James H. McMillan
Sally Schumacher

RESEARCH IN EDUCATION

A CONCEPTUAL INTRODUCTION

RESEARCH IN EDUCATION

A Conceptual Introduction

James H. McMillan
Virginia Commonwealth University

Sally Schumacher
Virginia Commonwealth University

Little, Brown and Company
Boston Toronto

To Donald T. Campbell and Louis M. Smith

Library of Congress Cataloging in Publication Data

McMillan, James H.
Research in education.

Includes bibliographical references and index.
1. Education—Research. 2. Education—Research—Evaluation. 3. Educational statistics. I. Schumacher, Sally. II. Title.
LB1028.M365 1984 370'.7'8 83-19934
ISBN 0-316-56243-2

Copyright © 1984 by James H. McMillan and Sally Schumacher

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means including information storage and retrieval systems without permission in writing from the publisher, except by a reviewer who may quote brief passages in a review.

Library of Congress Catalog Card No. 83-19934

ISBN 0-316-56243-2

9 8 7 6 5 4

MV

Published simultaneously in Canada
by Little, Brown & Company (Canada) Limited

Printed in the United States of America

PREFACE

The increasing use of research as a basis for knowledge about education and for influencing decisions, programs, and policy demands that educators possess research skills. To assist students in attaining skills in reading, conducting, and understanding research, we set out to present a comprehensive yet concise, an accurate yet nontechnical introduction to the principles, concepts, and methods currently used in educational research and evaluation. We hope that students will develop an appreciation for the contributions research can make to educational practice.

Rationale

Students enrolled in their first educational research course typically have two instructional needs. Some plan to take additional work in statistics, research design, or evaluation. In addition to mastering the skills needed to conduct studies, students must also develop both an awareness of the breadth of educational research and a conceptual base for understanding more technical aspects of research. Other students, whose immediate career goals lie more in educational practice than in conducting research, need an emphasis on key research terms, practice in reading studies critically, a knowledge of the way design and procedures may effect empirical findings, and an understanding of the different functions of research. This book provides the knowledge base to meet the needs of both groups of students.

Educational research in the past has been dominated by the psychological research model. Emphasis was placed on designing experiments, doing research with groups of subjects, and testing hypotheses. We can thus think of this research model as a quantitative approach that stresses measurement and statistics. We believe that educational research is no longer dominated by this model. Qualitative research in which meaning is derived from words rather than numbers focuses on a particular event, person, process, institution, or concept in a case study design. Such studies are noted for their richness of contextual descriptions and detailed analyses to provide an understanding of the complexities of education. Because education itself is an interdisciplinary field, basic, applied, and evaluation research will reflect methodologies drawn from various disciplines. Our task in this book is to present a balanced emphasis on quantitative and on qualitative methodologies. Furthermore, because most students intend to use their research skills in practical situations, we explain the importance of basic research, and we go on to emphasize applied and evaluation research.

Organization

We have divided the book into three parts. Part I, Basic Principles of Educational Research, defines research as scientific inquiry to produce knowledge. The functions of basic, applied, and evaluation research are carefully delineated, and an overview of research designs, techniques, and formats is presented. Problem selection and formulation of a problem statement are illustrated with research statements, questions, and hypotheses. The literature review chapter includes descriptions of current research and evaluation sources, techniques for manual and computer searches, and methods to write a critical literature review.

In Part II, Research Designs and Methods, we begin with a discussion of principles that are important for designing all types of research, with an emphasis on internal and external validity. Several chapters then focus on quantitative methods, beginning with data collection techniques and followed by descriptive statistics. Experimental research, including experimental designs, single-subject designs, and *ex post facto* research, is followed by inferential statistics. The statistical chapters will help both the consumer of research and the researcher develop a conceptual understanding of basic statistical procedures. Computational methods and use of the computer are reserved for Appendices B and C. We then turn to two qualitative methodologies, analytical research and ethnography. Both are presented as having distinctly different research orientations in their problem statements, procedures, presentation of results, and criteria for evaluating a study. Part II concludes with evaluation research, which is defined as the application of research skills to a particular practice in order to facilitate decision-making. An overview of four approaches to evaluation is followed by procedures for developing an evaluation proposal and criteria for judging evaluation reports.

Part III, Communication of Educational Research, returns to more general principles of and perspectives on educational research. The writing style, summary and interpretation of results, and the conclusions and recommendations of a journal article, research study, or evaluation report are emphasized. Throughout the book educational research is presented as an evolving field influenced by changing practices, previous research, and methodological advancements.

Instructional Aids

In each chapter we have included a number of instructional aids to assist the student: a list of key terms, a set of self-instructional test items and application problems, and a list of criteria for evaluating studies conducted by different methodologies. We believe the instructor, rather than a book, best determines course objectives and level of student competencies. The instructor can emphasize general knowledge, certain methodologies, or specific skills, such as making an annotated bibliography on a topic, writing a critical literature review, developing a preliminary proposal with problem statement

此为试读,需要完整PDF请访问: www.ertongbook.com

and design, or conducting a small-scale study. We have used all four approaches to meet different student and programmatic needs.

A major instructional aid of this book is the use of excerpts from published studies in all chapters except 1 and 14. Excerpts were chosen by the following criteria: the excerpt within a chapter concisely illustrates the text explanation; excerpts across chapters represent different disciplines; and excerpts across chapters are applicable to a variety of such education practices as administration, supervision, instruction, special education, early childhood, counseling, adult education, and programs in noneducational agencies. We believe these excerpts will be especially helpful in introducing students gradually to the style and format of published articles and evaluation reports.

Acknowledgments

Because this book resulted from a merging of our specializations as researchers and professors, there is no senior author. Each author contributed equally to the book. We gratefully acknowledge the support of our colleagues, mentors, friends, and students, all of whom are too numerous to name. We also wish to thank the reviewers whose ideas, criticisms, and suggestions helped fashion the book. They were H. Parker Blount, Georgia State University; Alice Boberg, University of Calgary; David J. Cowden, Western Michigan University; Jane A. Goldman, University of Connecticut; Harry Hsu, University of Pittsburgh; Sylvia T. Johnson, Howard University; Stephen Olejnick, University of Florida; and Robert J. Yonker, Bowling Green State University. We sincerely appreciate the guidance and support of our editor, Mylan L. Jaixen, and others at Little, Brown. Pattie Aigner and Janet Dooley were our capable typists. Finally, our families, Mrs. F.X. Schumacher, Donald F.X., and Macia Schumacher, and Janice McMillan have provided continued encouragement for this exciting, if at times difficult, undertaking.

James H. McMillan
Sally Schumacher

CONTENTS

PART I
Basic Principles of Educational Research 1

CHAPTER 1 Introduction to the Field of Educational Research 2

Research as Scientific Inquiry 3

- Sources of Knowledge 3
- Definition of Research 4
- Nature of Research-Based Knowledge 5
- Scientific Inquiry 7

The Functions of Research 7

- Basic Research 10
- Applied Research 12
- Evaluation Research 13

Education as a Field of Inquiry and Practice 15

- Interdisciplinary Field of Inquiry 15
- Limitations of Educational Research 16
- Importance of Educational Research 17

Summary 18

Self-Instructional Review Exercises 19

CHAPTER 2 Types of Research: Designs, Techniques, and Format 21

Research Design 22

- Experimental Designs 22
- Nonexperimental Designs 25

Collecting Information 27

- Observational Research 28
- Questionnaire Research 29
- Test Research 29
- Interview Research 30
- Documents 30
- Ethnographic Research 30
- Unobtrusive Research 31

Format of Research Articles 31

- Abstract 32
- Introduction 32
- Research Problem 32

Review of Literature *33*
Research Hypothesis or Question *35*
Methodology *36*
Results *38*
Discussion, Implications, Conclusions *38*
References *40*

How to Read Research *40*

Research Problems *43*
Review of Literature *43*
Hypotheses or Questions *44*
Methodology *44*
Results *44*
Discussion, Implications, Conclusions *44*

Summary *44*

Self-Instructional Review Exercises *45*

CHAPTER 3 Research Problems: Statements, Questions, and Hypotheses *47*

Nature of Research Problems *48*

Sources of Problems *48*
Illustrative Topics *49*

Problem Statements *51*

Concepts, Constructs, and Variables *52*
Problem Formulation *54*
Formal Problem Statements *56*

Significance of Problem Selection *58*

Knowledge of an Enduring Practice *58*
Theory Development *59*
Generalizability *59*
Methodological Advancement *60*
Current Issues *60*
Evaluation of a Specific Practice at a Given Site *60*

The Logic of Research Statements, Questions, and Hypotheses *61*

Statements of Research Purposes *62*
Specific Research Questions *63*
Research Hypotheses *65*
Operational Definitions *67*

Standards of Adequacy for Problem Statements *69*

General Research Problem *69*
Significance of Problem *69*
Specific Research Purpose, Question, or Hypothesis *69*
Other Criteria for Standards of Adequacy *70*

Summary *70*

Self-Instructional Review Exercises *71*

CHAPTER 4 Literature Review *74*

Functions of a Review of Related Literature *75*

Sources for a Literature Review *78*

- Reviewing the Literature *78*
- Sources for Reviews of Secondary Literature *80*
- Sources for Primary Literature Review *81*

The Search for the Literature *86*

- Selection of Databases and Key Terms *86*
- Manual Search *87*
- Computer Search *91*
- Abstracting and Organizing the References *96*

Presentation of the Literature Review *97*

- Organization of the Literature Review *97*
- Criticism of the Literature *98*

Standards of Adequacy *100*

- Selection of the Literature *100*
- Criticism of the Literature *100*
- Summary and Interpretation *101*

Summary *101*

Self-Instructional Review Exercises *102*

PART II
Research Designs and Methods *105*

CHAPTER 5 Research Design *106*

Characteristics of Research Design *107*

- Internal Validity *108*
- External Validity *114*

Choosing Subjects *116*

- Sample Selection *117*
- Sample Size *120*

Choosing Instruments *123*

- Test Validity *123*
- Test Reliability *126*
- Sources for Locating Existing Instruments *130*

Procedures for Collecting Information *132*

Ethical and Legal Considerations *132*

- Ethics of Research *132*
- Legal Constraints *135*

Summary *135*

Self-Instructional Review Exercises *136*

CHAPTER 6 Data Collection Techniques and Surveys *139*

Questionnaires *140*

- Justification *140*
- Defining Objectives *140*
- Writing Questions and Statements *140*
- General Format *142*
- Types of Items *143*
- Item Format *149*
- Pretesting *150*

Interviews *150*

- Preparing the Interview *151*
- During the Interview *153*

Observation *156*

- Justification *156*
- Defining Observational Units *157*
- Recording Observations *157*
- Training Observers *158*

Unobtrusive Measures *158*

Survey Research *160*

- Steps in Conducting a Survey *161*

Summary *165*

Self-Instructional Review Exercises *166*

CHAPTER 7 Data Analysis of Quantitative Descriptive Research *169*

Introduction to Descriptive Statistics *170*

- Scales of Measurement *171*

Graphic Portrayals of Data *173*

- Frequency Distribution: A Picture of a Group *173*
- Histogram *175*
- Frequency Polygon *175*

Measures of Central Tendency *177*

- The Mean *178*
- The Median *179*
- The Mode *180*
- Relationships Among Measures of Central Tendency *180*

Measures of Variability *183*

- The Range *184*
- Standard Deviation *184*
- Standard Scores *188*

Measures of Relationship *189*
Scatter Plot *189*
Correlation Coefficient *191*
Interpreting Correlation Coefficients *192*
Summary *198*
Self-Instructional Review Exercises *199*

CHAPTER 8 Experimental, Single Subject, and *Ex Post Facto* Research *202*
Purpose and Characteristics of Experimental Research *203*
Characteristics of Experimental Research *203*
Strengths and Limitations of Experimental Research *205*
Planning Experimental Research *207*
Internal Validity of Experiments *208*
External Validity of Experiments *209*
Pre-Experimental Designs *212*
Notation *212*
One-Group Posttest-Only Design *212*
One-Group Pretest-Posttest Design *213*
Posttest-Only with Nonequivalent Groups *215*
True Experimental Designs *217*
Pretest-Posttest Control Group Design *218*
Posttest-Only Control Group Design *221*
Quasi-Experimental Designs *224*
Nonequivalent Pretest-Posttest Control Group Design *225*
Time Series Designs *227*
Single-Subject Designs *230*
A-B Designs *231*
A-B-A Designs *232*
Multiple-Baseline Designs *233*
Ex Post Facto Designs *237*
Characteristics *237*
Conducting *Ex Post Facto* Research *238*
Standards of Adequacy *239*
True Experimental Designs *240*
Quasi-Experimental Designs *240*
Single Subject Designs *241*
Ex Post Facto Designs *241*
Summary *241*
Self-Instructional Review Exercises *242*

此为试读，需要完整PDF请访问：www.ertongbook.com

CHAPTER 9 Inferential Data Analysis *245*

The Logic of Inferential Statistics *246*

Probability *246*
Error in Sampling *247*

Null Hypothesis *248*

Level of Significance *250*

Errors in Hypothesis Testing *252*
Interpreting Level of Significance *252*

Comparing Two Means: The *t*-Test *253*

Comparing Two or More Means: Analysis of Variance *257*

One-Way Analysis of Variance *257*
Multiple Comparison Procedures *258*
Factorial Analysis of Variance *260*
Analysis of Covariance *265*

Nonparametric Tests *266*

Chi-Square *268*

Multivariate Analyses *269*

Summary *271*

Self-Instructional Review Exercises *274*

CHAPTER 10 Analytical Research: Historical, Legal, and Policy Studies *276*

General Characteristics of Analytical Research *277*

Topics of Analysis *277*
Types of Sources *279*
The Search for Facts *280*
Nature of Analytical Explanations *281*
Kinds of Analysis *282*

Analysis of Educational Concepts *285*

Analysis of Educational Events: Historical, Legal, and Policy-making Studies *286*

The Topic and Problem Statement *286*
Location and Criticism of Sources *288*
Facts, Generalizations, and Causal Explanations *294*

Analytical Research in Perspective *299*

Standards of Adequacy for Analytical Research *300*

Problem Statement *300*
Selection and Criticism of Sources *300*
Facts and Generalizations *301*
Causal Explanations *301*

Summary *301*
Self-Instructional Review Exercises *302*

CHAPTER 11 Ethnographic Research *305*
Ethnographic Research Traditions and Educational Studies *306*
Distinguishing Characteristics of Ethnographic Research *306*
Reseach Orientation *308*
Origins of the Problem *310*
Foreshadowed Problems *311*
A Valid Data Base *313*
Qualitative Analysis: Triangulation *319*
Case Study Design *321*
Presentation of Results: Levels of Abstraction *322*
Uses of Ethnographic Methodology in Research *326*
Standards of Adequacy for Ethnographic Studies *328*
Focus and Purpose of the Study *328*
Research Design and Methodology *329*
Presentation of Findings and Conclusions *329*
Contribution to Knowledge and Further Research *329*
Summary *330*
Self-Instructional Review Exercises *331*

CHAPTER 12 Evaluation Research *335*
Definition and Functions of Evaluation Research *336*
Definition of Evaluation *336*
Formative and Summative Evaluation *337*
Basic and Evaluation Research *338*
Selected Approaches to Evaluation *339*
Objectives-Based Evaluation *341*
Systems and Cost Analysis *344*
Decision-Oriented Evaluation *347*
Responsive Evaluation *349*
The Evaluation Proposal *351*
The Evaluation Focus: Memorandum of Agreement *352*
Evaluation Design *352*
Adequacy of Evaluation Proposals *355*
Adequacy of Evaluation Reports *356*
Conclusion *359*
Summary *360*
Self-Instructional Review Exercises *360*

PART III
Communication of Research 365

CHAPTER 13 Interpreting Research 366

Interpretation Requires Thinking 367

Communication of Research 367

Choice of What to Include 367
Writing Style 369
Interpretations of the Reader 371

Summarizing Results 372

Summary of Descriptive Statistics 373
Summary of Inferential Statistics 373
Summary of Qualitative Research 378

Interpretation of Results 378

Interpretations Based on Research Design 379
Interpretations Based on Previous Research 382

Conclusions and Recommendations 383

Summary 387

Self-Instructional Review Exercises 387

CHAPTER 14 Educational Research: An Evolving Field 393

Development of Educational Knowledge 394

Research Problems from Changing Educational Practices 394

Empirical Problems from Previous Research 396

Expansion of Research Methodologies 397

Design 397
Methodology 398
Integration of Previous Research Findings 398
Tools of Research 399

Trends in Educational Research 401

Continued Change in Research and Educational Practices 401
Dialogue Among Scientists, Researchers, and Practitioners 402
Synthesis of Theory, Research, and Practice 402

Summary 403

Self-Instructional Review Exercises 403

Appendices 405

A. Glossary 405

B. Computers in Educational Research 417

C. Calculations for Selected Descriptive and Inferential Statistics *423*

D. Research-Oriented Journals *442*

Answers to Self-Instructional Review Exercises *446*

References *455*

Index *463*

PART I

Basic Principles of Educational Research

What is research? Educators unfamiliar with scientific methods frequently ask this question. They may also ask: Why is research considered more useful in making decisions than experience or the advice of others? How does research influence educational practices? What kinds of studies are done in education? Is there a simple way to understand a research article?

Chapters 1 and 2 answer these questions by providing an introduction to the field of educational research, an overview of designs and methodologies, and the format of a research journal article. This introduction will familiarize the reader with basic terminology and fundamental concepts of research.

All research begins with a problem statement and usually involves a literature review. Chapters 3 and 4 help one to recognize and state a research problem and to review the literature. What is a research problem and how is it stated in order to be useful in planning a study? What should a problem statement convey to a reader? How are problem statements evaluated? Why is a literature review important? What are the sources for a literature review? How does one conduct a manual or a computer search of the literature? How is a literature review evaluated?

Together, these four chapters present basic principles of research that are necessary for a student to understand when conducting, reading, and analyzing different types of research and methodologies. Part II will discuss in greater detail the procedures for specific methodologies.

CHAPTER 1

Introduction to the Field of Educational Research

Educational research has gradually affected most of our ideas about education and the practices we use to achieve our objectives in education. Yet many excellent teachers and administrators know little about educational research and assume that research has had no effect on their daily activities. Practitioners may also assume that research cannot be useful in program planning and development.

This chapter introduces the reader to the field of educational research by defining research and discussing how educators and others use different types of research. In it we note the contributions and limitations of educational research. Most important, we indicate why it is important to read educational research and to conduct studies.

KEY TERMS

research	science
research methods	scientific method
quantitative	generalizability
qualitative	basic research
objectivity	theory
verification	scientific law
explanation	applied research
empiricism	evaluation research
data	informed consent
scientific inquiry	limitations of a study

此为试读，需要完整PDF请访问：www.ertongbook.com