Do I want to describe? Predict? Explain? Create an intervention?
2. What are my independent variables? Dependent variables? What is some OTHER important information that I want to know?
3. What are my research questions? In formulating, try to:
  - a. *Keep open-ended (answer requires more than “yes” or “no”)*
  - b. *Avoid causal language (unless you are REALLY certain your study design is that strong)*
  - c. *Imply the research design (compare groups, correlate variables)*
  - d. *Include some parameters around generalizability*
4. Do I have enough information to formulate hypotheses?

# What's the Problem with Quantitative Research?

1. They don't provide the thick, rich descriptions of educational phenomena that we need to fully describe what is going on in social studies education
2. Quantitative methods are incompatible with the critical theories that provide an increasingly important perspective in social studies
3. Quantitative methods don't allow for a consideration of sociocultural context

# How is the term “Quantitative” Used?

1. Focus on accountability and high-stakes testing
2. Confounding of quantitative research with STEM
3. Continued assumption of the positivist paradigm

# Other Questions for Discussion

1. What are the current areas of social studies research in which quantitative methods are most frequently used?
2. What are some areas where quantitative approaches should be used MORE often? (Which specific approaches/to answer what particular questions?)
3. Are there things that quantitative researchers can do to make this approach to research more approachable/understandable, or less closely tied to high-stakes accountability?