

*2nd Edition*

**INTRODUCTION** *to*  
**RESEARCH METHODS**  
*in* **EDUCATION**

*Keith F Punch & Alis Oancea*



Los Angeles | London | New Delhi  
Singapore | Washington DC

# 1

## INTRODUCTION

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### LEARNING OBJECTIVES

After studying this chapter you should be able to:

- Explain the phrase ‘empirical research’ and define what is meant by an empirical research question
- Describe the differences between qualitative and quantitative data and their implications for different approaches to research
- Describe and explain the relationship between research questions and research methods
- Explain and relate to your own research the model of research shown in Section 1.7.

Being a researcher and doing research in education carries with it the possibility of deep and creative, sometimes playful, sometimes frustrating engagement with families of practices that weave together different forms of knowledge and value judgements about enabling and sustaining human flourishing. There is a wide diversity of approaches to educational inquiry that feed off and complement each other, but it can also be a fiercely disputatious field. This may be bewildering for the novice researcher, but struggling through this bewilderment is part of developing as a researcher in one's own right: part of growing to speak with one's own voice and of calibrating one's own methodological compass while encountering a range of concrete research situations and of different ways of constructing educational problems. This book aims to assist this process not by providing technical recipes, but by making explicit, from the authors' own perspectives and experiences as researchers, some of the deliberative processes and conceptual complexities that constitute educational research.

This book is about empirical research in education. It covers research with both qualitative and quantitative data, and focuses on the essential features of each. It places both types of 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 5 and 6. 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. We hope also that the book will be useful to those who teach research methods, to practitioner-researchers and to early career education researchers.

At the end of each chapter we have offered a reading list consisting of a mixture of classical texts about research methodology, philosophy, social and educational theory, and more recent specialist textbooks. Reading the classics is as important as keeping up to date with new developments, and both can be equally gratifying or disturbing – but neither of the two is a full replacement for reading research monographs, reports and articles. We also encourage the reader to explore the examples provided throughout the text in full; in as much as possible, we have provided references not only to the original texts, but also to reflective pieces by their authors, in which they give an account of the research process and of the decisions and impulses that had moved it along. Many of these examples are pieces of research that made us think differently, or more deeply, or in a more focused way, about research – and we are hoping that they may do the same for the readers.

## **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 basis or

source of knowledge (Audi, 2011: 116). Experience refers here to what is received through the senses, to sense data or to what can be observed, as well as to the interaction between the person and the world. Thus 'empirical' means based on direct experience or observation of, or interaction with, 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 reasoning alone, or by arguing from first principles (although the latter forms of inquiry are also crucial to the well-rounded development of educational research). The key concept is 'observable information about (some aspect of) the world'. The term used by researchers for the 'observable information' or 'direct experience' that forms the basis of their claims about the world is data. The essential idea in empirical research is to use data in order to answer questions, and to develop and test ideas.

Empirical research is not the only type of research in education today. Examples of other types of research are theoretical research, conceptual-philosophical research and historical research. This book concentrates on empirical research, but many of the points it makes may 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, this means words, but it can also mean other things, such as images, artefacts, or music).

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. For many researchers, 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, for many researchers qualitative research is much more than just research that uses non-numerical data. It points to a heterogeneous set of approaches to research, drawing on different ways of thinking about social reality and involving a collection of methods for working with data that are in non-numerical or qualitative form. Quantitative researchers typically conceptualise the world in terms of variables (which can be measured) and study relationships between these variables. Qualitative researchers, by contrast, typically study cases and processes, rather than variables.

Some argue that the terms ‘quantitative research’ and ‘qualitative research’ point to distinctions not just between types of data, but between fundamentally different ways of conceptualising and exploring the social reality being studied, and to the designs and methods used to represent these ways of thinking. We will come back to this argument, and to responses to it, in Section 1.3.

In teaching about research, we find it useful to approach the quantitative–qualitative distinction primarily through the nature of the data. Later, the discussion can encompass and question the distinctions between ways of conceptualising the reality being studied and the methods. Also, in the practical business of planning and doing research for their dissertations, students very often focus on such questions as: Should the data be numerical, textual, or visual? Am I going to measure variables in this research, or not? Am I going to elicit detailed information about particular cases? Am I going to combine different types of data? Or, in other words, should my research be quantitative, qualitative or a combination?

For these reasons, we will keep the nature of the data at the heart of the distinction between quantitative and qualitative research, and that is why we start with the simplified definitions shown above. But we need also to remember that research is much more diverse than this distinction might imply, in its philosophical underpinnings (or ways of thinking about the social world and its values, and about the ways in which we may gain knowledge of it), in its methods and in its data.

### 1.3 Relaxing the qualitative–quantitative distinction . . . .

The qualitative–quantitative distinction has long been a basic organising principle for the research methods literature. However, the value of this sharp distinction has been questioned in the literature (see, for example, Hammersley, 1992: 41–3; Pring, 2004: 44–57), and important similarities, overlaps and complementarities have been noted between different approaches (Tashakkori and Teddlie, 2010). According to Pring (2004: 44–57), it can be very tempting to describe the distinction between quantitative and qualitative research in terms of a sharp opposition between mutually exclusive epistemological and ontological positions. However, he argues, such a move is ‘mistaken’ and leads to a ‘false’ methodological dualism.

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 strategic combination of qualitative and quantitative methods is now increasingly common, and is known as mixed methods research. This is the topic of Chapter 14.

Thus, rather than either–or thinking about the quantitative–qualitative distinction, or rehearsing 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 and the overall aims of the research. Box 1.1 illustrates the way in which

different questions require different kinds of data to answer them, and thus prompt the use of different methods in educational research.

### BOX 1.1

#### The relationship between research questions, methods and data

Some questions require methods suited to gathering and analysing *qualitative* data to answer them. For example, Sandberg and Ottosson (2010) studied pre-school cooperation around support for children in need of special support. They asked ‘How do parents, pre-school teachers, and other professionals experience the existing cooperation between the family and the pre-school?’ and ‘What experiences and thoughts do parents, pre-school teachers, and other professionals have regarding possibilities and obstacles to cooperation?’ (p. 743). These questions prompted a design centred on qualitative data that enabled interpretation of participants’ own descriptions of their concerns and activities, gathered via semi-structured interviews and analysed thematically.

*Read more:* Sandberg, A. and Ottosson, L. (2010) ‘Pre-school teachers’, other professionals’, and parental concerns on cooperation in pre-school – all around children in need of special support: the Swedish perspective’, *International Journal of Inclusive Education*, 14(8): 741–54.

Other questions require methods suited to gathering and analysing *quantitative* data to answer them. For example, Anders et al.’s (2011) study of the early identification of young children’s special educational needs (SEN) asked ‘which child, family and home factors predict primary teachers’ identification of children’s SEN status in relation to difficulties with reading and number work at age 10?’, and ‘whether children’s earlier pre-school experience is still related to later incidence of SEN’ (p. 426). To answer these questions, the researchers used quantitative data gathered via questionnaires and tests and carried out statistical analyses to test the relationships between pre-defined predictor variables and outcome measures.

*Read more:* Anders, Y., Sammons, P., Taggart, B., Sylva, K., Melhuish, E. and Siraj-Blatchford, I. (2011) ‘The influence of child, family, home factors and pre-school education on the identification of special educational needs at age 10’, *British Educational Research Journal*, 37(3): 421–41.

Finally, research that asks different types of questions may require *mixed methods* to answer them. For example, an exploratory question prompting the collection of qualitative data via open-ended questioning (such as how do staff in pre-schools define ‘children in need of special support’) could articulate with questions that prompt quantitative data collection and correlational analysis (such as: ‘are the characteristics of the children in a pre-school unit, such as type and degree of disability and gender, related to the staffs’ definitions of children in need of special support?’) (Sandberg et al., 2010: 46).

*Read more:* Sandberg, A., Lillvist, A., Eriksson, L., Björck and Åkesson, A. and Granlund, M. (2010) ‘“Special Support” in preschools in Sweden: preschool staff’s definition of the construct’, *International Journal of Disability, Development and Education*, 57(1): 43–57.

Depending on the questions being asked, it is also possible to transpose data to a different format in order to enable different types of analysis – for example, numeric data may be interpreted qualitatively, or textual data may be converted into numbers to be analysed quantitatively (as illustrated in Figure 1.1).

	Data	
	Non-numerical (qualitative)	Numerical (quantitative)
Used qualitatively	<i>Examples of approaches:</i> Grounded theory Discourse analysis Narrative construction	<i>Treated as qualitative:</i> Interpretation of quantitative processing
Used quantitatively	<i>Converted into numbers:</i> Content analysis Corpus-based analyses	Statistical processing of numeric data

Writing  
 Physical objects  
 Sounds  
 Images

Numbers

FIGURE 1.1 Types of data

A basic principle in research is that the research aims, questions, methods and the ensuing answers or claims need to be consistent with each other. Often the best way to do that is to focus first on what we are trying to find out (the aims and questions) before we focus on how we will do the research (the methods). The importance of identifying clear aims and shaping focused 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, the function of which is to make it easier to see the logic behind empirical research processes, whether qualitative, quantitative or mixed methods.

## 1 ● 4 ● 1 The pre-empirical stage of research .....

Drawing on Punch (2014), a distinction is made in the early part of this book between the pre-empirical and empirical stages of research. It is stressed in Chapters 5 and 6 that empirical research has an important pre-empirical stage, where careful analysis of the problem and its context and of the aims and questions for research clarifies the empirical 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 under-emphasised, 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 Figure 1.2 on page 12, 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.

### 1 ● 4 ● 2 Importance of research questions .....

The book uses a model of research which stresses the central role of research questions. Their development is the goal of the pre-empirical stage of the research as described in this book. Research questions provide the backbone of the empirical procedures and 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 the development of 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. For example, research questions worked out in advance may change as the empirical work proceeds – there is no requirement that they be ‘set in concrete’. Also, it may not be desirable or possible to plan certain types of studies in terms of fully prespecified research questions. Rather, the strategy in these 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 that is discussed in Chapter 2.

### 1 ● 4 ● 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 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 research methods books are only about methods, and there is little connection between methods, on the one hand, and defining and analysing research problems, on the other. We think research methods texts at the introductory level now need to be stronger in connecting methods to problem and question identification, definition and analysis. This book aims to make these connections clear. 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 recognised 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 and design and procedures. This point is further discussed in Chapter 2.

### 1 4 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 14. Another example is the simplified model of research shown in Section 1.7.

### 1 5 Essentials and logic .....

The full field of research methods, across the range of qualitative and quantitative approaches, is very big – far too big for one book. Therefore the selection of material is necessary. In making that selection, we 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 all approaches, the 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 that the researcher needs to understand? Compiling the book has thus involved identifying and distilling the core essentials of qualitative and quantitative methods and using them to take readers into the process of empirical research.

For quantitative research, the selection of material has seemed less problematic than for qualitative research. That reflects the higher level of agreement that is often found among researchers 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. This is because of

the diversity of approaches and the variety of perspectives 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, we decided to continue, in this edition of the book, to introduce it (in Chapters 8, 9 and 10) in a way that builds on its logical similarities with quantitative research. Thus the same main headings are used for both (design, data collection, data analysis) and two of the approaches to the analysis of qualitative data described in more detail (the Miles and Huberman approach, and grounded theory) are among those most similar in logic to quantitative research. By doing this we do not intend to imply that all qualitative research proceeds in this way, and Chapter 10 includes a number of 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 5 and 6) and using this view to guide the selection and presentation of material. This means that the chapters are interconnected and that there is considerable cross-referencing of material between chapters. It also means that technical and methodological issues 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, in the first edition, as ‘organised 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. We do not advocate a formula approach to doing research, since we do not believe that research can be reduced to a set of mechanical steps. On the contrary, we try to stress understanding rather than ‘how to do it’. 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 of this book.

## 1.6

### Science, the social sciences and education research .....

Drawing on Punch (2014), this book starts from a view of empirical education research as a 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 nature of science and scientific methods, and today, especially, there are different definitions and points of view. As a starting point in learning about research, however, this book adopts Punch's (2014) conception of the relationship between data and theory in scientific research, which he describes as a 'modified logical empiricist' view, with some additions from critical rationalism – see Higgs (1995).

*The relationship between data and theory in scientific research:* In this conception, the relationship between data and theory is at the heart of scientific inquiry. Science relies on testing theoretical ideas against empirical data. The answers arrived at through this process are provisional and open to revision in light of further testing. Data and theory (however defined) are thus essential to science – although the methods for generating and linking them may vary widely. Put simply, it is scientific to raise questions about aspects of the world, to collect or generate data that can help address systematically these questions, to build theories to explain and account for the data, and to test those theories against further data. Data could come before theory, or theory could come before data: what matters is that both are present. 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 involves numerical data, or measurements. It may well do so, but it is not necessary that it should do so. This point is relevant to later chapters of this book.

*Social science:* The general term 'social science' refers to the scientific study of people, their interactions, and their contexts. 'Social' refers to people and their behaviour, and to the fact that so much of human behaviour occurs in a social context. 'Science' refers to the way that people and their behaviour are studied. Simply put, if a generic aim of science is to build and test theory about empirical data, an aim of social science is to build theories about data on people, their behaviour and their contexts. These theories are to be based on, and are to be tested against, real-world data. Competing traditions in the social sciences have put forward different perspectives on what counts as 'data', what is meant by 'theory', and the nature of the relationship between them. These traditions are often described as 'paradigms', although the definition of this term varies; one way of thinking about it is to see paradigms as overlapping sets of theoretical assumptions, together with methodological principles, images of the subject matter, norms for practice, and bodies of exemplar work. We will return to this view of science in Chapter 2. There is also contestation around different definitions of 'science' – from method-centric definitions to discourse-centric definitions – and around their relevance to social (including educational) inquiry (e.g. Lincoln et al., 2011; Popkewitz, 2011).

*Education and the 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. Sciences such as psychology, sociology, anthropology, economics and political science 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 other areas may also be described 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. There are numerous debates and arguments about whether educational research is a discipline in its own right (Bridges, 2006; Biesta, 2011; Furlong, 2013), or a ‘field’ of interest for other, ‘foundation disciplines’ (such as psychology, sociology, economics, history, philosophy) (Tibble, 1966; Furlong and Lawn, 2011). There are also debates around the description of education research as ‘social scientific’, with many attempts to qualify this description, for example as ‘practical science’ (Elliott, 2012) or as ‘critical educational science’ (Carr and Kemmis, 1986). These debates emphasise disagreements about the nature and aims of social scientific inquiry, for example, about different forms of description, explanation, interpretation and critique as aims for research, and about the notions of rigour, quality or trustworthiness underpinning them (Yates, 2004; Oancea, 2005; Oancea and Furlong, 2007).

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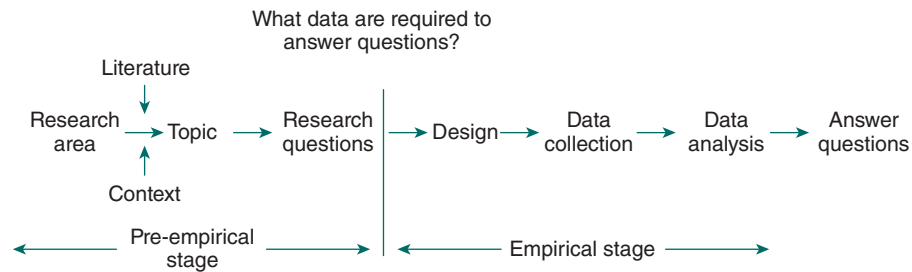
**A model of research .....**

Faced with the many definitions, descriptions and conceptions of research in the methodological literature, it is sufficient for our present purposes to see (empirical) research as an organised, systematic and logical process of inquiry, using empirical information to answer questions (or test hypotheses – see Chapter 5, Section 5.7). Seen this way, it has much in common with how we find things out in everyday life – thus, the description of scientific research as organised common sense is useful. Perhaps the main difference is the emphasis in research on being organised, systematic and logical. An influential definition of educational research by Stenhouse (1975) as ‘systematic inquiry made public’ (p. 142) makes the same emphasis, whilst also hinting at the role of inter-subjective, critical scrutiny of both processes and answers from research.

This view of research is shown in Figure 1.2. 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 (however provisionally).

A modification of this model, to include hypothesis-testing research, is shown as Figure 5.1 in Chapter 5.



**FIGURE 1.2** A simplified model of research

As well as capturing essential elements of the research process, 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 be phrased as questions, and questions can be phrased as problems.

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### Organisation 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 but are brought together in Chapter 2 for reference purposes. Some readers may want to skim this chapter on a first reading, and 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 Chapter 4 ('Ethics in Educational Research') discusses ethical issues in research from both a philosophical and a practical angle.

Chapters 5 and 6 deal with the pre-empirical stage of research, focusing on research questions. Chapter 5 deals with identifying and developing research questions, and with the role of hypotheses and the literature in doing this. Chapter 6 ('From Research Questions to Data') continues the consideration of research questions, but concentrates on linking the questions to data.

Chapter 7 then discusses literature searching and reviewing, an important task in dissertation preparation.

Chapters 8, 9 and 10 together give an overview of qualitative research methods. Chapter 8 ('Qualitative Research Design') 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 9 ('Collecting Qualitative Data') deals with the main methods of data collection in qualitative research. Chapter 10 ('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 specialised approaches. These three chapters would be suitable, as a unit, for the reader who wants an overview of qualitative methods.

Chapters 11, 12 and 13 together give a similar overview of quantitative research methods, using the same general headings. Thus Chapter 11 ('Quantitative Research Design') describes the main ideas behind the design of quantitative studies. Chapter 12 ('Collecting Quantitative Data') considers what is involved in collecting quantitative data, and the central role of measurement in that process. Chapter 13 ('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.

Chapter 14 ('Mixed Methods Research') deals with mixed methods approaches, which are now increasingly popular in empirical studies in education.

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 summarises the main content. Exercises and study questions are then provided. At the end of the book, there is a glossary of key terms.

### Chapter summary

This book focuses on methods for doing empirical research in education, seen as a social science. Research is centrally important in the modern world. It can be defined as an organised, systematic and logical process of inquiry, using empirical data to answer questions. Data can be quantitative (in the form of numbers) or qualitative (i.e. not in the form of numbers but words, images and sounds etc. instead). The relationship between data and theory is at the heart of scientific inquiry. Competing traditions in the social sciences have put forward different perspectives on what counts as 'data', what is meant by 'theory', and the nature of the relationship between them. Research questions are highlighted in the model of research used in this book; they come logically before research methods, and need to be carefully developed.

### Key terms

**Empirical:** based on direct experience or observation of the world

**Data:** observable information about the world; direct experience of the world

**Quantitative data:** data which are in the form of numbers

**Qualitative data:** data which are not in the form of numbers

**Paradigms:** overlapping sets of theoretical assumptions, together with methodological principles, images of the subject matter, norms for practice and bodies of exemplar work

**Research questions:** the questions developed to guide research; empirical research questions are needed for empirical research

**Scientific inquiry:** building theories to explain data, and testing these theories against further data

**Research:** 'systematic inquiry made public' (Stenhouse, 1975: 142)

**Education as a social science:** using social science research approaches to study educational processes, relations and settings

### 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
- social science.

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?