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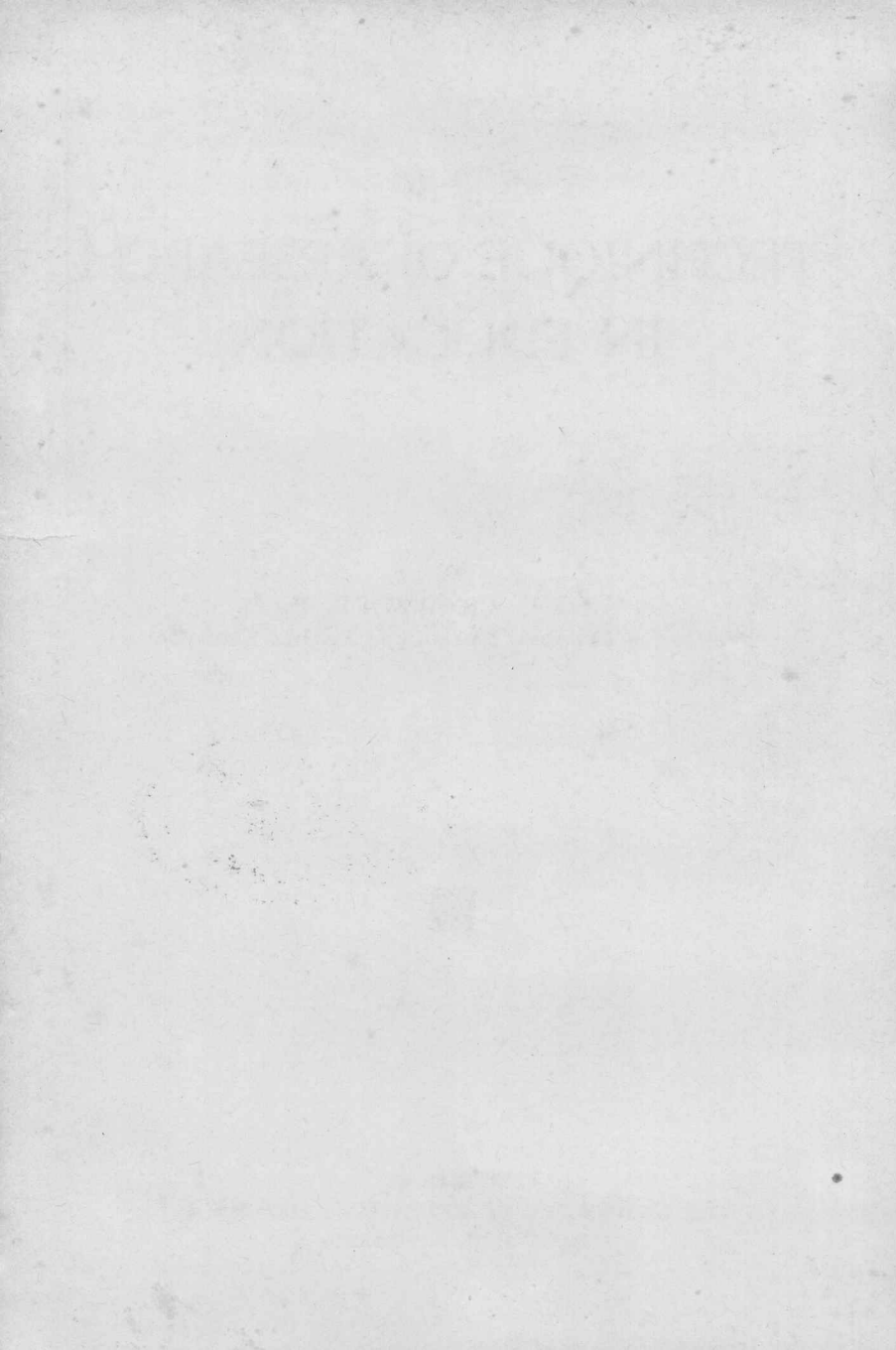# TECHNIQUE OF RESEARCH
IN EDUCATION

BY
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THE
TECHNIQUE OF RESEARCH IN EDUCATION

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PREFACE

This book is the result of the writer's conviction that the progress of research might be accelerated if those who engage in it possessed a little more training in its technique. Such training as graduate students get in research technique is largely of an incidental nature, except in the case of a few who take courses in statistical or historical method. The writer believes that much could be done in a more direct way as a preparation for later individual work.

The author's hope is that this book may be used as a textbook in a regular course in the senior or graduate year, in preparation for entrance into graduate study and research. Allowing for seventeen effective weeks in the semester, the course would deal with one chapter a week, together with extensive supplementary reading and study in the library. In this way each student should get acquainted with the leading authorities on each type of research and the principles involved in it. In addition to this study of the fundamentals by all students in the class, the author suggests that each student might be expected to do two other pieces of work of an individual character. He might be expected to prepare a comprehensive paper based on very extensive reading about the particular type of research in which he expects to engage, and also to do an actual piece of research employing that technique. If the student is a graduate, this piece of research might be the beginning of the thesis, or it might be merely a preparation for it.

The material included here has been assembled by the

following processes: *First,* a complete difficulty analysis was made by having graduate students report those difficulties which they had encountered, and by having professors report those which they had experienced or observed in research workers, and by examining about one hundred theses for their shortcomings, defects, and implied difficulties. *Second,* these difficulties were classified into types and formulated into questions beginning with the word "How". There were 145 such "How" questions, each representing a research difficulty. *Third,* all methods that could possibly be found for solving each of these difficulties were collected. These methods were drawn from about one hundred graduate students, a few professors, numerous books and articles about research, and scores of published and unpublished research reports. Each method, when found, was written on a small card and given the number of the difficulty of which it was a solution. *Fourth,* the cards were classified and arranged according to content, and their contents written in textbook form, with a goodly mixture of the author's own thinking and evaluation of the methods presented. If the recommendations here made are not all sound, they will at least raise issues and stimulate thought.

Special acknowledgements are due to Dr. W. W. Charters for the technique used in assembling the material for the book, to Dr. W. S. Ford, for supplying material for the chapter on Survey Technique, to the various authors of books, articles, and theses from which suggestions have been drawn, and to the many graduate students who supplied their lists of difficulties and methods.

<div align="right">C. C. CRAWFORD.</div>

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THE TECHNIQUE OF RESEARCH IN EDUCATION

CHAPTER I

SELECTING PROBLEMS

Two tasks confront the person who would begin educational research. He must, first, discover problems that need solving, and, second, he must judge the relative values of those he discovers. Each of these tasks will be discussed in this chapter.

I. *Finding Problems*

If every person who wished to engage in research could come to his professor or director with his problem clearly formulated, and his plans for attacking it already made for approval or revision, this would be ideal. More often, however, the candidate for research is faced more urgently by the need of doing *something* than by any definite problem that he wishes to solve. The search for a problem or the discovery of an issue which needs investigating can be made more productive by employing refined or systematic procedures. Blind searching is more desirable in this case than in the case of searching for objects of a material nature. The following paragraphs are intended to assist in the process of discovering problems that lend themselves to scientific investigation:

1. Deriving a problem from a vocational choice.
The person who has selected as a life work the teaching
of English, the administering of a high school, or the
handling of an adjustment room, is already in an excel-
lent position to select a thesis problem. On the other
hand, one who does not know whether he will teach
history or mathematics is sometimes not ready to make
the decision on a thesis problem. A piece of research
has a double relationship with one's vocation: (1) It
will be a better piece of research if it fills a vital pro-
fessional need. (2) It will contribute more to future
professional growth and development if it is in the
general field that is to be followed as a life work.

2. Specializing in the field to be followed. There is
actually such a thing as being too ignorant to ask in-
telligent questions. The person who knows nothing
about education will likewise find difficulty in discover-
ing the vital issues that demand further study. Cer-
tainly no one should attempt to explore the unknown
and uncharted areas in education until he has acquired
a reasonable familiarity with what is the common
knowledge of well-informed educational workers. Occa-
sionally this is done, with the result comparable to dis-
covering the "new" principle of the bow and arrow in
this modern age of machine guns and heavy artillery.
Anyone who hopes to engage in research, whether for
an advanced degree or not, should, in justice to himself,
acquire a reasonably thorough foundation in the ordi-
nary subject matter of the field in which he ultimately
hopes to do his work. Such a foundation makes it
easier to perceive the issues and to judge the import-
ance of problems that present themselves.

3. Analyzing a field or topic into its parts. Almost
any educational topic, if reduced to its elements, would

break up into hundreds of excellent research problems. The beginner is usually acquainted with the major topics, such as supervised study, project method, socialized recitations, etc., and not uncommonly attempts such a topic instead of a problem. These topics are unsatisfactory because they are in too large units to be attacked as such. A little analysis has not only the advantage of reducing the size of the unit but also that of enormously increasing the number of units or parts which may be followed up as research problems. It has been the writer's experience that most thesis problems were arrived at by subdividing much larger topics into their parts rather than by the opposite plan.

4. Extending term papers. It is customary in most advanced courses and in graduate seminars for each student to be asked to prepare a long paper on some subject connected with the course. While these papers are usually not of a research nature, they are nevertheless an excellent preparation for a thesis in that they are exploratory and help to discover the problems that are involved in the field. A good policy for an advanced student who is about ready to begin research is to select several *topics* in which he is somewhat interested and to write a term paper on each in a different course; then to narrow one of them down to a thesis *problem* to be attacked by scientific research methods.

5. Providing research contacts. It is fairly safe to judge a man by the company he keeps. Particularly is this true in research. A person who is interested in research will do well to enroll in courses with kindred souls and under professors who have a spark of the research fire in their hearts. There is in the usual college faculty at least one man who is especially interested in research and scholarly production. He may not

be the best teacher nor the most interesting person-
ity on the campus, but his interest in research is strong
and his power to inspire and to direct scientific work is
great.   The would-be research worker should find such
a man and study under his direction.   This usually
involves enrolling in a graduate seminar, a veritable
nursery for research workers.   Such definite and for-
mal contacts with persons interested in research can
not help contributing greatly both to the discovery and
the solution of research problems.

6. Meditating.   One way to discover research prob-
lems, but a rather poor way as a rule, is by simply
meditating.   To dwell on the need or desire for a prob-
lem long enough is likely to cause one to arise in the
mind.   Some active or systematic plan of attack, or
some purposeful search for a problem, is much more
likely to produce results.   The most fruitful results of
meditation are derived when it is employed in evaluat-
ing problems after several possibilities have been defin-
itely formulated.   An active search for several prob-
lems, followed by a period of "soaking," or meditation,
is to be encouraged.

7. Analyzing popular superstitions.   The history of
science has been a long succession of blasting of popu-
lar superstitions.   Copernicus discovered that the earth
moves instead of the sun; Columbus demonstrated that
the earth is round and not flat.   Yet for years after
these discoveries the masses clung to the older beliefs.
Similarly, in our own day we find scores of popular
superstitions about biology, psychology, sociology, edu-
cation, etc., which are still cherished by the multitudes.
The popular mind refuses to believe that dogs do not
reason, or that study does not produce a general mental
discipline.   Any one of these issues, which may be

thought of as skirmishes between the scientist and the layman, would furnish an excellent thesis problem. If the masses are right, we should know it; if they are wrong, the more facts that are made available, the more likely are they finally to see the light and accept the scientific view.

8. Particularizing feelings of discontent. There is probably no one who is entirely satisfied in every way. Even the best teacher or administrator is likely to be unhappy about something. The trouble with most people, however, is that they have not taken the trouble to sit down and decide exactly what they are displeased about. The lower animals are said to be unable to distinguish consciously the difference between the promptings of such impulses as hunger, thirst, cold, sex, and pain, and simply become so restless under one of these stimuli that they stir around until they happen upon suitable sources of relief or satisfaction. In contrast with this blind and aimless method of remedying our troubles, scientifically trained research workers think the situation over or make a definite analysis of it until the exact source of irritation or annoyance is located, and then set up the necessary procedure to correct it. Each cause of discontent is a potential thesis problem.

9. Making an analysis of difficulties or deficiencies. "They that are whole have no need of the physician, but they that are sick." The greatest need of research is in those phases of endeavor which are falling short of the mark. A principal who wishes to encourage research in his school has only to note where the school is weak, faulty, or deficient to find a multitude of research problems. The classroom teacher needs only to look over the red marks she has put on a set of papers

to discover a host of research problems dealing with the learning process and methods of studying employed by her pupils. Every difficulty or deficiency is a potential research problem.

10. Observing educational practice. To watch a teacher or student at work for an hour should raise in the mind a number of problems for intensive study. The observation will bring to mind several unsatisfactory elements, several elements of unusual merit, or several matters that call for further interpretation. A few days devoted to observation and visitation of actual classrooms should raise in the mind such a number of questions that the difficulty would no longer be in finding *a* problem, but in deciding *which of several* problems to follow up. If this plan were employed more frequently by research workers, there would be fewer purely abstract investigations and more genuine solutions of the vital issues now troubling educational practitioners.

11. Listening with a critical attitude. What people say is usually less carefully thought out and less thoroughly considered than what they write. Even scientists of some repute who would not publish mere opinions dogmatically will sometimes speak them orally with an air of absolute finality. The person of less training is even more prone to say what is on his mind without taking the trouble to examine its truthfulness. The result is that lectures, round-table discussions, and class recitations afford an innumerable supply of possible thesis problems, because almost every sentence that is uttered is likely to contain something that is unproven and therefore in need of further investigation. Listening to an ordinary argument should suggest to a scientific mind very quickly what

essential facts are needed by the contestants, or what investigations would be required to settle the issue. Most lectures and class discussions involve an element of argumentation, and every subject that lends itself to argumentation is at least a possible candidate for scientific investigation.

12. Reading research reports. Research begets research. One man's investigation inspires and suggests scientific work on the part of others. To read what another person has done on a given problem helps to see the issues and to decide upon a phase of it for one's own study. To read several theses or published articles of a scientific nature will almost certainly help in making a choice of a problem. Most graduate schools have, in addition to the theses produced by their own students, more or less complete files of the Columbia University doctors' dissertations. A few days spent in reviewing these would be worth the time of any graduate student who is getting ready for his own thesis study. Not only does the reading of such works contribute greatly in making clear the nature of scientific work, but also in suggesting the further work that needs to be done on each of the problems that have been investigated. To take up any ordinary thesis problem and apply to it the remaining procedures which the previous investigator overlooked or omitted would constitute on entirely satisfactory thesis undertaking.

13. Reading current periodicals. There are two reasons why educational periodicals are especially helpful in the selection of research problems: (1) They are of a research nature to a greater extent than books. Books, as a rule, present the thoughts of their authors, whereas the periodicals present the facts

derived from investigations. For this reason a person hunting a thesis topic will profit more by going through periodicals than by going through books. (2) Periodicals are more recent than books. Books are often out of date by the time they are published, and hence do not suggest the newest things in educational science. Periodicals, however, present what is on the very "firing line" of educational activity. Since research is by nature something of a pioneer or frontier work, it is especially important to move up to the frontier to begin, by reading what is going on at the time. Without reading the journals a student cannot be sure that a proposed problem has not already been solved by another investigator, or outgrown by the march of events.

14. Reading textbooks critically. The usual textbook in education is only partially based on scientific data. Research has not gone far enough to provide data for guidance on matters of educational practice. But textbook writers cannot wait. They are obliged to provide something for the training of the new generation of educational workers, and in the absence of science they are forced to resort to common sense or empirical advice. To read a textbook on methods, administration, or educational psychology with this point in mind should suggest a host of problems for investigation. Each chapter title might be considered a thesis topic and almost any paragraph or sentence in the chapter might be made into a thesis problem. The chief essential is that the reading be done not from the viewpoint of assimilation but of investigation or critical searching for points which are stated without scientific verification.

15. Using questions and exercises in textbooks.