

Introduction to Research Methodologies in Education

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Key concepts, purposes, and common approaches for conducting rigorous educational research.

1. Why Study Research Methodology?

Purpose	What It Enables
Clarify problems	Precise definition of educational issues and gaps
Guide data collection	Selection of appropriate tools and procedures
Ensure validity & reliability	Trustworthy findings that can inform practice
Facilitate replication	Others can test or extend the study
Support evidence-based policy	Decisions grounded in systematic inquiry

2. Core Concepts

Term	Definition	Example in Education
Research Paradigm	Underlying worldview shaping the study (e.g., positivist, interpretivist, critical).	A positivist study measuring test scores; an interpretivist study exploring teachers' lived experiences.
Research Design	Blueprint for how the study will be conducted.	Experimental, quasi-experimental, case study, ethnography, mixed methods.
Population vs. Sample	Population = entire group of interest; Sample = subset actually studied.	All high-school math teachers in a state (population) ? 150 teachers randomly selected (sample).
Variables	Measurable attributes that can vary.	Independent variable: type of instructional strategy; Dependent variable: student achievement.
Validity	Extent to which the study measures what it intends to measure.	Content validity of a new math-assessment instrument.
Reliability	Consistency of measurement across time or observers.	Cronbach's ? = .89 for a teacher-self-efficacy scale.

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Ethics	Principles protecting participants and ensuring integrity.	Informed consent, confidentiality, IRB approval.

3. Major Research Designs

Design	Key Features	When to Use
Experimental	Random assignment, control group, manipulation of IV.	Testing causal impact of a new curriculum.
Quasi-experimental	No randomization; uses comparison groups or pre/post designs.	Evaluating a school reform where random assignment is impossible.
Descriptive	Surveys, observations, secondary data; no manipulation.	Mapping teachers' attitudes toward technology.
Correlational	Examines relationships between variables; no causation claim.	Linking student engagement scores with attendance rates.
Case Study	In-depth analysis of a bounded system (school, program).	Exploring implementation of inclusive education in one district.
Ethnography	Long-term immersion, cultural interpretation.	Understanding classroom discourse in multilingual settings.
Action Research	Collaborative cycles of planning, acting, observing, reflecting.	Teachers improving formative assessment practices in their own classrooms.
Mixed Methods	Integration of quantitative & qualitative strands.	Measuring achievement gains (quantitative) while interviewing students about learning experiences (qualitative).

4. Steps in Conducting Educational Research

1. Identify & Refine the Problem

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- Review literature ? locate gaps.
- Formulate a clear research question(s) or hypothesis.

2. Select a Paradigm & Design

- Align worldview with the nature of the question.
- Choose between experimental, case study, etc.

3. Define Variables & Instruments

- Operationalize constructs (e.g., “motivation” ? Likert?scale).
- Validate or adapt measurement tools.

4. Determine Sampling Strategy