

# 1 Introduction

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## 2 INTRODUCTION TO RESEARCH METHODS IN EDUCATION



### LEARNING OBJECTIVES

After studying this chapter you should be able to:

- Explain the word 'empirical' and define what is meant by an empirical research question
- Describe the differences between qualitative and quantitative data and research
- Show the relationship between research questions and research methods
- Reproduce and explain the model of research shown in section 1.7

This book is about empirical research in education. It covers both qualitative and quantitative approaches, and focuses on the essential elements of each. It places both approaches within the same framework for organising research, and it deals with them under the same main headings – design, data collection, data analysis. These main headings follow logically from the view of research outlined in this chapter, and elaborated in Chapters 4 and 5. The stress in the book is on the logic of what is done in research, rather than its technical aspects. Therefore it is not a 'how to do it' book, but aims instead to develop a basic understanding of the issues involved and of the ideas behind the main techniques.

The general audience for the book is anybody who wants to learn about research in education. A more specific audience is postgraduate and upper level undergraduate students in universities, who need to learn about empirical research, and many of whom need to execute a research project, often as a dissertation for a higher degree. I hope also that the book will be useful to those who teach research methods, and to contract education researchers.

## 1.1 EMPIRICAL RESEARCH – DATA

Our subject is empirical research in education. *Empiricism* is a philosophical term to describe the epistemological theory that regards experience as the foundation or source of knowledge (Aspin, 1995: 21). Since experience refers here to what is received through the senses, to sense-data or to what can be observed, I will use the general term 'observation' alongside the term 'experience'. Thus 'empirical' means based on direct experience or observation of the world. To say that a question is an empirical question is to say that we will answer it – or try to answer it – by obtaining direct, observable information from the world, rather than, for example, by theorizing, or by reasoning, or by arguing from first principles. The key concept is 'observable information about (some aspect of) the

world'. The term used in research for this 'observable information about the world', or 'direct experience of the world', is *data*. The essential idea in empirical research is to use observable data as the way of answering questions, and of developing and testing ideas.

Empirical research is the main type of research in education today, but it is not the only type. Examples of other types of research are theoretical research, analytical research, conceptual-philosophical research and historical research. This book concentrates on empirical research, but I believe many of the points it makes apply also to other types of research.

## 1.2 QUANTITATIVE AND QUALITATIVE DATA

Data is obviously a very broad term, so we subdivide data for empirical research into two main types:

- *quantitative data* – which are data in the form of numbers (or measurements), and
- *qualitative data* – which are data not in the form of numbers (most of the time, though not always, this means words).

This leads to two simplifying definitions:

- *Quantitative research is empirical research where the data are in the form of numbers.*
- *Qualitative research is empirical research where the data are not in the form of numbers.*

These simplified definitions are useful for getting started in research, but they do not give the full picture of the quantitative–qualitative distinction. The term 'quantitative research' means more than just research that uses quantitative or numerical data. It refers to a whole way of thinking, or an approach, which involves a collection or cluster of methods, as well as data in numerical form. Similarly, qualitative research is much more than just research that uses non-numerical data. It too is a way of thinking,<sup>1</sup> or an approach, that similarly involves a collection or cluster of methods, as well as data in non-numerical or qualitative form.

Thus full definitions of the terms 'quantitative research' and 'qualitative research' would include:

- the way of thinking about the social reality being studied, the way of approaching it and conceptualizing it;<sup>2</sup>

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- the designs and methods used to represent that way of thinking, and to collect data;
- the data themselves – numbers for quantitative research, not-numbers (mostly words) for qualitative research.

In teaching about research, I find it useful initially to approach the quantitative–qualitative distinction primarily through the third of these points, the nature of the data. Later, the distinction can be broadened to include the first two points – ways of conceptualizing the reality being studied, and methods. Also, I find that in the practical business of planning and doing research, dissertation students very often focus on such questions as: Will the data be numerical or not? Am I going to measure variables in this research, or not? Or, in other words, will my research be quantitative or qualitative?

For these reasons, I think that the nature of the data is at the heart of the distinction between quantitative and qualitative research, and that is why I start with the simplified definitions shown above. But we need also to remember that there is more to the distinction than this, as shown in the other two points above, and that qualitative research is much more diverse than quantitative research, in its ways of thinking, in its methods and in its data.

### 1.3 RELAXING THE QUALITATIVE – QUANTITATIVE DISTINCTION

The qualitative-quantitative distinction has been of major significance in educational research, and a basic organising principle for the research methods literature. Despite that, we should note that the value of this sharp distinction has been questioned in the literature (see, for example, Hammersley, 1992: 41–3), and that there are important similarities between the approaches.

Therefore, once understood, this distinction can be relaxed. This book deals with both qualitative and quantitative approaches to research, and is based on the view that neither approach is better than the other, that both are needed, that both have their strengths and weaknesses, and that they can and should be combined as appropriate. The combination of qualitative and quantitative methods is now increasingly common, and is known as mixed methods research. This is the topic of Chapter 13.

Thus, rather than either–or thinking about the qualitative-quantitative distinction, or tired arguments about the superiority of one approach over the other, the viewpoint in this book is that the methods and data used (qualitative, quantitative or both) should follow from and fit in with, the question(s) being asked. In particular, qualitative questions require qualitative methods and data to answer them, quantitative questions require quantitative methods and data to answer

them, and research that asks both qualitative and quantitative questions requires mixed methods to answer them.

These statements are examples of the principle that questions and methods need to be matched with each other in a piece of research. In general, I believe that the best way to do that is to focus first on what we are trying to find out (the questions) before we focus on how we will do the research (the methods). The importance of identifying research questions – the pre-empirical stage of research – is stressed below, and the matter of question–method connections is discussed in Chapter 2.

## 1.4 SOME SIMPLIFYING DEVICES

The book uses four simplifying devices, whose function is to make it easier to see the logic behind the empirical research process, whether qualitative, quantitative or mixed methods.

### (1) The pre-empirical stage of research

A sharp distinction is made in the early part of this book between the pre-empirical and empirical stages of research. It is stressed in Chapters 4 and 5 that empirical research has an important pre-empirical stage, where careful analysis of the problem and the questions clarifies the empirical, technical and methodological considerations. Question development is a good term to describe this pre-empirical work, which is important in setting up the research. It essentially comes down to clarifying and disentangling the different issues, and to restating the original problem as a series of empirical research questions. This question development work is often underemphasized, but the pre-empirical stage is important, since the issues involved in doing empirical research are as likely to be conceptual and analytical as they are to be technical and methodological. While this distinction is made sharply, in order to stress the importance of conceptual and analytical issues, these issues do not always precede the methodological issues. Sometimes the two are intertwined.

### (2) Importance of research questions

Research questions are strongly highlighted, and a model of research is used which stresses their central role. They are the goal of the pre-empirical stage of the research, they provide the backbone of the empirical procedures and they are the organising principle for the report. This model (shown in section 1.7) is stressed in order to clarify and illustrate the research planning process, and developing research questions is set up as a useful goal for that process. At the same time, actual research situations may require this model to be modified, in two ways. Research questions worked out in advance may change as the empirical work proceeds – there is no requirement that they be ‘set in concrete’. Again, it

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may not be desirable or possible to plan certain types of studies in terms of pre-specified research questions. Rather, the strategy in those cases is to identify and clarify the research questions as the study proceeds. When that happens, research questions retain a central role, but emerge at a different stage of the study. This points ahead to the contrast between prespecified and emerging research questions, designs and methods, an important distinction and a theme that is discussed in Chapter 2.

### (3) Methods follow questions

The book stresses that methods should follow from questions. *How* we do something in research depends on *what* we are trying to find out. This point is stressed because, too often in the past teaching of research methods, we have put the methodological cart before the substantive (or content) horse. This has been called ‘methodolatry’, the idolatry of method, and has been particularly characteristic of (though not exclusive to) the quantitative approach. Many previous research methods books have taught methods ‘in the abstract’. They are only about methods, and there is little connection between methods, on the one hand, and defining and analysing research problems, on the other. I think research methods texts at the introductory level now need to be more eclectic, and stronger in connecting methods to problem and question identification, definition and analysis. This book aims to do both of these things. Therefore, before it covers qualitative, quantitative and mixed methods, it deals with identifying, defining and analysing research questions, with the phrasing of research questions, and with connections between questions, data and techniques for their collection and analysis.

In other words, the book, especially in the early chapters, stresses the influence of research questions on research methods as a useful teaching/learning device. In actually doing research, methods can constrain and influence the questions that can be asked. These influences are recognized in later chapters, and the reciprocal interaction between question and method is discussed. But the question-to-method influence is deliberately stressed, because of its value in ensuring a close fit between the research questions and the methods. In the end, a main objective of the planning is to maximise the fit between questions on the one hand, and design and procedures on the other. This point is also an important theme, and is discussed in Chapter 2.

### (4) Simplified model for research

In several places, models are used for thinking about research, and some sharp distinctions are drawn. Simplified models to represent aspects of the research process are useful in teaching and learning about research. At the same time, actual research is often quite messy, and clear-cut textbook models have to be modified, but the models help in building understanding. Similarly, it is helpful to draw some contrasts very sharply, to illustrate the points involved. Once understood, those sharp distinctions can be relaxed, as they often must be in actual research. An example is the central distinction in the book between qualitative

and quantitative research. That distinction is made sharply in the early chapters, and is relaxed somewhat in Chapter 13. Another example is the simplified model of research shown in section 1.7.

## 1.5 ESSENTIALS AND LOGIC

The full field of research methods, especially across both the qualitative and quantitative approaches, is very big – far too big for one book. Therefore selection of material is necessary. In making that selection, I have tried to concentrate on what a reader is most likely to need, in order to understand the logic of research, and in order to get the process of planning and developing research well under way. In both approaches, my focus is therefore on the basics and the essentials. Whether the project will use qualitative methods, quantitative methods, or both, the guiding question has been: What are the basic and essential ideas and techniques whose logic the researcher needs to know? Compiling the book has thus involved identifying and distilling the core essentials of qualitative and quantitative methods. At the same time, as well as being selective, the book also aims to be both comprehensive and ambitious. While introducing research, it also aims to take readers a long way into the process of empirical research, by focusing on essentials.

For quantitative research, the selection of material has seemed less problematic than for qualitative research. That reflects the agreement that I think would be found on what constitutes the essentials of quantitative methods. For qualitative research, by contrast, selection of both material and perspective has been less straightforward, as has distilling the material selected. Here I think there would be much less agreement on what constitutes ‘essentials’. This is because of the paradigm diversity and the variety of perspectives and approaches within qualitative research, especially with respect to the analysis of qualitative data. In the face of these choices about what to include and what to emphasise in qualitative research, it is presented in this book (in Chapters 7, 8 and 9) in a way that emphasises its logical similarities with quantitative research. Thus the same main headings are used for both (design, data collection, data analysis). And, in the analysis of qualitative data, where the range of methods and perspectives is greatest, I have emphasized two approaches (the Miles and Huberman approach, and grounded theory) that are most similar in logic to quantitative research. But I do not intend to imply that all qualitative research proceeds this way, and Chapter 9 includes a number of the other approaches that are important in current qualitative research.

The book also aims to be more than just a collection of methods, by presenting a view of research (given first in section 1.7 of this chapter and described in detail in Chapters 4 and 5) and using that view to guide the selection and presentation of material. This means that the chapters are interconnected and that

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there is considerable cross-referencing of material between chapters. It also means that technical and methodological issues, which are discussed in logical terms, are related back to the analytical framework for research presented in the earlier chapters. That framework depends heavily on research questions. New approaches and perspectives, especially within qualitative research, have opened up both new types of research questions, and a much wider range of research questions. There are now many more things that we might be interested in finding out than research had previously considered. But even with this wider range, the need for clear research questions, and for close question–method fit, still applies.

The description of research as ‘organized common sense’ is useful. It supports the idea that good research is within the reach of many people. It is also consistent with the view that we can simplify the more technical aspects of research methods, and enhance understanding, by showing the logic behind them. This book therefore concentrates on the logic behind techniques, in an effort to avoid obscuring this logic behind technical considerations. I do not advocate a formula approach to doing research, since I do not believe that research can be reduced to a set of mechanical steps. On the contrary, I try to stress understanding rather than ‘how to do it’. I like the idea that method should not be seen as a codification of procedures, but rather as information about actual ways of working (Mills, 1959). This means that principles and guidelines are stressed throughout the book, rather than sets of mechanical rules. It also means that common sense is needed at all stages of the research process, a point that comes up many times in the different chapters.

### 1.6 SCIENCE, THE SOCIAL SCIENCES AND EDUCATION RESEARCH

I see education research as an applied social science. This raises questions: What is science, and what are the social sciences? What does it mean to study something scientifically? Much has been written on the topic of the scientific method, and today, especially, there are different definitions and points of view. As a starting point in learning about research, however, I suggest a simple and traditional conception of the method of science.<sup>3</sup>

*The method of science:* In this conception, the essence of science as a method is in two parts. The first part concerns the vital role of real-world data. Science accepts the authority of empirical data and ideas have to be tested against data. The second part is the role of theory, particularly theory that explains. The aim is to explain the data, not just to collect the data and not just to use the data to describe things. Explanatory theory has a central role in science. The two essential parts to science are therefore data and theory. Put simply, it is scientific to collect data about the world, to build theories to explain the data, and then to test those



theories against further data. Whether data come before theory, or theory comes before data, is irrelevant. It only matters that both are present. This point about the irrelevance of the order of theory and data has implications later in this book. There is nothing in this definition of science about the nature of the empirical data, and certainly nothing about whether the data are quantitative or qualitative. In other words, it is not a requirement of science that it involve numerical data, or measurements. It may well do so, but it is not necessary that it should do so. This point is also relevant to later chapters of this book.

*Social science:* The general term ‘social science’ refers to the scientific study of human behaviour. ‘Social’ refers to people and their behaviour, and to the fact that so much of that behaviour occurs in a social context. ‘Science’ refers to the way that people and their behaviour are studied. If the aim of (all) science is to build explanatory theory about its data, the aim of social science is to build explanatory theory about people and their behaviour. This theory about human behaviour is to be based on, and is to be tested against, real-world data.

*The basic social sciences:* Human behaviour can be studied from many different perspectives. The basic social sciences can be distinguished from each other according to the perspective they take on the study of human behaviour. Many would agree that there are five basic social sciences – psychology, sociology, anthropology, economics and political science. These mainly differ from each other in the perspective they take – thus, psychology typically focuses on the individual person, whereas sociology is more concerned with groups and the social context of behaviour, and so on. We should not try to take these distinctions too far, because of the variety of perspectives that exists within the basic areas, and because some would want to include other areas as basic social sciences. Also, there are fields at the intersections between these basic social sciences (for example, there is social psychology, social anthropology, and so on), but it is useful to keep these basic areas in mind. They can be thought of as disciplines, which can be applied to a variety of different areas.

*Applied social science:* The applied social sciences can now be distinguished from the basic social sciences by the setting or area of behaviour they focus on. There are many of these areas – for example, organization studies, government studies, administration and management, social work, nursing studies and health research, certain areas of medicine and public health, family studies, child development, marketing and market research, recreation and leisure studies, communication studies, justice, legal and clinical studies, policy analysis, programme evaluation, and research for social and economic development. But education is one of the main areas. To see education as an applied social science means that we use social science research methods to study (some aspect of) human behaviour in an educational setting.

We can make the phrase ‘some aspect of human behaviour’ more specific by applying a disciplinary perspective. Thus, with education as the area, and with psychology, sociology, anthropology, economics and political science as the basic social science disciplines, we have five specialized applied areas within

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education research – the psychology of education, the sociology of education, the anthropology of education, and the economics and politics of education. In each of these, we use scientific methods to study behaviour in an educational setting from a particular (disciplinary-based) point of view.

### 1.7 A MODEL OF RESEARCH

Faced with the many definitions, descriptions and conceptions of research in the methodological literature, I think it is sufficient for our present purposes to see research as an organized, systematic and logical process of inquiry, using empirical information to answer questions (or test hypotheses). Seen this way, it has much in common with how we find things out in everyday life – thus, the earlier description of scientific research as organized common sense is useful. Perhaps the main difference is the emphasis in research on being organized, systematic and logical.

This view of research, which I use as a teaching device, is shown in Figure 1.1. It stresses the central role of research questions, and of systematically using empirical data to answer those questions. It has four main features:

- framing the research in terms of research questions;
- determining what data are necessary to answer those questions;
- designing research to collect and analyse those data;
- using the data to answer the questions.

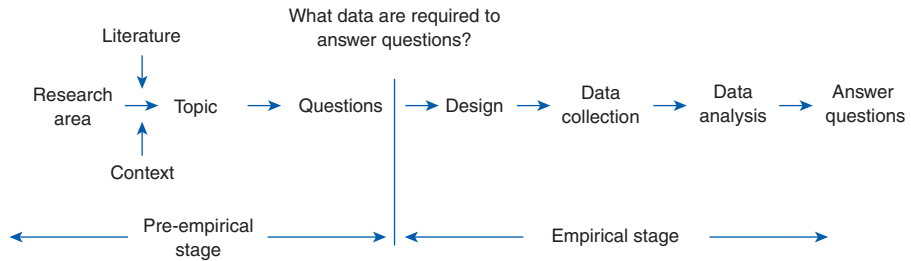
A modification of this model, to include hypothesis-testing research, is shown as Figure 4.1 in Chapter 4.

As well as capturing essential elements of the research process, I think this view also takes much of the mystery out of research, and enables students immediately to get started in planning research. It focuses on research questions, whereas some other writers focus on research problems. Whether to define the research in terms of questions or problems is a matter of choice for the researcher. In one sense, the terms are interchangeable – problems can always be phrased as questions, and questions can always be phrased as problems.

### 1.8 ORGANIZATION OF THE BOOK

Including this introductory chapter, the book is presented in 15 chapters, as follows.

Chapter 2 (‘Theory and Method in Education Research’) deals with the role of both methodological and substantive theory in research, and discusses three themes that occur frequently throughout the book. They are brought together in

**Figure 1.1** A simplified model of research

(a) Without hypotheses

Chapter 2 for reference purposes. Some readers may want to skim this chapter on a first reading, and to return to it for reference as the themes come up in relation to different topics.

Chapter 3 deals with the multiple contexts of education research, and with ethical issues in research.

Chapters 4 and 5 deal with the pre-empirical stage of research, focusing on research questions. Chapter 4 ('Research Questions') deals with identifying and developing research questions, and with the role of hypotheses and the literature in doing this. Chapter 5 ('From Research Questions to Data') continues the consideration of research questions, but concentrates on linking the questions to data.

Chapter 6 ('Literature Searching and Reviewing') then discusses literature searching and reviewing, an important task in thesis preparation.

Chapters 7, 8 and 9 together give an overview of qualitative research methods. Chapter 7 ('Main Qualitative Designs') describes a framework for thinking about research design, discusses some main strategies used in qualitative research, and notes the complexity and diversity of contemporary qualitative research. Chapter 8 ('Collecting Qualitative Data') deals with the main methods of data collection in qualitative research. Chapter 9 ('The analysis of qualitative data') discusses issues involved in analysing qualitative data, focuses on two of the main approaches that have been developed, and overviews several recent and more specialized approaches. These three chapters would be suitable, as a unit, for the reader who wants an overview of qualitative methods.

Chapters 10, 11 and 12 together give a similar overview of quantitative research methods, using the same general headings. Thus Chapter 10 ('Quantitative Research Design') describes the main ideas behind the design of quantitative studies. Chapter 11 ('Collecting Quantitative Data') considers what is involved in collecting quantitative data, and the central role of measurement in that process. Chapter 12 ('The Analysis of Quantitative Data') describes the logic behind the main statistical techniques used in quantitative social science. Again, these three chapters would be suitable, as a unit, for the reader who only wants an overview of quantitative methods.

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Chapter 13 ('Mixed-Methods Research') deals with mixed methods, which is now a popular and increasingly used design for empirical studies in education.

Chapter 14 ('Evaluation') describes criteria for use in evaluating a piece of empirical research, and outlines the related topic of programme evaluation.

Chapter 15 ('Research Writing') deals with the general topic of research writing, and discusses proposals in some detail.

In each of these chapters, an introduction lists the main learning objectives, and a final section summarizes the main content. Exercises and study questions are then provided. At the end of the book, there is a glossary of key terms.

Two appendices contain additional material. Appendix 1 deals with computing software for quantitative and qualitative analysis, and Appendix 2 deals with Miles and Huberman's (1994) tactics for drawing and verifying conclusions in qualitative analysis.

## CHAPTER SUMMARY

**Empirical research:** using data to answer research questions

**Quantitative research:** empirical research where the data are numbers

**Qualitative research:** empirical research where the data are not numbers (words)

**Research methods:** follow from research questions

**Scientific method:** using data to build and test explanatory theory

**Education research:** an applied social science

**Model of research:** pre-empirical stage: area, topic, questions; empirical stage: design, data collection, data analysis



### FURTHER READING

Because this book concentrates on the essentials and main ideas of research, with the aim of providing a comprehensive foundation for doing empirical research in education, detailed technical treatment of topics is not given. For those who want to go further into more technical aspects of the material, or who want to study techniques not dealt with in detail here, suggestions for further reading are given at the end of each chapter throughout the book.



## EXERCISES AND STUDY QUESTIONS

- 1 Define and discuss these key concepts:
  - empirical research
  - quantitative research
  - qualitative research
  - mixed-methods research
  - the scientific method
  - the social sciences
- 2 Study the table of contents of this book. Then consider these questions:
  - Which parts of the book do you think you will find easiest to understand? Why?
  - Which parts do you think you will find the most difficult to understand? Why?
  - Do you think you are more of a ‘numbers’ person, a ‘words’ person, or both? Why?

## NOTES

- 1 More accurately, qualitative research is a collection of ways of thinking about social reality. Whereas quantitative research is relatively homogenous in its way of thinking, qualitative research is more heterogenous.
- 2 This is part of what is meant by the term ‘paradigm’ (see section 2.1), involving assumptions about the nature of the reality being studied. As an example, quantitative research typically conceptualizes the world in terms of variables (which can be measured) and studies relationships between these variables. Qualitative research, by contrast, typically studies cases and processes, rather than variables.
- 3 This view might be described as a ‘modified logical empiricist’ view, with some additions from critical rationalism – see Higgs (1995).