Research Method

Y520
Strategies for Educational Inquiry

Characteristics of Research

- The goal is inference
- The procedures are *public*
- The conclusions are uncertain
- The content is method

(Appplies to Qualitative and Quantitative Studies)

(King, Keohane, & Verba, 1994)
Steps in the Scientific Method

- Observation and description of a phenomenon or group of related phenomena
- Formulation of a hypothesis to explain the phenomena
- Predict the existence of other phenomena using the hypothesis
- Conduct experimental tests of the predictions

(Frank Wolfs, University of Rochester)

Why use the Scientific Method?

Man prefers to believe what he prefers to be true.

— Francis Bacon
Why use the Scientific Method?

- Our personal and cultural beliefs can influence our perceptions and our interpretations of phenomena.
- The scientific method *minimizes* the influence of experimenter bias or prejudice.
- The scientific method enables researchers, collectively and over time, to construct a reliable, consistent, and non-arbitrary representation of the world.

Sources of Uncertainty in Experiments

- Random error – intrinsic to human observation and instruments of measurement.
- Systematic error – due to factors that bias the result in one direction (aka: threats to internal validity).
Common Mistakes

- Mistake the hypothesis for an explanation (fail to perform an experimental test)
- Ignoring or “ruling out” data that do not support the hypothesis.
- Failure to estimate quantitatively all errors

Objectivity is

- a procedure or method
- agreement among judges about what is observed
- the controlled experimental conditions that produce replicable results
- not an attribute of the person doing the research
Preliminary Research Proposal:

- States the research question
- States the purpose of the research
- Sketches the initial model
- Discusses (explains) the initial model
- Identifies relevant background literature (bibliography)

A systematic approach to carrying out research

Planning Stage

- State questions & hypotheses
- Identify variables
- Determine design structure

Execution Stage

- Identify population & sample
- Design instruments & classify: operational definitions
- Select statistical test for resolving hypotheses
- Carry out plan, collect data
- Analyse data, draw conclusions & evaluate process