

# EDUCATIONAL RESEARCH

Competencies for Analysis and Applications

TENTH EDITION

L. R. Gay

*Late of Florida International University*

Geoffrey E. Mills

*Southern Oregon University*

Peter Airasian

*Boston College*

PEARSON

Boston Columbus Indianapolis New York San Francisco Upper Saddle River  
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montreal Toronto  
Delhi Mexico City São Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

# Brief Contents

## Part I INTRODUCTION

---

<b>CHAPTER 1</b> INTRODUCTION TO EDUCATIONAL RESEARCH	3
<b>CHAPTER 2</b> SELECTING AND DEFINING A RESEARCH TOPIC	61
<b>CHAPTER 3</b> REVIEWING THE LITERATURE	79
<b>CHAPTER 4</b> PREPARING AND EVALUATING A RESEARCH PLAN	111
<b>CHAPTER 5</b> SELECTING A SAMPLE	129
<b>CHAPTER 6</b> SELECTING MEASURING INSTRUMENTS	149

## Part II QUANTITATIVE METHODS

---

<b>CHAPTER 7</b> SURVEY RESEARCH	183
<b>CHAPTER 8</b> CORRELATIONAL RESEARCH	203
<b>CHAPTER 9</b> CAUSAL-COMPARATIVE RESEARCH	227
<b>CHAPTER 10</b> EXPERIMENTAL RESEARCH	249
<b>CHAPTER 11</b> SINGLE-SUBJECT EXPERIMENTAL RESEARCH	293

## Part III QUANTITATIVE DATA ANALYSIS

---

<b>CHAPTER 12</b> DESCRIPTIVE STATISTICS	319
<b>CHAPTER 13</b> INFERENCE STATISTICS	341

## Part IV QUALITATIVE METHODS

---

<b>CHAPTER 14</b> QUALITATIVE DATA COLLECTION	381
<b>CHAPTER 15</b> NARRATIVE RESEARCH	399
<b>CHAPTER 16</b> ETHNOGRAPHIC RESEARCH	421
<b>CHAPTER 17</b> CASE STUDY RESEARCH	443
<b>CHAPTER 18</b> QUALITATIVE RESEARCH: DATA ANALYSIS AND INTERPRETATION	465

## Part V MIXED METHODS

---

<b>CHAPTER 19</b> MIXED METHODS RESEARCH: INTEGRATING QUALITATIVE AND QUANTITATIVE METHODS	481
--	-----

## Part VI ACTION RESEARCH

---

<b>CHAPTER 20</b> ACTION RESEARCH	507
-----------------------------------	-----

## Part VII REPORTING RESEARCH

---

<b>CHAPTER 21</b> PREPARING A RESEARCH REPORT	531
---	-----

## Part VIII CRITIQUING RESEARCH

---

<b>CHAPTER 22</b> EVALUATING A RESEARCH REPORT	555
--	-----

# Contents

## PART I INTRODUCTION

---

### CHAPTER 1 INTRODUCTION TO EDUCATIONAL RESEARCH 3

Tasks 1A, 1B	3
Task 1C	3
Welcome!	3
The Scientific Method	4
<i>Limitations of the Scientific Method</i>	5
<i>Application of the Scientific Method in Education</i>	5
Different Approaches to Educational Research	6
<i>The Continuum of Research Philosophies</i>	6
<i>Quantitative Research</i>	7
<i>Qualitative Research</i>	7
Classification of Research by Method	9
<i>Quantitative Approaches</i>	9
<i>Qualitative Approaches</i>	12
The Qualitative Research Process	15
<i>Characteristics of Qualitative Research</i>	16
Classification of Research by Purpose	16
<i>Basic and Applied Research</i>	16
<i>Evaluation Research</i>	17
<i>Research and Development (R&amp;D)</i>	17
<i>Action Research</i>	18
Guidelines for Classification	18
The Ethics of Educational Research	19
<i>Informed Consent and Protection from Harm</i>	21
<i>Deception</i>	22
<i>Ethical Issues in Qualitative Research</i>	22
<i>Ethical Guideposts</i>	23
<i>Gaining Entry to the Research Site</i>	25
Summary	28
Performance Criteria Task 1	32
<i>Tasks 1A and 1B</i>	32
<i>Task 1C</i>	32
<i>Task 1A Quantitative Example</i>	33
<i>Task 1B Qualitative Example</i>	51

### CHAPTER 2 SELECTING AND DEFINING A RESEARCH TOPIC 61

The Research Topic	61
Identifying a Research Topic	62

<i>Sources of Research Topics</i>	62
<i>Narrowing the Topic</i>	65
<i>Characteristics of Good Topics</i>	65
<i>Stating the Research Topic</i>	66
<i>Developing Research Questions</i>	67
Formulating and Stating a Hypothesis	69
<i>Definition and Purpose of Hypotheses in Quantitative Studies</i>	70
<i>Types of Hypotheses</i>	71
<i>Stating the Hypothesis</i>	72
<i>Testing the Hypothesis</i>	73
<i>Definition and Purpose of Hypotheses in Qualitative Studies</i>	73
Summary	75

### CHAPTER 3 REVIEWING THE LITERATURE 79

Task 2A	79
Task 2B	79
Review of Related Literature: Purpose and Scope	79
Qualitative Research and the Review of Related Literature	81
Identifying Keywords, and Identifying, Evaluating, and Annotating Sources	82
<i>Identifying Keywords</i>	82
<i>Identifying Your Sources</i>	82
<i>Evaluating Your Sources</i>	93
<i>Annotating Your Sources</i>	96
Analyzing, Organizing, and Reporting the Literature	99
Meta-Analysis	100
Summary	102
Performance Criteria Task 2 (A and B)	105
<i>Task 2 Example</i>	106

### CHAPTER 4 PREPARING AND EVALUATING A RESEARCH PLAN 111

Task 3A	111
Task 3B	111
Definition and Purpose of a Research Plan	111
Components of the Quantitative Research Plan	112
<i>Introduction Section</i>	113
<i>Method Section</i>	113
<i>Data Analysis</i>	115

<i>Time Schedule</i>	115
<i>Budget</i>	116
Components of the Qualitative Research Plan	116
<i>Prior Fieldwork</i>	116
<i>Title</i>	116
<i>Introduction Section</i>	117
<i>Research Procedures Section</i>	118
<i>Appendixes</i>	121
Revising and Improving the Research Plan	121
Summary	122
Performance Criteria Task 3	124
<i>Task 3 Example</i>	125

**CHAPTER 5 SELECTING A SAMPLE 129**

Task 4A	129
Task 4B	129
Sampling in Quantitative Research	130
<i>Defining a Population</i>	130
<i>Selecting a Random Sample</i>	131
<i>Determining Sample Size</i>	138
<i>Avoiding Sampling Error and Bias</i>	139
<i>Selecting a Nonrandom Sample</i>	140
Sampling in Qualitative Research	142
<i>Selecting Research Participants: Purposive Sampling Approaches</i>	142
<i>Determining Sample Size</i>	142
Summary	144
Performance Criteria Task 4	146
<i>Task 4A Example</i>	147

**CHAPTER 6 SELECTING MEASURING INSTRUMENTS 149**

Task 5	149
<i>Vignette</i>	150
Constructs	150
Variables	150
<i>Measurement Scales and Variables</i>	151
<i>Quantitative and Qualitative Variables</i>	152
<i>Dependent and Independent Variables</i>	152
Characteristics of Measuring Instruments	153
<i>Instrument Terminology</i>	154
<i>Quantitative and Qualitative Data Collection Methods</i>	154
<i>Interpreting Instrument Data</i>	154
Types of Measuring Instruments	155
<i>Cognitive Tests</i>	155
<i>Affective Tests</i>	156
<i>Projective Tests</i>	159
Criteria for Good Measuring Instruments	160
<i>Validity of Measuring Instruments</i>	160
<i>Reliability of Measuring Instruments</i>	164

Test Selection, Construction, and Administration	169
<i>Selecting a Test</i>	169
<i>Sources of Test Information</i>	170
<i>Selecting from Alternatives</i>	172
<i>Constructing Tests</i>	173
<i>Test Administration</i>	174
Summary	176
Performance Criteria Task 5	179
<i>Task 5 Example</i>	180

**PART II QUANTITATIVE METHODS**

---

**CHAPTER 7 SURVEY RESEARCH 183**

Task 6A	184
Survey Research: Definition and Purpose	184
Survey Research Design	184
<i>Cross-Sectional Surveys</i>	184
<i>Longitudinal Surveys</i>	185
Conducting Survey Research	185
<i>Conducting a Questionnaire Study</i>	186
<i>Administering the Questionnaire</i>	190
Summary	196
<i>Task 7A Quantitative Example</i>	198

**CHAPTER 8 CORRELATIONAL RESEARCH 203**

Task 6B	203
Correlational Research: Definition and Purpose	204
The Correlational Research Process	205
<i>Problem Selection</i>	205
<i>Participant and Instrument Selection</i>	205
<i>Design and Procedure</i>	205
<i>Data Analysis and Interpretation</i>	206
Relationship Studies	209
<i>Data Collection</i>	209
<i>Data Analysis and Interpretation</i>	210
Prediction Studies	212
<i>Data Collection</i>	213
<i>Data Analysis and Interpretation</i>	213
Other Correlation-Based Analyses	214
Problems to Consider in Interpreting Correlation Coefficients	215
Summary	216
<i>Task 8A Quantitative Example</i>	219

**CHAPTER 9 CAUSAL-COMPARATIVE RESEARCH 227**

Task 6C	227
Causal-Comparative Research: Definition and Purpose	228



The Causal–Comparative Research Process	231	<i>The Mean</i>	323
<i>Design and Procedure</i>	231	<i>The Median</i>	323
<i>Control Procedures</i>	232	<i>The Mode</i>	324
<i>Data Analysis and Interpretation</i>	233	<i>Deciding Among Mean, Median, and Mode</i>	324
Summary	235	<i>Measures of Variability</i>	325
		<i>The Range</i>	325
<b>CHAPTER 10 EXPERIMENTAL RESEARCH</b>	<b>249</b>	<i>The Quartile Deviation</i>	325
Task 6D	249	<i>Variance</i>	325
Experimental Research: Definition and Purpose	250	<i>The Standard Deviation</i>	326
<i>The Experimental Process</i>	251	<i>The Normal Curve</i>	326
<i>Manipulation and Control</i>	252	<i>Measures of Relative Position</i>	329
Threats to Experimental Validity	253	<i>Measures of Relationship</i>	332
<i>Threats to Internal Validity</i>	254	Graphing Data	334
<i>Threats to External Validity</i>	257	<i>Postscript</i>	335
Group Experimental Designs	262	Summary	336
<i>Control of Extraneous Variables</i>	262		
<i>Types of Group Designs</i>	264	<b>CHAPTER 13 INFERENCE STATISTICS</b>	<b>341</b>
<i>Single-Variable Designs</i>	264	Task 7	341
<i>Factorial Designs</i>	272	Concepts Underlying Inferential Statistics	341
Summary	275	<i>Standard Error</i>	342
		<i>Hypothesis Testing</i>	344
<b>CHAPTER 11 SINGLE-SUBJECT</b>	<b>293</b>	<i>Tests of Significance</i>	344
<b>EXPERIMENTAL RESEARCH</b>		<i>Two-Tailed and One-Tailed Tests</i>	345
Task 6E	293	<i>Type I and Type II Errors</i>	347
Single-Subject Experimental Designs	294	<i>Degrees of Freedom</i>	349
<i>Single-Subject Versus Group Designs</i>	294	Selecting Among Tests of Significance	350
<i>The Single-Variable Rule</i>	295	<i>The t Test</i>	351
<i>Types of Single-Subject Designs</i>	295	<i>Analysis of Variance</i>	357
Data Analysis and Interpretation	300	<i>Multiple Regression</i>	361
Threats to Validity	300	<i>Chi Square</i>	364
<i>External Validity</i>	300	<i>Other Investigative Techniques: Data Mining,</i>	
<i>Internal Validity</i>	301	<i>Factor Analysis, and Structural Equation</i>	
Replication	302	<i>Modeling</i>	367
Summary	303	<i>Types of Parametric and Nonparametric</i>	
Performance Criteria Task 6	305	<i>Statistical Tests</i>	368
<i>Task 6 Examples</i>	306	Summary	370
		Performance Criteria Task 7	374
		<i>Task 7 Example</i>	375
<b>PART III QUANTITATIVE DATA ANALYSIS</b>			
		<b>CHAPTER 14 QUALITATIVE DATA</b>	<b>381</b>
<b>CHAPTER 12 DESCRIPTIVE STATISTICS</b>	<b>319</b>	<b>COLLECTION</b>	
The Word Is “Statistics,” not “Sadistics”	319	Data Collection Sources and Techniques	381
<i>The Language of Statistics</i>	320	<i>Observing</i>	381
Preparing Data for Analysis	320	<i>Interviewing</i>	386
<i>Scoring Procedures</i>	320	<i>Questionnaires</i>	388
<i>Tabulation and Coding Procedures</i>	320	<i>Examining Records</i>	389
Types of Descriptive Statistics	322		
<i>Frequencies</i>	322		
<i>Measures of Central Tendency</i>	323		
		<b>PART IV QUALITATIVE METHODS</b>	

Validity and Reliability in Qualitative Research	391	Characteristics of Case Study Research	445
<i>Validity in Qualitative Research</i>	391	Case Study Research Design	446
<i>Reliability in Qualitative Research</i>	395	Sample Selection in Case Study Research	448
Getting Started	395	<i>Data Collection Techniques</i>	448
Summary	396	Conducting and Analyzing Multiple Case Studies	449
		Summary	452
		<i>Task 8-C Qualitative Example</i>	454
<b>CHAPTER 15 NARRATIVE RESEARCH</b>	<b>399</b>		
Task 8A	399		
Narrative Research: Definition and Purpose	400	<b>CHAPTER 18 QUALITATIVE RESEARCH: DATA ANALYSIS AND INTERPRETATION</b>	<b>465</b>
<i>Types of Narrative Research</i>	401	Data Analysis and Interpretation: Definition and Purpose	465
<i>Narrative Analysis and the Analysis of Narrative</i>	402	<i>Data Analysis During Data Collection</i>	466
The Narrative Research Process	402	<i>Data Analysis After Data Collection</i>	466
Key Characteristics of Narrative Research	404	Steps in Analyzing Qualitative Research Data	467
Narrative Research Techniques	404	<i>Reading/Memoing</i>	468
<i>Restorying</i>	405	<i>Describing</i>	468
<i>Oral History</i>	406	<i>Classifying</i>	468
<i>Examining Photographs, Memory Boxes, and Other Artifacts</i>	406	Data Analysis Strategies	468
<i>Storytelling</i>	406	<i>Example of Coding an Interview</i>	470
<i>Letter Writing</i>	406	<i>Developing a Concept Map</i>	472
<i>Autobiographical and Biographical Writing</i>	407	<i>Qualitative Data Analysis: An Example</i>	473
<i>Other Narrative Data Sources</i>	407	Data Interpretation Strategies	476
Writing the Narrative	407	Ensuring Credibility in Your Study	477
Summary	408	Summary	478
<i>Task 8-A Qualitative Example</i>	410		
<b>CHAPTER 16 ETHNOGRAPHIC RESEARCH</b>	<b>421</b>		
Task 8B	421	<b>PART V MIXED METHODS</b>	
Ethnographic Research: Definition and Purpose	423		
The Ethnographic Research Process	423	<b>CHAPTER 19 MIXED METHODS RESEARCH: INTEGRATING QUALITATIVE AND QUANTITATIVE METHODS</b>	<b>481</b>
Key Characteristics of Ethnographic Research	425	Task 8D	481
Types of Ethnographic Research	426	Mixed Methods Research: Definition and Purpose	483
Ethnographic Research Techniques	426	Types of Mixed Methods Research Designs	484
<i>Triangulation</i>	427	<i>The QUAL–Quan Model</i>	484
<i>Participant Observation</i>	427	<i>The QUAN–Qual Model</i>	485
<i>Field Notes</i>	429	<i>The QUAN–QUAL Model</i>	486
<i>Observing and Recording Everything You Possibly Can</i>	431	Data Analysis in Mixed Methods Designs	486
<i>Looking for Nothing in Particular; Looking for Bumps and Paradoxes</i>	432	Identifying Studies Using Mixed Method Designs	488
Summary	434	Evaluating a Mixed Methods Study	489
<i>Task 8B Qualitative Example</i>	436	Summary	490
		Performance Criteria Task 8	492
		<i>Task 8 Example</i>	493
		<i>Task 8D Mixed Methods Example</i>	496
<b>CHAPTER 17 CASE STUDY RESEARCH</b>	<b>443</b>		
Task 8C	443		
Case Study Research: Definition and Purpose	444		
<i>When to Use the Case Study Research Approach</i>	445		

**PART VI ACTION RESEARCH****CHAPTER 20 ACTION RESEARCH 507**

Task 9	507
Action Research: Definition and Purpose	508
Key Characteristics of Action Research	508
<i>Action Research Is Persuasive and Authoritative</i>	509
<i>Action Research Is Relevant</i>	509
<i>Action Research Is Accessible</i>	509
<i>Action Research Challenges the Intractability of Reform of the Educational System</i>	509
<i>Action Research Is Not a Fad</i>	510
Types of Action Research	510
<i>Critical Action Research</i>	510
<i>Practical Action Research</i>	511
Levels of Action Research	511
The Action Research Process	512
<i>Identifying and Gaining Insight into an Area of Focus</i>	513
<i>Collecting, Analyzing, and Interpreting Data</i>	514
<i>Action Planning</i>	515
Summary	516
Performance Criteria and Examples Task 9	518
<i>Write an Area-of-Focus Statement</i>	518
<i>Define the Variables</i>	518
<i>Develop Research Questions</i>	518
<i>Describe the Intervention or Innovation</i>	518
<i>Describe the Membership of the Action Research Group</i>	519
<i>Describe Negotiations That Need to Be Undertaken</i>	519
<i>Develop a Timeline</i>	519
<i>Develop a Statement of Resources</i>	519
<i>Develop Data Collection Ideas</i>	519
<i>Task 9 Action Research Example</i>	521

**PART VII REPORTING RESEARCH****CHAPTER 21 PREPARING A RESEARCH REPORT 531**

Task 10	531
Guidelines for Writing a Research Report	532
Format and Style	533

Formatting Theses and Dissertations	534
<i>Preliminary Pages</i>	535
<i>The Main Body</i>	536
Writing for Journal Publication	538
Summary	540
<i>Performance Criteria Task 10</i>	542
<i>Task 10 Example</i>	543

**PART VIII CRITIQUING RESEARCH****CHAPTER 22 EVALUATING A RESEARCH REPORT 555**

Tasks 11	555
General Evaluation Criteria	555
<i>Introduction</i>	556
<i>Method</i>	557
<i>Results</i>	557
<i>Discussion (Conclusions and Recommendations)</i>	558
<i>Abstract or Summary</i>	558
Type-Specific Evaluation Criteria	558
<i>Survey Research</i>	558
<i>Correlational Research</i>	558
<i>Causal–Comparative Research</i>	559
<i>Experimental Research</i>	559
<i>Single-Subject Research</i>	559
<i>Qualitative Research (In General)</i>	559
<i>Evaluating Validity and Reliability in Qualitative Studies</i>	560
<i>Narrative Research</i>	560
<i>Ethnographic Research</i>	560
<i>Case Study Research</i>	561
<i>Mixed Methods Research</i>	561
<i>Action Research</i>	561
Summary	562
<i>Performance Criteria Task 11</i>	564
<i>Task 11 Example</i>	565

Appendix A Reference Tables	577
-----------------------------	-----

Appendix B Statistical References	593
-----------------------------------	-----

Appendix C Suggested Responses	617
--------------------------------	-----

Glossary	623
----------	-----

Name Index	635
------------	-----

Subject Index	637
---------------	-----