RESEARCH IN EDUCATION

Ninth Edition

JOHN W. BEST
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NINTH EDITION

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Preface

The ninth edition of *Research in Education* has the same goals as the previous editions. The book is meant to be used as a research reference or as a text in an introductory course in research methods. It is appropriate for graduate students enrolled in a research course or seminar, for those writing a thesis or dissertation, or for those who carry on research as a professional activity. All professional workers should be familiar with the methods of research and the analysis of data. If only as consumers, professionals should understand some of the techniques used in identifying problems, forming hypotheses, constructing and using data-gathering instruments, designing research studies, and employing statistical procedures to analyze data. They should also be able to use this information to interpret and critically analyze research reports that appear in professional journals and other publications.

No introductory course can be expected to confer research competence, nor can any book present all relevant information. Research skill and understanding are achieved only through the combination of course-work and experience. Graduate students may find it profitable to carry on a small-scale study as a way of learning about research.

This edition expands and clarifies a number of ideas presented in previous editions. Additional concepts, procedures, and examples have been added. Each of the five methodology chapters has the text of an entire published article following it that illustrates that type of research. Nothing substantive has been deleted from the eighth edition. An Appendix (B) contains a data set for use by students in Chapters 10, 11, and 12. This edition, as also was true of all of the editions since the fifth, has been written to conform to the guidelines of the American Psychological Association's (APA) *Publications Manual* (now in its 5th edition). The writing style suggested in Chapter 3 is also in keeping with the APA manual.

Many of the topics covered in this book may be peripheral to the course objectives of some instructors. It is not suggested that all of the topics in this book be included in a single course. It is recommended that instructors use the topics selectively and in the sequence that they find most appropriate. The portion of the book not used in those courses can then be used by the student in subsequent courses, to assist in carrying out a thesis, and/or as a reference.

This revision benefited from the comments of the second author's students who had used the earlier editions of this text. To them and to the reviewers: Bertram Chiang, University of Wisconsin-Oshkosh; David L. Henderson, Sam Houston

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J.W.B.
J.V.K.

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Part I

Introduction to Educational Research: Definitions, Research Problems, Proposals, and Report Writing

The first three chapters of this book are intended to explore the historical underpinnings of educational research, define some basic concepts, describe the processes of selecting a research problem to be investigated and writing a research proposal, and demonstrate a style of writing that can be used to write research reports, research proposals, and term papers.

Chapter 1 introduces the research endeavor. Such matters as methods of science, the importance of theory, the formulation of hypotheses, sampling techniques, and an overview of the methodologies used in educational research are described. Different types of educational research—historical, quantitative descriptive, qualitative, and experimental—are briefly described.

Chapter 2 describes the process by which a research problem is identified. This is one of the most difficult steps in the research process for beginners and sometimes for experienced researchers as well. This chapter also discusses the ethics of conducting research with humans in detail using the Federal regulations. Also included are ethic statements by both the American Psychological Association and American Educational Research Association. Finally, some suggestions for library research and how to write a research proposal are presented.

Chapter 3 describes one style for writing a research report, the style of the American Psychological Association. This style was selected because it is the most commonly accepted by journals in the field of education and psychology. The description includes writing style, preparing the manuscript, referencing, tables, and figures. This chapter also briefly describes an approach to evaluating research reports written by others.

1

Fundamentals of Research

The Search for Knowledge

Human beings are the unique product of their creation and evolution. In contrast to other forms of animal life, their more highly developed nervous system has enabled them to develop sounds and symbols (letters and numbers) that make possible the communication and recording of their questions, observations, experiences, and ideas.

It is understandable that their greater curiosity, implemented by their control of symbols, would lead people to speculate about the operation of the universe, the great forces beyond their own control. Over many centuries people began to develop what seemed to be plausible explanations. Attributing the forces of nature to the working of supernatural powers, they believed that the gods manipulated the sun, stars, wind, rain, and lightning at their whim.

The appearance of the medicine man or priest, who claimed special channels of communication with the gods, led to the establishment of a system of religious authority passed on from one generation to another. A rigid tradition developed, and a dogma of nature's processes, explained in terms of mysticism and the authority of the priesthood, became firmly rooted, retarding further search for truth for centuries.

But gradually people began to see that the operations of the forces of nature were not as capricious as they had been led to believe. They began to observe an orderliness in the universe and certain cause-and-effect relationships; they discovered that under certain conditions events could be predicted with reasonable accuracy. However, these explanations were often rejected if they seemed to conflict with the dogma of religious authority. Curious persons who raised questions were often punished and even put to death when they persisted in expressing doubts suggested by such unorthodox explanations of natural phenomena.

This reliance on empirical evidence or personal experience challenged the sanction of vested authority and represented an important step in the direction of scientific inquiry. Such pragmatic observation, however, was largely unsystematic

and further limited by the lack of an objective method. Observers were likely to overgeneralize on the basis of incomplete experience or evidence, to ignore complex factors operating simultaneously, or to let their feelings and prejudices influence both their observations and their conclusions.

It was only when people began to think systematically about thinking itself that the era of logic began. The first systematic approach to reasoning, attributed to Aristotle and the Greeks, was the deductive method. The categorical syllogism was one model of thinking that prevailed among early philosophers. Syllogistic reasoning established a logical relationship between a *major premise*, a *minor premise*, and a *conclusion*. A major premise is a self-evident assumption, previously established by metaphysical truth or dogma, that concerns a relationship; a minor premise is a particular case related to the major premise. Given the logical relationship of these premises, the conclusion is inescapable.

A typical Aristotelian categorical syllogism follows:

Major Premise: All men are mortal.
Minor Premise: Socrates is a man.
Conclusion: Socrates is mortal.

This deductive method, moving from the general assumption to the specific application, made an important contribution to the development of modern problem solving. But it was not fruitful in arriving at new truths. The acceptance of incomplete or false major premises that were based on old dogmas or unreliable authority could only lead to error. Semantic difficulties often resulted from shifting definitions of the terms involved.

Centuries later Francis Bacon advocated direct observation of phenomena, arriving at conclusions or generalizations through the evidence of many individual observations. This inductive process of moving from specific observations to the generalization freed logic from some of the hazards and limitations of deductive thinking. Bacon recognized the obstacle that the deductive process placed in the way of discovering new truth: It started with old dogmas that religious or intellectual authorities had already accepted and thus could be expected to arrive at few new truths. These impediments to the discovery of truth, which he termed "idols," were exposed in his *Novum Organum*, written in 1620.

The following story, attributed to Bacon, expresses his revolt against the authority of the written word, an authority that dominated the search for truth during the Middle Ages:

> *In the year of our Lord, 1432, there arose a grievous quarrel among the brethren over the number of teeth in the mouth of a horse. For thirteen days the disputation raged without ceasing. All the ancient books and chronicles were fetched out, and wonderful and ponderous erudition was made manifest. At the beginning of the fourteenth day a youthful friar of goodly bearing asked his learned superiors for permission to add a word, and straightway, to the wonder of the disputants,*

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