

Chapter 2

The Scientific Approach in Education

Instructional Objectives

1. Describe the major research methodologies used in educational investigations.
2. Distinguish between the philosophical approaches underlying quantitative and qualitative research.
3. List the specific types of research that fall into the broad categories of quantitative and qualitative research.
4. Give an example of a research problem that would be investigated by quantitative methodology and one for which qualitative methodology would be more appropriate.
5. Define mixed-methods research and state its advantages.
6. Identify the research methodology used in given examples of both quantitative and qualitative research.
7. List the steps involved in conducting a research study.
8. Distinguish between basic and applied research.
9. Define the terms construct variable, and constant.
10. Distinguish among types of variables: categorical versus continuous and independent versus dependent.
11. Distinguish between constitutive and operational definitions and explain the importance of the latter in research.

Chapter Outline

- I. MAJOR METHODOLOGIES IN EDUCATIONAL RESEARCH
 - A. Two Broad Categories
 1. Quantitative
 2. Qualitative
 - B. Roots of Quantitative Research
 - C. Roots of Qualitative Research
 - D. Comparison of Quantitative and Qualitative Approaches
 - E. Mixed-Methods Approach

II. TYPES OF QUANTITATIVE RESEARCH

- A. Experimental
 - 1. Randomized
 - 2. Quasi-experimental
- B. Non-experimental
 - 1. Ex Post Facto
 - 2. Correlational
 - 3. Survey

III. TYPES OF QUALITATIVE RESEARCH

- A. Basic Interpretive
- B. Case Studies
- C. Document Analysis
- D. Ethnography
- E. Grounded Theory
- F. Historical Research
- G. Narrative Inquiry
- H. Phenomenological Studies

IV. TYPICAL STAGES IN RESEARCH

- A. Selecting Problem
- B. Reviewing the Literature
- C. Designing the Study
- D. Collecting the Data
- E. Analyzing the Data
- F. Interpreting the Findings and Stating Conclusions
- G. Reporting Results

V. QUESTIONS THAT EDUCATIONAL RESEARCHERS ASK

- A. Theoretical
- B. Practical

VI. BASIC AND APPLIED RESEARCH

VII. LANGUAGE OF RESEARCH

- A. Constructs
 - 1. Constitutive Definition
 - 2. Operational Definition
- B. Variables
 - 1. Categorical and Dichotomous Variables
 - 2. Independent and Dependent Variables
- C. Constants

VIII. SUMMARY

Suggestions for Instructors

1. Have students choose a published educational research study in their area of interest and classify the study as a quantitative or a qualitative study.
2. If the study above is quantitative, have students determine what type of quantitative methodology is used.
3. If the study is qualitative, have students determine what kind of qualitative study it is.
4. In either type of study above, have the students identify the research problem, the sample, the data-gathering procedure, and the findings.
5. Have the students compare the approaches and tell why the methodology chosen was the appropriate one to answer the research question.
6. Provide students with a list of quantitative research topics and have them indicate the methodology required to investigate the problem.

Examples:

- (a) The relationship between gender and achievement in advanced mathematics
 - (b) The relationship between teacher age and extent of burnout
 - (c) The attitudes of nondisabled students toward their disabled peers
 - (d) Full-day vs. half-day kindergarten and 1st graders' reading readiness scores
 - (e) The effect of using computer simulations on the learning of science concepts
7. Provide students with a list of qualitative research topics and have them identify the type of study.

Examples:

- (a) A study of a school where standardized test scores have significantly improved
 - (b) How an immigrant child adjusts to an American elementary school
 - (c) "Political correctness" in social studies textbooks used in American schools
 - (d) How does a child react to being labeled "learning disabled"?
 - (e) A study of a settlement school in a remote area of Appalachia
8. Provide students with a list of research problems. Have them identify the independent and dependent variables in each. Have them give an operational definition of the variables in at least two of the research problems.
 9. Have students locate a research study that would be considered "basic research" and have them determine if there are any implications of the research for education.

Discussion Questions

1. What is your understanding of the “paradigm war” that went on among educational researchers in the late 20th century?
2. Which research paradigm do you prefer? Which will you use in your research? Explain why.
3. Would you recommend a mixed-methods research study to a beginning researcher? Why or why not?
4. Slavin (2004) wrote that “enlightened educators look to education research for well-founded evidence to help them do a better job with the children they serve.” Can you think of some recent evidence-based research findings that have helped teachers in the classroom?
5. Consider a construct like stress. Give a constitutive definition and an operational definition for stress. How do the definitions differ and which would be more helpful in a research study?
6. While the various approaches to empirical research in education may differ in types of problems and methods, there are certain fundamental commonalities to almost all approaches. Discuss some of these common characteristics.