

THE METHODOLOGY OF EDUCATIONAL RESEARCH

BY

CARTER V. GOOD

*Professor of Education
University of Cincinnati*

A. S. BARR

*Professor of Education
University of Wisconsin*

DOUGLAS E. SCATES

*Director of Research and Statistics
Cincinnati Public Schools*



D. APPLETON-CENTURY COMPANY

INCORPORATED

NEW YORK

LONDON

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PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

This volume is addressed to field workers: teachers, principals, supervisors, and superintendents; graduate students who are preparing to be field workers; and those who supervise the training of such workers. The point of view of the authors is that competent educational workers should participate in the solution of professional problems, either as consumers or producers of research. In the rôle of consumers, emphasis is placed on the application of investigational results to practical field situations and problems. Although some field workers will make significant contributions to the store of educational knowledge as active participants in the production of research, the primary outcomes for the majority of field participants in educational research will be found in the training value of the problem-solving approach, with an increased understanding of the educative process.

To argue that most research should be conducted in graduate schools, laboratories, and research bureaus is to underestimate the importance of field situations in terms of the application of the results of educational investigation and the intellectual and professional growth of approximately one million teachers in this country, through the discovery and solution of important educational problems under normal field conditions. From this point of view, competent field workers have an important dual obligation: one relating to the practice of teaching, supervision, or administration, and the other relating to problem solving in their respective areas of responsibility. Then, too, if children are to learn through problem-solving methods and activities, the teachers themselves should have at least a working knowledge of the scientific method, such as is presented in this volume. Both intelligent consump-

tion of investigational literature and effective participation in the solution of practical problems of teaching, administration, and supervision require an understanding of at least the elementary principles of problem solving and research.

It has not been possible to supply within a one-volume treatment of the methodology of educational research all of the information necessary for the solution of many of the more technical problems of education. For these, the producer of research may need additional advanced training in keeping with the nature of the study undertaken, for example, the statistical analysis of data, construction and use of measuring instruments for the collection of data, and the invention and manipulation of laboratory equipment.

The preceding paragraphs should not be interpreted to mean that all field workers are to do research, without regard to their training and qualifications. In making these statements it is conceded that scientific experimentation is difficult and complicated, much more so than the average lay or even professional worker realizes. It is recognized that not all teachers will rise to the level of making scientific contributions to the study of education. This statement, of course, is also true of many so-called research workers. There is really a tendency on the part of the educational practitioner to put entirely too much faith in the training researches of both teachers and research workers. Unfortunately, supervisors and professors today seem to assume too frequently that they alone are to see problems, solve problems, and do the educational thinking prerequisite to the successful management of school systems. They hand down their solutions in the form of methods to be applied, textbooks to be used, courses of study to be followed, and policies for teachers and students to put into operation. The teachers, then, only teach, acting neither as producers nor consumers of research. If one were to visit a classroom and find the teacher doing all of the thinking, entertaining all of the points of view, and solving all the problems, he would characterize such a worker as inefficient. Judged from this point of

view, much of the supervision, administration, and instruction of to-day is ineffective.¹

The authors have sought to avoid such a paternalistic attitude in the preparation of this book. An attempt has been made to present the major principles of investigational procedure, together with numerous illustrations and bibliographical references, rather than to formulate research recipes to be followed in routine fashion. Only in this type of treatment, which leaves much to the interest and initiative of the reader, could the authors be consistent with the true spirit of scientific method.

Convinced of the feasibility of improving educational procedure through problem solving, many teachers, supervisors, administrators, and other field workers have lacked the necessary technical knowledge. It is the purpose of the present volume to supply this information so far as possible within the scope of an elementary treatise. It is recognized that a number of helpful discussions of the methodology of educational research have appeared within the past eight or ten years. However, the more general books on investigational procedures have been rather brief and incomplete, while the specialized volumes devoted entirely to a single area, such as tests, statistical methods, the school survey, the questionnaire, historical research, experimental research, the interview, or case work, have covered only a limited portion of the field of research methodology. Also, a large amount of significant literature on research procedures has appeared within recent years, scattered through periodicals, bulletins, monographs, year-books, and theses, which the authors have attempted to assemble and interpret for the benefit of field workers, most of whom do not have access to such materials in the original sources of publication.

This book presents a reasonably complete analysis of the literature dealing with the methodology of educational re-

¹ A. S. Barr, "Research for Teachers," *Journal of Educational Research*, XX (June, 1929), 42-3.

search; moreover, the authors have sought to inculcate in the research student a type of intellectual independence which comes in large part through the development of desirable bibliographical procedures and habits, as keys to the vast stores of educational literature. Therefore, constant reference has been made to library guides such as the *Education Index*, the *Review of Educational Research*, and the annual bibliographies of research published by the United States Office of Education, in order that months or years after this book has appeared in print, the reader may bring its contents up to date by a canvass of current educational literature.

The sequence of chapters here represented may be defended in terms of logical organization, as well as in terms of an analysis of the various possible ways of attacking educational problems, and of the steps in scientific method or problem solving. The introductory chapter presents a characterization of scientific method and its contribution to education. The next three chapters deal with the early stages of research; namely, the selection and definition of the problem, the survey of related information and investigations, and formulation and testing of hypotheses. Chapter V attempts a systematic classification of available investigational procedures, as well as lists many of the classifications adopted by other writers in this field. Chapters VI, VII, VIII, IX, and X discuss in detail the major approaches to problem solving in education; namely, through historical, survey, experimental, and related methods of research. Chapters VII and VIII include descriptions of the various instruments for the collection of data, used quite extensively in normative-survey investigations, and in varying degrees in the other types of research. Chapters XI, XII, XIII, and XIV deal with later steps in the research process; namely, the analysis and interpretation of data, formulation of conclusions and generalizations, writing of the research report, and evaluation of educational writing and investigation. Chapter XV is of concern to apprentices in educational research and to those who supervise their training, whether in the field or in

the graduate school. It is suggested that some readers may wish to begin with the last chapter (XVI) as an overview of the entire volume.

The authors have deliberately avoided use of the term *scientific* on the title page and at many other points where it might have been employed, maintaining that there is no essential conflict between the methods of science and the processes of logic and philosophy. In clarifying the complementary functions of science and philosophy, it has seemed more effective to discuss the contribution of philosophy and logic in connection with the various steps in problem solving (formulation of hypotheses, analysis and interpretation of data, formulation of conclusions and generalizations, and evaluation) rather than to devote a separate chapter to philosophical procedures. The plan of organization followed, therefore, presents philosophy in its functional relationship to a number of steps in problem solving rather than as a separate or self-sufficient method of research.

In order to show more clearly that the various chapters represent, in the main, different aspects of the research pattern or different steps in problem solving, certain related problems and exercises have been carried through a number of chapters. For example, the problem of how the school may adapt its program of instruction to varying needs is treated in terms of the formulation of a problem, the survey of related literature, the application of survey, experimental, and historical techniques, and of other procedures.

It is hoped that this volume may be of service in one or more of a variety of educational situations: (1) possibly in the last year of the undergraduate teacher-training institution, as a preview of graduate work in education or in courses dealing with scientific method; (2) in the first year of graduate study, with an orientation function at an advanced level, somewhat like that of certain introductory courses and texts at the undergraduate level (for example, C. H. Judd's *Introduction to the Scientific Study of Education*); (3) in classes or

seminars which deal with principles of thesis writing and methods of educational research; (4) in institutional or field groups made up of so-called "consumers" of research, since the fundamental principles of investigational procedure should be understood by both producers and consumers of research, although, of course, the former will need a more technical and intensive type of training in the methodology of problem solving; and (5) as a handbook and reference manual for educational workers in whatever problem-solving capacity they may serve. The patterns of research methodology discussed have been drawn from the fields of education, psychology, sociology, philosophy, logic, history, statistics, and other sciences, and organized as an integrated series of functional approaches to problem solving in education.

Acknowledgment is made in footnotes and bibliographies to the large number of authors and publishers who have made possible at least a foundation for the ultimate establishment of education on a sound basis, and who have generously permitted the use of certain of their materials in the present volume.

The authors are much indebted to the large number of educational workers who have either criticized or tested out in their classes the experimental edition of this book: R. L. Johns, Alabama Polytechnic Institute; J. R. Gerberich, University of Arkansas; G. M. Wilson, Boston University; T. E. Newland, Bucknell University; O. E. Hertzberg, State Teachers College at Buffalo; W. A. Smith, University of California at Los Angeles; Noel Keys and L. A. Williams, University of California; T. G. Foran, Catholic University of America; C. H. Judd, G. T. Buswell, Newton Edwards, and W. C. Reavis, University of Chicago; L. A. Pechstein, Gordon Hendrickson, James Vaughn, G. A. Hedger, and S. L. Eby, University of Cincinnati; H. P. Allen, Claremont College; R. A. Davis, University of Colorado; Maude Williamson, Colorado State College of Agriculture and Mechanic Arts; Carter Alexander and P. M. Symonds, Teachers College, Columbia Uni-

versity; W. A. Brownell, Duke University; W. C. Ruediger, George Washington University; P. J. Rulon, Harvard University; Florence E. Bamberger, Johns Hopkins University; C. H. Thompson, Howard University; E. L. Abell, Indiana State Teachers College; P. V. Sangren, Western State Teachers College, Michigan; R. A. Schwegler, University of Kansas; W. S. Taylor, University of Kentucky; I. P. Foote, Louisiana State University; W. S. Small, University of Maryland; W. R. Good and H. C. Koch, University of Michigan; E. L. Austin, Michigan State College; A. C. Eurich and P. O. Johnson, University of Minnesota; P. V. West, New York University; H. H. Abelson, College of the City of New York; P. A. Witty, Northwestern University; L. F. Kuntz, University of Notre Dame; H. G. Good, Ohio State University; C. O. Mathews, Ohio Wesleyan University; C. W. Knudsen, George Peabody College for Teachers; R. D. Matthews and E. D. Grizzell, University of Pennsylvania; G. W. Hartmann and R. P. Wray, Pennsylvania State College; O. K. Buros, Rutgers University; F. M. Crowley, St. Louis University; W. H. Burton, University of Southern California; J. B. Sears, Stanford University; H. P. Smith, Syracuse University; G. E. Walk, Temple University; J. E. Avent, University of Tennessee; B. F. Pittenger, University of Texas; E. A. Jacobsen, Utah State Agricultural College; E. K. Hillbrand, University of Wichita; M. J. Neuberg, Wittenberg College; and O. C. Schwiering, University of Wyoming. M. D. Munn, graduate assistant at the University of Cincinnati, was of material assistance in certain of the bibliographical work.

C. V. G.

A. S. B.

D. E. S.

EDITOR'S INTRODUCTION

The past quarter century has seen a very great increase in the use of scientific methods in the attack upon educational problems. The results of scientific research have increasingly affected educational procedure in all phases—administration, supervision, and teaching.

The realization has grown that all school workers must know something of the nature and technique of scientific research. This is necessary, first, in order that such workers may utilize sound methods in attacking their own practical problems. All too often these problems have been solved by reference to "experience," which is perforce limited and in many cases misleading. Critically analyzed experience is, of course, valuable. Second, this knowledge is necessary in order that school workers may be better able to distinguish the fundamental from the superficial, the basic from the momentary fad. Possessed of relatively limited and superficial training, too many school workers in the United States are prone to follow the "latest idea," whether it be sound or hopelessly superficial.

More recently there has emerged the idea that classroom teachers must not only make use of scientific methods and know the technical background of teaching, but should also be encouraged to participate in the derivation of this very scientific background itself. This idea is sound psychologically and fully in accord with our democratic school philosophy. Hence, knowledge of scientific methods is necessary not only for the field worker on any level, but also for all prospective school workers in training.

A number of books and manuals have appeared in answer to the need just indicated. Most of them have been commendable, pioneer efforts. The authors of the present volume have

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