

Research

What is research?

Research is a systematic process of collecting and analyzing objective evidence in order to establish facts and reach new conclusions. The purpose of research is to increase common knowledge and understanding in an area of interest or concern.

What is the research process?

1) The scientific research process usually begins with a specific **research question** or problem, often linked to prior research or a related theory.

The National Research Council places research questions into three categories:

- Description--What is happening?
- Cause--Is there a systematic effect?
- Process or mechanism--Why or how is something happening?

2) Researchers use **systematic, empirical methods** to obtain evidence. Scientific research designs are either **experimental** or **quasi-experimental**. Both involve manipulating one or more independent variables and measuring a dependent variable. For example, a study might examine whether lessons that involve dramatizing stories (the independent variable) improve fourth-graders' reading comprehension (the dependent variable).

3) Researchers follow an explicit, coherent chain of reasoning in arriving at their conclusions.

4) Researchers submit their study results for peer review.

What is the difference between experimental and quasi-experimental studies?

In experimental studies, subjects are randomly placed in two comparison groups. The groups are alike except that one group receives the intervention and the other (a control group) does not. In this way, the variables not being studied are less likely to affect the results. Experimental studies provide the strongest evidence that an intervention made a difference.

In quasi-experimental studies, subjects are not randomly assigned, but either a control group or multiple measures are used. Statistical methods may be used to adjust for variables that cannot be controlled. Education researchers often use quasi-experimental designs since experimental designs often are not feasible, ethical, or legal in a school environment.

What are the requirements of No Child Left Behind?

The Federal Elementary and Secondary Education Act (No Child Left Behind) does not mandate experimental designs.

The law stresses “rigorous, systematic, and objective methodology to obtain reliable and valid knowledge relevant to education activities and programs.” It also stresses the need to obtain “acceptance by a peer-reviewed journal or approval by a panel of independent experts through a comparably rigorous, objective, and scientific review” and to “present findings and make claims that are appropriate to and supported by the methods that have been employed.”

Also cited is the importance of “making claims of causal relationships only in random assignment experiments or other designs (to the extent such designs substantially eliminate plausible competing explanations for the obtained results).”

What are some things to consider when designing research methods?

Data used to support a claim should come from multiple sources. **Triangulation**--approaching the same measurement from three or more independent routes--is often used to confirm results or examine a result more completely. **Mixed method** research combines quantitative and qualitative techniques to ensure both rigor and depth.

The methods used to collect the data should be:

- **Valid**--the method measures what it is supposed to measure
- **Reliable**--the method can be used effectively and consistently
- **Objective**--the data collected through the method can be verified by independent inquiry
- **Acceptable**--the method will yield data that is credible and understandable to those who will use it

What is action research?

Action research can be described as a family of research methodologies which pursue action (or change) and research (or understanding) at the same time. Typically, action research alternates between action and critical reflection. Methods, data and interpretation are continually refined as understanding develops.

Resources

Leedy, P. (1996) *Practical research*. 6th edition. Prentice Hall.

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National Science Foundation, *User-Friendly Handbook for Mixed Method Evaluations*, www.ehr.nsf.gov/EHR/REC/pubs/NSF97-153/start.htm

Action Research Resources website. www.scu.edu.au/schools/gcm/ar/arhome.html