An Introduction to Research

Objectives:

- Be able to better formulate a research question
- Feel more comfortable with the clinical research process
- Understand the ideas of constructs and operationalization
- Understand the major differences between quantitative and qualitative approaches to doing educational research

“If we knew what we were doing, it wouldn’t be called research, would it?”

Albert Einstein

Developing Your Question

- Start with a clear purpose
- Know your literature
- Be iterative in your approach
- Try to specify the who, what, where and when of your purpose
- Ask yourself “What would the answer to this question add to the literature?” and…

Developing Your Question

Don’t let methodology drive the question!

The Research Process

1. Identification of general problem/question
2. Literature review
3. Specify questions/hypotheses
4. Determination of design/methodology
5. Data collection
6. Data analysis/presentation
7. Interpretation of findings

The Right and the Left

- Quantitative research - numbers, numbers, numbers
- Qualitative research - words, words, words

Quantitative vs. Qualitative: Assumptions about the World

- Based upon the idea of "logical positivism", that is, there is a singular reality with stable, social facts that are separate from the feelings and beliefs of individuals.
- Based on the notion of "constructivism", which assumes multiple realities that are socially constructed through individual and collective perceptions or views of the same situation.

Quantitative vs. Qualitative: Research Purpose

- Seeks to establish relationships and explain causes of changes in measured variables. That is, the goal of science is to explain and predict.
- Concern is with the understanding of the social phenomenon from the participants' perspectives. This requires, to some degree, researcher participation.

Quantitative vs. Qualitative: Methods and Process

- The scientific method, also known as a priori or pre-established design.
- Use of emergent design utilizing constant comparison and revision.

Quantitative vs. Qualitative: Prototypical Studies

- Experimental or correlational designs are used to reduce error, bias and the influence of extraneous variables--control of bias is through design.
- Use of ethnography, which helps readers understand the multiple perspectives of the situation by the persons studied. Subjectivity in data analysis and interpretation is acknowledged.

Quantitative vs. Qualitative: Researcher Role

- Detachment from study in order to avoid bias.
- Immersion in situation and the phenomenon being studied.

Quantitative vs. Qualitative: Context

- Context-free generalizations
- Generalizations are contextually-bound.

Quantitative vs. Qualitative: Precision

- Obtained through the use of measurement and statistics
- Provided by detailed description of phenomenon

Quantitative vs. Qualitative: Verification

- Results replicated by others.
- Extension of understandings by others.

Quantitative vs. Qualitative: Explanation

- Traditionally, parsimonious explanations were sought, but this may be changing due to technology.
- Summary through narrative--importance is placed on reducing complex realities to simple explanations.

Quantitative vs. Qualitative: Logical Reasoning

- DEDUCTIVE--What's the classic example?
- INDUCTIVE--anyone have an example?

Quantitative vs. Qualitative: Conditional Conclusions

- Statements of statistical probability.
- Tentative summary interpretations.

Types of Quantitative Studies

- Descriptive
- True experimental
- Quasi-experimental
- Correlational
- Predictive

Research Using Primary Data

- Cross-sectional
- Case Control
- Cohort
- Randomized controlled trial

Cross-sectional Study

- Data gathered at one point in time
- Often used for surveys
- Can not make inferences about causality

Robert Johnston's Project

- Interested in PTSD
- Reviewed literature on PTSD in primary care settings for his POM1 presentation
- Decided to do a survey to determine prevalence and associated conditions
- Reviewed existing instruments
- Survey includes 2 PTSD questionnaires, AUDIT, SF-12 and PHQ-9
- Obtained IRB approval June, 2010
- Goal is to survey 100 patients at UMA

Case Control Study

- Start with the outcome- identify a sample with the condition of interest
- Identify a similar control group
- Look back to determine exposure
- Calculate the risk in the cases and controls- odds ratio used
- Can not use to establish prevalence

Cohort Study

- Start with an identified group
- Determine exposure in everyone at the same time
- Follow the group to determine who develops the outcome of interest
- Can be used to determine prevalence
- Association measured as relative risk (rate ratios)

Randomized Controlled Trial

- Gold standard for determining associations
- Identify a group
- Randomly assign individuals to exposure
- Only reliable way to control for confounding

Research Using Secondary Data

- Literature review
- Systematic review
- Metanalysis
- Analysis of existing data collected for another purpose

Literature Review

- Gather articles on a topic of interest
- Summarize the findings

Systematic Review

- Gather articles using a pre-defined search strategy- may include unpublished studies
- Develop a-priori objective criteria to evaluate the quality of the studies
- Summarize the quality of the data and the results

Metanalysis

- Do a systematic review
- Obtain the primary data if possible
- Summarize the data quantitatively

Analysis of Existing Data

- Use administrative data for research
  - Insurance claims data- Medicare
  - Central Data Repository (CDR) at UVa
- Use regularly collected survey data
  - National Center for Health Statistics performs multiple surveys periodically- NAMCS, NHIS, NMCES, NHANES
- Use data collected for another study