Choosing a research project

CHAPTER 9

This chapter provides key decision points of reference on which researchers can reflect and plan, including:

- how to choose a research project
- the importance of the research
- the purposes of the research
- ensuring that the research can be conducted
- research questions
- the scope of the literature review
- a summary of key issues in choosing a research topic or project

This chapter concerns the selection of the research and initial, practical matters that researchers can address when choosing and deciding the project on which to work. It is the first of six consecutive chapters that concern the planning of research. This chapter concerns the selection of the research and the initial matters to address, whilst the subsequent chapters unpack several of these in greater detail. We draw not only from relevant literature but from our own experiences of supervising several hundred research students. Research is a practical activity, and the advice that we give here is practical. This is not a simplistic recipe or low-level 'tips for researchers'; rather it is the distillation of key features of practicable research and issues on which to deliberate, and to help to ensure that the research provides relevant and useful findings.

9.1 Introduction

Choosing a research project is normally the decisive feature of successful research. Many novice students and researchers start with an over-ambitious project. The task of a mentor or supervisor is to help the novice researcher to narrow and hone down the research field in order to render the research practicable, useful and workable. Indeed part of the discipline of choosing and conducting a piece of research is fining it down to manageable/researchable proportions, to enable rigour (e.g. fitness for purposes and methodological soundness) to be inserted into the research. Rigour in planning and doing research lies in choosing a project that is sufficiently tightly framed. A research topic is only one small aspect of the field of the subject, and careful boundaries must be drawn around the topic: what it will and will not do.

For novice researchers, a piece of educational research often starts by wanting to be their life story or the opportunity to give their personal opinions some grounding in literature and empirical study that support their opinions or prejudices. This is not the task of research. The task of research is to find out, to investigate, to develop, to test out (e.g. a theory), to address questions such as: 'what if', 'how', 'why', 'how well', 'what' and 'where'.

9.2 What gives rise to the research project?

Several points can give rise to a research topic. For example, for many teachers it may be a problem that they encounter in their day-to-day work: they may want to find out the causes of the problem and how to solve it; they may want to plan an intervention to see how well it addresses or solves the problem. Examples of these might be: 'How can teachers improve students' learning of algebra in lower secondary schools?'; 'How to maximize the learning of students with Asperger's syndrome in mainstream schooling'; 'How to conduct a music lesson with many musical instruments, without the lesson descending into chaos and noise'; 'How to teach speaking a foreign language in large, mixed-ability classes'.

Some research projects may begin with an area of interest or personal experience that researchers may have been wanting to investigate, for example: 'What is the long-term effect on employment of early school dropout?'; 'How effective is early identification of behaviour disorders on educational provision for such students?'; 'How can teachers improve students' motivation to learn a second language?'; 'Why do young teachers leave teaching and older teachers stay?'

Some research topics may begin with a recognized area of importance or topical concern in the field, for example: 'How to maximize primary students' learning

using ICT'; 'What is the effect of frequent testing on students' stress?'; 'How can developments in brain research and cognitive neuroscience impact on pedagogy?'; 'What is the predictive validity of personality tests or learning styles inventories on the success of first-time employees' applications for employment?'; 'Do interactive teaching methods produce higher test scores in university students than lecture-based teaching?' Such importance may arise from coverage of the topic in the press, articles, conference papers and journals.

Some research is conducted as part of a sponsored research project, in which the field and purposes of the research must be spelled out very clearly in order for the sponsorship to be obtained. For example in the UK the Economic and Social Research Council (www.esrc.ac.uk/research/research-topics), the Leverhulme Trust (www.leverhulme.ac.uk), Nuffield Foundation (www.nuffieldfoundation.org) and the Joseph Rowntree Foundation (www.jrf.org.uk) require detailed applications to be completed, and in the United States the Social Science Research Council (www.ssrc.org) requires similarly high levels of detail. Such funding might also need to fit the categories of research set out by the funding agencies.

A decision on what to research can arise from several wellsprings of the researcher's own motivation:

- a problem encountered in the researcher's everyday work or outside her/his everyday work (e.g. conceptual, theoretical, substantive, practical, methodological);
- an issue that the researcher has read about in a journal, book or other media;
- a problem that has arisen in the locality, perhaps in response to government policy or practices or to local developments;
- an area of the researcher's own interest;
- an area of the researcher's own experience;
- a perceived area of importance;
- an interesting question;
- a testable guess or hunch;
- a topical matter;
- disquiet with a particular research finding that one has met in the literature or a piece of policy (e.g. from the school, from a government), and a wish to explore it further;
- an awareness that a particular issue or area has been covered only partially or selectively in the literature, and a wish to plug the gap;
- a wish to apply a piece of conceptual research to actual practice, or to test a theory in practice;
- a wish to rework the conceptual or theoretical frameworks that are often used in a specific area;
- a wish to revise or replace the methodologies that are often used in researching a specific area;
- a desire to improve practice in a particular area;
- a desire to involve participants in research and development;
- a desire to test out a particular methodology in research;
- an interest in seeing if reported practice (e.g. in the literature) holds true for the researcher's own context (e.g. a comparative study);
- an interest in investigating the causes of a phenomenon or the effects of a particular intervention in the area of the phenomenon;
- a wish to address an issue or topic that has been under-researched in the literature;
- a priority identified by funding agencies;
- an issue identified by the researcher's supervisor or a project team of which the researcher is a member;
- a wish to explore further or to apply an issue or topic that one has encountered, for example, in the literature.

The long list above concerns the motivation that leads a researcher to consider doing a particular piece of research. Add to this a salutary point for researchers, which is that the study on which they might embark will probably take weeks, months and maybe years. Sustaining interest and momentum in the researcher(s) are important considerations. Researchers should ask themselves whether they really have the interest in studying the issue in question or in conducting the research for a long period of time. If the answer is 'no' then, if they have the luxury of not having to do this particular piece of research, they may wish to consider an alternative area that will enable them to sustain interest in, and motivation for, the research. A piece of research that is conducted by an unwilling or bored researcher could easily become unimpressive.

Beyond the *motivation* for the research are the *sources* of the research in question: where does research come from? For example, the research may derive from:

- a practical concern (e.g. 'why do females have higher scores than males in international tests of reading at age 14?') or a practical need (Leong *et al*., 2012);
- a literature review (though Andrews (2003) observes that if the research question derives from the literature review then there is a risk that there is no research question to initially drive the literature review (p. 18), i.e. the literature review could lack direction, purpose and boundaries). A literature

search (including specialist literature in the field, primary and secondary sources) helps the researcher to understand the existing field and the real-world implications of the research (Alvesson and Sandberg, 2013);
- the identification of a gap in the literature or field of study (gap filling) (Alvesson and Sandberg, 2011, 2013);
- the identification of where the research can build on existing literature (Alvesson and Sandberg, 2011);
- a theoretical concern, enabling theories to be generated and tested (e.g. 'how significant is performance-related pay in motivating senior managers of schools?', in which the 'theory' to be tested is that performance-related pay is a necessary but not sufficient motivator of senior staff (Pink, 2011));
- policy concerns (e.g. 'how effective is such-and-such in attracting females to take STEM subjects?');
- concerns in the media and blogs (including the Internet);
- society, empirical data (Alvesson and Sandberg, 2013, p. 16);
- personal experience, interest or observation (Leong *et al*., 2012);
- colleagues and contacts (ibid.);
- experts and practitioners in the field (ibid.);
- conferences and conventions (ibid.);
- faculty seminars, research groups, discussion groups and workshops (ibid.);
- students (ibid.);
- societies, associations, research bodies and special interest groups;
- spotting where areas are neglected, for example, overlooked/under-researched;
- existing studies and influential theories (Alvesson and Sandberg, 2013, p. 17);
- challenge to, or problematization of, an assumption, agenda or existing theory (Alvesson and Sandberg, 2013);
- a novel idea which challenges existing ideas or practices;
- funding bodies and/or project directors;
- spotting where applications may lie;
- spotting where confusions need to be clarified;
- spotting where new methodologies and research methods might be applied;
- other starting points – the list is endless.

It is essential that the research and the questions it asks should address something that is worth asking: asking the right question (Leong *et al*., 2012, p. 121). In turn this means that the research itself must be worth doing – it must make a significant contribution to the field. Behind the many features of effective research questions lies the need to ensure that the research itself, i.e. in principle, is interesting. In this respect there is an overlap in the literature between research areas and research questions, i.e. what some authors would place under the category of 'research questions' could just as easily be placed in the category of 'research areas' or 'fields of research', or 'research topics'. This harks back to the seminal work of Davis (1971) (see also Chapter 4), who provides a formidable list of twelve factors that make social science, and hence research and research questions, 'interesting'.

More recently, Alvesson and Sandberg (2011, 2013) argue that much research is 'gap filling', and that, whilst worthy, this risks being over-confined to the status quo, conservative, under-problematizing or over-problematizing matters, derivative and non-interesting because, since it builds on or around existing literature, it does not challenge assumptions in the literature, does not sufficiently problematize assumptions and agendas, and does not generate really new ideas or innovatory, creative thinking. It reinforces rather than challenges consensus (Alvesson and Sandberg, 2011, p. 250). Gap spotting, they observe, might be easy, uncontroversial and resonant with the idea of cumulative research, but it does not question received wisdoms and research perspectives.

Rather, Alvesson and Sandberg (2011, 2013) argue for the problematization of issues and the development of new ideas – *challenging* assumptions, agendas and theories – in order to create 'interesting' and 'influential' research and research questions (2013, p. 45). Problematization and questioning assumptions, they suggest, is a powerful methodology for generating interesting research questions and questioning of received truths, i.e. disruptive of existing theory, practices, paradigms and ideologies, and it is faithful to the uncertain nature of scientific 'truths' (p. 50). The aim of problematization, they argue, is to 'disrupt rather than build upon and extend an established body of literature' (2011, p. 248).

Of course, gap filling, building on existing research and problematization for the creation of new ideas are not mutually exclusive. All can generate 'interesting' research; as the authors remark (Alvesson and Sandberg, 2011, p. 266), there are good reasons for gap spotting as this can enable research to supplement and enrich existing studies, and clarify issues, for example, where there are disagreements among researchers. Innovative, high-impact research questions, they suggest (Alvesson and Sandberg, 2011, 2013), stem from the questioning of assumptions that underlie existing theories in significant ways. They set out a methodology

for problematization to produce 'interesting' research and research questions which constitutes one of Davis's (1971) features of 'interesting' research: what appear to be matters or phenomena that can coexist actually cannot, and vice versa (p. 4). Alvesson's and Sandberg's (2011, p. 256) methodology for generating 'interesting' research through 'dialectical interrogation' of assumptions requires researchers to:

Step 1: Identify a domain of literature;
Step 2: Identify and articulate the assumptions that underlie that domain;
Step 3: Evaluate the assumptions that underlie that domain;
Step 4: Develop an alternative assumption ground;
Step 5: Consider this alternative assumption ground in relation to its audience;
Step 6: Evaluate the alternative assumption ground.

Essentially the task is to expose and evaluate existing 'in-house' assumptions (e.g. in the literature, in 'theories'), i.e. those assumptions which are regarded as unproblematic and which are accepted by their advocates (p. 254), thence to challenge those assumptions (e.g. problems with them, their shortcomings and oversights) (p. 267), and develop and evaluate an 'alternative assumption ground' that will generate 'interesting' theory, taking the latter into account in relation to the audience, i.e. the wider intellectual, social and political situation of the research community and their possible reactions to the challenges posed (p. 258), and check to see if the alternative assumption ground is obvious, interesting or, indeed, absurd (p. 259).

Alvesson and Sandberg argue, for example, that rather than trying to develop research and research questions solely from a literature review, it might be more 'interesting' (and they use Davis's (1971) word here) to ask how a particular field becomes the target of investigation, to evaluate and challenge the *assumptions* (unchallenged, accepted and shared schools of thought), *ideologies* (e.g. values, politics, interests, identifications, moral and ethical views), *paradigms* (ontological, epistemological and methodological assumptions, world views), *root metaphors* (images of a particular area) and *field assumptions* (broader sets of assumptions about specific subject matter which are shared by schools of thought within, across a paradigm or discipline) (2011, p. 255) that underlie a theory. From there, the researcher seeks to develop and evaluate the 'alternative assumption ground' which, thereby, is 'more disruptive' and 'less reproductive' (Alvesson and Sandberg, 2013, p. 122). Challenging in-house assumptions is regarded as a minor level of problematization (Alvesson and Sandberg, 2011, p. 255); questioning root metaphors constitutes a middle-ground challenge; and challenging ideology, paradigms and field assumptions constitutes a more fundamental form of problematization (p. 255).

Leong *et al*. (2012, pp. 128–9) suggest that research and its research questions can be framed which: (i) discover a new effect; (ii) extend an established effect (e.g. to new domains); (iii) demonstrate mediation of factors (interaction), i.e. the mechanisms that lead to an effect; and (iv) moderation of an established effect (modelling for which groups of people/situations the effects hold true or not true). Whilst discovering a new effect may be for seasoned researchers, they note that extending an established effect may be suitable for novice researchers. They comment that moving beyond 'gap filling' to novel research is uncomfortable because it takes us out of our familiar, sedimented, deeply ingrained ways of thinking. They suggest that making the opposite assumptions, exposing hidden assumptions, casting doubt on existing assumptions and scrutinizing meanings of key concepts is unsettling (pp. 126–7).

Alvesson and Sandberg (2011, 2013) are arguing that effective, high-impact research and research questions derive from high-impact research proposals that move beyond 'gap filling' to disrupting conventions, modes of thinking and examining a phenomenon. This echoes Leong *et al*. (2012) who argue that creative, innovative, worthwhile research may be unclear at the outset and that if it is too clear too early on then it may not be focusing on anything new or important (p. 122); as the authors say, if it is too predictable, why do it? Indeed they write that an innovative research question is one that generates ambiguity rather than certainty, and they suggest that effective research questions are those which: are unclear on their outcomes; can generate answers; and discriminate between theories, each of which leads to different predictions (p. 122).

9.3 The importance of the research

Whatever research area or topic is identified, it is important for it to be original, significant, non-trivial, relevant, topical, interesting to a wider audience and to advance the field. For example, I may want to investigate the use of such-and-such a textbook in Business Studies with sixteen-year-olds in Madagascar, but, really, is this actually a useful research topic or one that will actually help or benefit other teachers or educationists, even though it yields original data?

Or I might conduct research that finds that older primary children in a deprived area of Aberdeen,

Scotland prefer to have their lunch between 12 noon and 1.00 p.m. rather than between 1.00 p.m. and 2.00 p.m., but, really, does anybody actually care? The topic is original and, indeed, the data are original, but both are insignificant and maybe not worth knowing.

In both of these examples, the research brings about original data, but that is all. Research needs to go beyond this, to choose a significant topic that will actually make an important contribution to our understanding and to practice. Originality alone is not enough. Rather, the research should move the field forward, perhaps in only a small-scale, piecemeal, incremental way, but nevertheless to advance it such that, without the research, the field would be poorer. Hence it is important to consider how the research takes the field forwards not only in terms of data, but also conceptually, theoretically, substantively and/or methodologically. At issue here is not only the contribution to knowledge that the research makes, but the *impact* of that knowledge; indeed funding agencies typically require an indication of the impact that the research will make on the research community and more widely, and how that impact will be assessed and known. What will be the impact, uptake and effects of the research, and on whom?

It is also useful for the researcher to identify what benefit the research will bring, and to whom, as this helps to focus the research and its audience. Fundamental questions are 'what is the use of this research?' 'What is the point of doing this research?' 'Who benefits?' 'Is this research worth doing?' If the answer to the last question is 'no', then the researcher should abandon it, otherwise it ceases to be useful research and becomes an indulgence of the dilettante.

Many novice researchers may not know whether the research is original, significant, important, complex, difficult, topical and so on. Here it is important for such a novice to read around the topic, to conduct a literature search, to conduct an online search, to attend conferences on the topic, to read newspaper reports on the topic; in short, to review the state of the field before coming to a firm decision on whether to pursue research in that field. In this respect, if the researcher is a student, it is vital to discuss the proposed topic with a possible supervisor, to receive expert feedback on the possible topic.

Before a researcher takes a final decision on whether to pursue a particular piece of research, it is useful to consider selecting a topic that interests the researcher, reading through background materials and information and compiling a list of keywords, clarifying the main concepts and writing the topic as a statement (or a hypothesis). Whilst incomplete, nevertheless this provides a useful starting point for novice researchers contemplating what to research.

9.4 The purposes of the research

Implicit in the previous section is the question 'why do the research?' This is ambiguous, as 'why' can refer to reasons/causes and purposes, though the two may overlap. Whereas the previous section concerned reasons, this section concerns purposes: what we want the research to achieve. It is vital that the researcher knows what she or he wants the research to 'deliver', i.e. to answer the question 'what are the "deliverables" in the research?' In other words, what do we want to know as a result of the research that we did not know before the research commenced? What do we want the research to do? What do we want the research to find out (which is not the same as what we want the results to be: we cannot predict the outcome, as this would be to 'fix' the research; rather, the kind of information or answers we want the research to provide)?

In this respect it is important for the researcher to be very clear on the purposes of the research, for example:

- to demonstrate that such-and-such works under a specified set of conditions or in a particular context (experiment; action research);
- to increase understanding and knowledge of learning theories (literature-based research);
- to identify common features of successful schools (research synthesis; descriptive research);
- to examine the effects of early musical tuition on general intelligence (meta-analysis; multilevel research);
- to develop and evaluate community education in rural and dispersed communities (participatory research; evaluative research; action research);
- to collect opinions on a particular educational proposal (survey);
- to examine teacher–student interactions in a language programme (ethnography; observational research);
- to investigate the organizational culture of the science faculty in a university (ethnography; survey);
- to identify the relative strengths of a range of specified factors on secondary school student motivations for learning (survey; observational study; multiple regression analysis; structural equation modelling);
- to see which of two approaches to teaching music results in the most effective learning (comparative study; experiment; causal research);
- to see what happens if a particular intervention in setting homework is introduced (experiment; action research; causal research);

- to investigate trends in social networking in foreign language teacher communities (network analysis);
- to identify key ways in which teachers in a large secondary school view the leadership of the senior staff of the school (personal constructs; accounts; survey);
- to interrogate government policy on promotion criteria in schools (ideology critique; feminist critique);
- to see the effects of assigning each student to a mentor in a university (survey; case study; causal research);
- to examine the long-term effects of early student dropout from school (survey; causal or correlational research);
- to see if repeating a year at school improves student performance (survey; generalization; causal or correlational research);
- to chart the effects of counselling disruptive students in a secondary class (case study; causal or correlational research);
- to see which catches richer survey data on student drug usage: questionnaires or face-to-face interviews (testing instrumentation; methodology-related research);
- to examine the cues that teachers give to students in question-and-answer classroom episodes (discourse analysis);
- to investigate vandalism in schools (covert research; informer-based research);
- to investigate whether case studies or surveys are more effective in investigating truancy in primary school (comparative methodology);
- to run a role-play exercise on communication between a school principal and senior teachers (role-play);
- to examine the effects of resource allocations to under-performing schools (ideology critique; case study; survey; causal research);
- to understand the dynamics of power in primary classrooms (ethnography; interpretive research);
- to investigate the demise of the private school system in such-and-such a town at the end of the nineteenth century (historical research);
- to understand the nature of trauma and its treatment on primary-aged children living in violent households (case study; action research; grounded theory; ex post facto research);
- to generate a theory of effective use of textbooks in secondary school physics teaching (grounded theory);
- to clarify the concept of 'the stereotype activation effect' for investigating the effect of sex stereotyping on reading in young teenagers (survey; case study; experiment; causal research);
- to test the hypothesis/theory that increasing rewards loses effect on students over time (experiment; survey; longitudinal research; causal or correlational research).

As can be seen in these examples, different purposes suggest different approaches, so 'fitness for purpose' takes on importance in planning research (see Chapter 10). One can also see that there is a range of purposes and types of research in education. The researcher cannot simply say that he or she likes questionnaires, or is afraid of numbers, or prefers to conduct interviews, or feels that it is wrong to undertake covert research so no covert research will be done. That is to have the tail wagging the dog. Rather, the research purposes determine what follow in respect of the kind of research, the research questions, the research design, the instruments for data collection, the sampling, whether the research is overt or covert (the ethics of research), the scope of the research, and so on.

9.5 Ensuring that the research can be conducted

Many novice researchers, with the innocence and optimism of ignorance, may believe that whatever they want to do can actually be done. This is very far from the case. There is often a significant gulf between what researchers want to do and what actually turns out to be what they can do.

A formidable issue to be faced here is one of *access*. Many new researchers fondly imagine that they will be granted access to schools, teachers, students, parents, difficult children, students receiving therapy, truants, dropouts, high performers, star teachers and so on. This is usually NOT the case: gaining access to people and institutions is one of the most difficult tasks for any researcher, particularly if the research is in any way sensitive (see Chapter 13). Access problems can kill the research, or can distort or change the original plans for the research.

It is difficult to overstate the importance of researchers doing their homework before planning the research in any detail, to see if it is actually feasible to gain access to the research sites or people they seek. If the answer is 'no' then the research plan either stops or has to be modified. It is not uncommon for the researcher to approach organizations (schools, colleges, universities, government departments) with some initial, outline plans of the research, to see if there is a possibility, likelihood or little or no chance of doing the research.

Nor is it enough to be clear on access; supplementary to this is 'access to what?'. It is of little use to be given access to a school by the school principal if the teachers have not been consulted about this, or if they are entirely uncooperative (see the discussion of informed consent in Chapter 7). One of the authors recalls an example of a Master's student who wanted to study truancy; the student had the permission of the school principal and turned up on the day to commence the research with the school truants, only to find that they had truanted, and were not present! The same is true for sensitive research. For example, let us suppose that one wished to research child abuse in primary school students. The last people to consent, or even to be identified and found, might be the child abusers or the abused children; even if they *were* identified and found, why should they agree to being interviewed by a stranger who is conducting research? Or, let us suppose that one wished to investigate the effects on teachers of working with HIV-positive children in hospital; those teachers might be so traumatized or emotionally exhausted at the end of a day's work that the last thing they want to do is to talk about it further with an outside researcher whom they have never met before; they simply want to go home and 'switch off'. These are real issues. The researcher has to check out the situation before embarking on a fully worked-out plan, because the plan might come to nothing if access is not possible.

It is not only the people with whom the researcher is working who have to be considered; it is the researcher herself/himself. For example, does the researcher have the right personality, dispositions, sympathies, interpersonal skills, empathy, emotional intelligence, perseverance and so on to conduct the research? For instance, it would likely be a disaster if a researcher were conducting a piece of research on student depression and tacitly believed that students were just lazy or work-shy and that they used 'feeling down' (as the researcher might put it) as an excuse, i.e. the researcher refused to recognize the seriousness of depression as a clinical condition or as a pathological disorder. Equally, it would be an unwise researcher who would choose to conduct a longitudinal study if she had limited perseverance or if she knew that she was going to move overseas in the near future.

Researchers themselves will also need to decide whether they have sufficient expertise in the field in which they want to do the research. It could be dangerous to the researcher and to the participants if the researcher were comparatively ignorant of the field of the proposed research, as this could mean that direction, relevance, prioritization or even safety might be jeopardized. This is a prime reason for the need for researchers to conduct a literature review, to demonstrate that they are sufficiently well-versed in the field to know what to do, what to look for, and where, when and how to proceed.

Researchers will also have a personal commitment to the research; it may help to further their specialist interest or expertise; it may help to establish their reputation; it may make for career advancement or professional development. These considerations, though secondary, perhaps in choosing a piece of research, nevertheless are important features, given the commitment of time and effort that the research will require.

In addition to access, there are issues of time to be considered. Part of the initial discipline of doing research is to choose a project that is manageable – can actually be done – within the time frames that the researcher has at her/his disposal. It would be ridiculous for a researcher to propose a longitudinal study if that researcher only has maybe six or nine months to plan, conduct and report the entire research project. The time frames may prevent certain types of research from being conducted.

Similarly, the time availability of the researcher has to be considered: many researchers are part-time students who may not have much time to conduct research, and often their research is a lonely, one-person affair rather than a group affair with a team of full-time researchers. This places a practical boundary around what can and cannot be done in the research. Again, these are real issues. The availability of the researcher features in ensuring that the research can be conducted, and this applies equally to the participants: are they willing and able to give up their time in participating in the research, for example, in being interviewed, in keeping diaries, attending follow-up debriefings, participating in focus groups and writing reports of their activities?

Whilst access and time are important factors, so are resources (e.g. human, material). For example, if one is conducting a postal survey there are costs for printing, distribution, mail-back returns and follow-up reminders. If one is conducting a questionnaire survey on a large, dispersed university campus then one will need the cooperation of academic and administrative staff to arrange for the distribution, collection and return of the questionnaires. If one is conducting an online survey of teachers' views of, for example, government assessment policy, can it be assured that all teachers will have access to the online facilities at times that are convenient for them, and that poor connectivity, slow speed and instability of the system will not end in them abandoning the survey before it is completed?

If one is conducting an analysis of trends in public education in early-twentieth-century Scotland, then one needs to have time to search and retrieve public records (and this may involve payment), maybe visit geographically dispersed archives, and sit in front of microfiche readers or computers in public record offices and libraries.

A further consideration in weighing up the practicalities of the research is whether, in fact, the research will make any difference. This is particularly true in participatory research. Researchers may wish to think twice before tackling issues about which they can do nothing or over which they may exert little or no influence, such as changing an education or schooling system, changing the timetabling or the catchment of a school, changing the uses made of textbooks by senior staff, changing a national or school-level assessment system. This is not to say that such research cannot or should not be done; rather it is to ask whether the researcher's own investigation can do this, and, if not, then what the purposes of the research really are or can be.

Many researchers who are contemplating empirical enquiries will be studying for a degree. It is important that they will be able to receive expert, informed supervision for their research topic. Indeed, in many universities a research proposal will be turned down if the university feels that it is unable to supervise the research sufficiently. This will require the student researcher to check out whether his/her topic can be supervised properly by a member of the staff with suitable expertise, and, indeed, many students find this out before even registering with a particular university. It is a sound principle.

A final feature of practicality is the scope of the research. This returns to the opening remarks of this chapter, concerning the need to narrow down the field of the study. We advise that a single piece of research be narrow and limited in scope in order to achieve manageability as well as rigour. As the saying goes, 'the best way to eat an elephant is one bite at a time'! Researchers must put clear, perceptible, realistic, fair and manageable boundaries round their research. If this cannot be done straightforwardly then maybe the researcher should reconsider whether to proceed with the planned enterprise, as uncontrolled research may wander everywhere and actually arrive nowhere. Part of the discipline of research is to set its boundaries clearly and unequivocally. In choosing a piece of research, the manageability of setting boundaries is important; if these cannot be set, then the question is raised of the utility of the proposed endeavour.

For example, if one were to investigate students' motivations for learning, say, biology, this would involve not only identifying a vast range of independent variables, but also handling likely data overload, and ensuring that all the theories of motivation were included in the research. This quickly goes out of control and becomes an impossible task. Rather, one or two theories of motivation might be addressed, within a restricted, given range of specified independent variables (unless, of course, the research was genuinely exploratory), and with students of a particular age range or kind of experience of biology.

Small samples, narrowly focused research, can yield remarkable results. For example, Axline's *Dibs in Search of Self* (1964) study of the restorative and therapeutic effects of play therapy focused on one child, and Piaget's (1932) seminal theory of moral development, in *The Moral Judgement of the Child*, focused on a handful of children. In both cases, the detailed carefully bounded research yielded great benefits for educationists.

Practical issues, such as those mentioned here, often attenuate what can be done in research. They are real issues. The researcher is advised to consider carefully the practicability of the research before embarking on a lost cause in trying to conduct a study that is doomed from the very start because insufficient attention has been paid to practical constraints and issues.

9.6 Considering research questions

The move from the aims and purposes of a piece of educational research to the framing of research questions – the process of operationalization of the research – is typically not straightforward, but an iterative process. The construction of careful research questions is crucial and we devote an entire chapter to this (Chapter 10). We refer the reader to that chapter and indicate in it that research questions typically drive and steer much research.

It is the answers to the research questions that can provide some of the 'deliverables' referred to earlier in the present chapter. A useful way of deciding whether to pursue a particular study is the clarity and ease in which research questions can be conceived and answered. As mentioned in more detail in Chapter 10, research questions turn a general purpose or aim into specific questions to which specific, data-driven, concrete answers can be given. Questions such as 'what is happening?', 'what has happened?', 'what might/will/should happen?' open up the field of research questions. Chapter 6 also mentioned causal questions; here 'what are the effects of such-and-such a cause?' and 'what are the causes of such-and-such an effect?' are two such questions, to which can be added the frequently

used questions 'how?' and 'why?'. These questions ask for explanations as well as reasons.

As we mention in Chapter 10, the research may have one research question or several. Andrews (2003, p. 26) suggests that the research should have only one main research question and several supporting questions: 'subsidiary' questions which derive from and are necessary, contributory questions to the main research question (see Chapter 10 of the present volume). He notes that it is essential for the researcher to identify what is the main question and how the subsidiary questions relate to it. For example, he suggests that a straightforward method is to put each research question onto a separate strip of paper and then move the strips around until the researcher is happy with the relationship between them as indicated in the sequence of the strips (p. 39). This implies that the criteria for identifying the relationship have to be clear in the researcher's mind (e.g. logical/chronological/psychological, general to specific, which questions are subsumed by or subsidiary/subordinate/superordinate to others, which questions are definitional, descriptive, explanatory, causal, methodological etc., which question emerges as the main question). This process, he notes (p. 41), also enables the researcher to identify irrelevant questions and to refine down, to delimit the research; many novice researchers may have many research questions, each of which merits its own substantial research in itself, i.e. the research questions are unrealistically ambitious.

Chapters 1 and 2 drew attention to numerical, non-numerical and mixed methods research questions. Some research questions might need to be answered by gathering only numerical data, others by only qualitative data. However, we recommended in Chapter 2 that, for mixed methods research, attention should be paid to the research questions such that they can *only* be answered by mixed – combined – types of data, or by adopting mixed methodologies, or by having a set of purposes that can only be addressed by mixed methods, or by taking mixed samples, or by having more than one researcher on the project (mixed researchers), in short, by building a mixed methods format into the very heart of the research. So, a research question in this vein might combine 'how' and 'what' into the same research question, or 'why' and 'who' might be combined in the same question, or description and explanation might be combined, or prediction, explanation and causation might be combined, and so on. We provide examples of these in Chapter 2.

It has been suggested (e.g. Bryman, 2007b) that, in mixed methods research, the research question has considerable prominence in guiding the research design and sampling, yet it is often more difficult to frame research questions in mixed methods research than in single paradigm research (e.g. quantitative or qualitative) (Onwuegbuzie and Leech, 2006a, p. 477). This is because it requires quantitative and qualitative matters to be addressed within the same research questions. Onwuegbuzie and Leech provide examples of mixed methods research questions, such as 'What is the relationship between graduate students' levels of reading comprehension and their perceptions of barriers that prevent them from reading empirical research articles?' (pp. 483–4). Here both numerical and qualitative data are required in order to provide a complete answer to the research question (e.g. numerical data on levels of reading comprehension, and qualitative data on barriers to reading articles) (p. 484). They provide another example of mixed methods research questions thus: 'What is the difference in perceived classroom atmosphere between male and female graduate students enrolled in a statistics course?' (p. 494). This could involve combining measures with interviews.

Here is not the place to discuss the framing of research questions (Chapter 10 addresses this). Here we draw attention to research questions per se, in particular their clarity, ease of answering, comprehensiveness, comprehensibility, specificity, concreteness, complexity, difficulty, contents, focus, purposes, kinds of data required to answer them and utility of the answers provided, to enable researchers to decide whether the particular piece of research is worth pursuing. This will require researchers to pause, generate and reflect on the kinds of research question(s) required before they decide whether to pursue a particular investigation. This argues that researchers may wish to consider whether they really wish to embark on an inquiry whose research questions are too difficult or complex to answer within the scope or time frames of the study. Many of the most useful pieces of research stem from complex issues, complex research questions and 'difficult-to-answer' research questions. They move from Alvesson's and Sandberg's (2013) 'gap filling' to problematization, new ideas and areas, innovatory thinking and the elements that make for Davis's (1971) 'interesting' research, mentioned in Chapter 4.

9.7 The literature search and review

A distinction has to be drawn between a literature search and a literature review. The former identifies the relevant literature; the latter does what it says: reviews the literature selected. If the researcher knows in advance what are the research purposes, issues and research questions then this can make the literature

search efficient, directed and selective; they determine what to look for. But this is not always the case. It is frequently the case that the researcher does not have an exact or clear picture of the field or what is relevant, and is relying on the literature review to provide such clarity and exactitude. In this situation, the literature search risks being somewhat aimless, too wide or too unfocused. In Chapter 11 we provide detailed guidance on how and where to conduct a literature search. Among other kinds of written or online materials, a sound literature search (and indeed review) will include up-to-date information from materials such as: books, articles, reports, research papers, newspaper articles, conference papers, theses, dissertations, reviews and research syntheses, government documents, databases and Internet sources, primary and secondary sources and so on.

A literature review is an essential part of many kinds of research, particularly if the research is part of a thesis or dissertation. It serves many purposes, for example:

- it ensures that the researcher's proposed research will not simply recycle existing material (reinventing the wheel), unless, of course, it is a replication study;
- it gives credibility and legitimacy to the research, showing that the researcher has 'done his/her homework' and knows the up-to-date, key issues and the theoretical, conceptual, methodological and substantive problems in the field in which the research is being proposed;
- it clarifies the key concepts, issues, terms and the meanings of these for the research;
- it acts as a springboard into the study, raising issues, showing where there are gaps in the research field, and providing a partial justification or need for the research. It makes clear where new ground has to be broken in the field and indicates where, how and why the proposed research will break that new ground;
- it indicates the researcher's own critical judgement on prior research or theoretical matters in the field and, indeed, provides new theoretical, conceptual, methodological and substantive insights and issues for research;
- it sets the context for the research and establishes key issues to be addressed;
- it enables the researcher to raise questions that still need to be answered in the field, how to move the whole field forward, and how to look differently at the field;
- it establishes and justifies the theoretical and conceptual frameworks of the research and the research design (see also Chapter 4).

We provide more details on conducting the literature search and review in Chapter 11. A literature review must be useful, not only to show that the researcher has read some relevant materials, as this is a trivial, self-indulgent reason, but that this actually informs the research. A literature review must be formative and lead into, or give rise to, all aspects of the research: the field, the particular topic, the theoretical grounding and framework, the methodology, the data analysis and implications for future research.

The researcher who is contemplating conducting a particular piece of research will need to give careful consideration to the necessary size and scope of the literature review, as this has implications for time, manageability, practicability and decision making on whether the project is too large, unfocused, diffuse, general or difficult to have justice done to it in the time and resources available. It is a determinant of whether to opt for a particular piece of research.

9.8 Summary of key issues in choosing a research topic or project

This chapter has set out several practical considerations in choosing a research topic. We advise researchers, both novice and experienced, to approach the selection of, and decision making on, a research topic with caution, going into it 'with their eyes open', aware of its possible pitfalls as well as its benefits and implications. We summarize the points discussed in the chapter in Box 9.1.

BOX 9.1 ISSUES TO BE FACED IN CHOOSING A PIECE OF RESEARCH

1. Make the topic small. Think small rather than big.
2. Limit the scope and scale of the research: think narrow rather than broad.
3. Keep the focus clear, limited, bounded and narrow.
4. Don't be over-ambitious.
5. Be realistic on what can be done in the time available, and whether, or how much, this might compromise the viability or worth of the research.
6. Make it clear what has given rise to the research – why choose this topic/project.
7. Choose a topic that might enable you to find your niche or specialism in the research or academic world or which might help to establish your reputation.
8. Decide why the research is important, topical, interesting, timely, significant, original, relevant and positively challenging.
9. Decide what contribution the research will make to the conceptual, practical, substantive, theoretical and methodological fields.
10. Decide whether your research is mainly to 'fill a gap' or to break new ground, to be innovatory.
11. Choose a research project that will be useful, and decide how and for whom it will be useful.
12. Decide why your research will be useful and who will/might be interested in it.
13. Decide what might be the impact of your research, and on whom.
14. Choose a topic that is manageable and practicable.
15. Choose a topic that will enable rigour to be exercised.
16. Choose a topic that has clear boundaries or where clear, realistic, fair boundaries can be set.
17. Decide what the research will 'deliver'.
18. What will the research do?
19. What will the research seek to find out?
20. Choose a topic for which there is a literature.
21. Decide whether you will have the required access and access to what/whom in order to be able to conduct the research.
22. Decide what can and cannot be done within the time and timescales available.
23. Decide what can and cannot be done within the personal, people-related, material, effort-related, financial and scope of the research.
24. Consider the likely clarity, scope, practicability, comprehensiveness, ease of answering, framing, focus, kinds of data required, comprehensibility of the research questions and their combination.
25. Consider whether the research will influence, or make a difference to, practice, and, if not, why it might still be important.
26. Consider whether you have the right personality, characteristics, experience and interpersonal behaviour to conduct the proposed piece of research.
27. Consider whether the research will sustain your creativity, imagination, positive attitude and motivation over time.
28. Choose a topic for which you know you will able to receive expert, informed supervision.
29. Be clear on why you – personally, professionally, career-relatedly – want to do the research, and what you personally want out of it, and whether the research will enable you to achieve this. How will the research benefit you?
30. How will the research benefit the participants?
31. How will the research benefit the world of education?
32. Choose a topic that will sustain your interest over the duration of the research.
33. Consider whether you have sufficient experience, skills and expertise in the field in which you want to conduct the research for you to be able to act in an informed way.
34. Consider whether it is advisable to embark on a piece of research that deliberately does not have research questions.
35. Consider the necessary complexity (where it exists) of the research phenomenon, scope and conduct of the research, and the difficulty of the research issues, foci and conduct.
36. Consider how future research will be able to build on your research, i.e. that the research opens up possibilities rather than closes them down.

Companion Website

The companion website to the book provides PowerPoint slides for this chapter, which list the structure of the chapter and then provide a summary of the key points in each of its sections. This resource can be found online at: **www.routledge.com/cw/cohen**.

Research questions

CHAPTER 10

This chapter will explore:

- the purpose of research questions and where they come from
- different kinds of research questions
- devising your research question(s)
- making your research question answerable
- how many research questions you should have

10.1 Why have research questions?

Research design includes a concrete and specific statement of the aims and objectives of the research as set out in the overall research purposes. There is a move in the research design from the general to the specific and concrete. From these specific, concrete objectives the researcher can formulate direct, concrete, specific research questions that the research will answer specifically and concretely and, thereby, address the objectives of the research. Research questions get to the heart of the research issue.

For many kinds of research, the framing of the research question(s) is critical; it focuses, centres, shapes, steers and drives the entire research and it is the answers to the research questions in which the researcher is interested. As Alvesson and Sandberg (2013) remark, research questions concern the direction of a study and what it is about (p. 2). They strive to 'tame curiosity' (White, 2013, p. 213) and to shape and direct the research (Agee, 2009), to make the research topic tractable. Research questions might raise a problem and shape it into a testable question or hypothesis and enable the results to be reported; they inform the direction of the research in substantive, contextual, theoretical and methodological terms; in other words, they indicate what the research is really about and what it must address.

Research questions are not the start of the research; typically they stem from the overall research purposes, objectives and design. They are the concrete questions, carefully composed in order to address the research objectives, to constitute a fair operationalization and embodiment of a valid set of indicators for addressing the research objectives, providing answers which address the research purposes with warranted data. Research questions render research aspirations, in principle, researchable and able to be investigated scientifically and rigorously, and answered empirically or by appropriate non-empirical means. We say 'in principle' because other factors, for example, practical matters such as access, permissions, finances and resources (human, material, temporal, administrative), may obstruct the research progress. Research questions take the purposes and objectives of the research and narrow them down into specific, concrete areas of focus; they narrow the boundaries of the research and help the researcher to decide where to go in the research.

This chapter does not distinguish between qualitative and quantitative research, as the issues raised apply to both. It is invidious to suggest that certain issues apply only to quantitative research and that others apply only to qualitative research; the issues apply to both types, and, indeed, mixed methods research demonstrates this very clearly, drawing on different kinds of research and data in order to answer a particular research question. For example, Simon (2011) notes that qualitative research questions tend to be exploratory and open in nature (p. 1), but there is no reason why this cannot apply to quantitative research.

Research questions typically precede the specification of research designs, methodologies, data types, methods of data collection, instrumentation and sampling, i.e. the logistical aspects of the research and which follow from the research questions.

10.2 Where do research questions come from?

Research questions stem from the aims, purposes and objectives of the research. Research questions turn a general purpose or aim into specific questions to which specific, data-driven, concrete answers can be given. This is the process of operationalization of the aims and purposes into research questions. Researchers must ensure that there is an alignment between the aims and objectives of the research and the research questions,

such that the latter serve the former. The research questions must yield data that provide warrantable evidence to address the research purposes and objectives and to draw conclusions. They must follow logically from the research purposes and objectives, and the data used in answering them must be reliable and valid indicators of the evidence needed to answer the research purposes and objectives.

It is the answers to the research questions that can provide some of the 'deliverables' referred to in Chapter 9. A useful way of deciding whether to pursue a particular study is to ascertain the clarity and ease with which research questions can be conceived and answered. Leong *et al*. (2012) argue that, in constructing research questions, it is important to have: (i) knowledge of the literature on the topic (research literature, theoretical literature); (ii) an awareness of the implications, practicability and limitations in conducting the research; and (iii) an integration of (i) and (ii). Whereas the overall research identifies the *field*, the *main topic* and *direction* of the research, the research question asks for specific, explicit answers from the outcomes of the research (p. 34).

For example, take the issue 'why do females have higher scores than males in international tests of reading at age 14?'; here the research questions might ask: (a) 'what are the test scores of females and males in such-and-such an international test of reading comprehension at age 14 in such-and-such a country?'; (b) 'how consistent among different sub-groups of females and males are the scores in such-and-such an international test of reading comprehension at age 14 in such-and-such a country?'; (c) 'how much variation is there in the scores of females and males in the scores in such-and-such an international test of reading comprehension at age 14 in such-and-such a country?'; and (d) 'what reasons do the test designers and data give for the answers to (a), (b) and (c)?'. Here the initial single overall question generates several research questions; this is common, as one of the purposes of a 'good' research question is to take a particular objective of the research and render it concretely researchable and practicable (White, 2009, p. 34).

10.3 What kinds of research question are there?

Questions such as 'what is happening?', 'what has happened?' 'what might/will/should happen?' open up the field of research questions. Chapter 6 also mentioned causal questions; 'what are the effects of such-and-such a cause?' and 'what are the causes of such-and-such an effect?' are two such questions, to which can be added the frequently used questions 'how?' and 'why?'. These questions ask for explanations as well as reasons. De Vaus (2001, p. 1) notes that there are two fundamentals of research questions: 'what is going on?' (description) and 'why is it going on?' (explanation). These are useful pointers when starting to think about research questions.

A useful approach to framing different kinds of research questions can be to ask questions that start with: what; what if; who; when; where; which; whence; whither; why; and how. There are many categories or types of research question. An early typology of these stem from Dillon (1984) who identified seventeen types of research question, which he refined into four main types: descriptive, explanatory, comparative and normative. His 'first order' type addresses 'properties' (p. 330): existence, identification, affirmation, substance, definition, character, function and rationale. His 'second order' type concerns 'comparisons': concomitance, conjunction and disjunction, equivalence and difference. His 'third order' type concerns 'contingencies': relations, correlations, conditionality (consequence and antecedence) and causality. His 'extra order' type concerns deliberation (normative questions), and other attributes. He arranges these in a hierarchy, with causal questions at the apex, being closest to the purpose of scientific inquiry.

Flick (2009) differentiates questions concerning describing states (what they are, how they came about, how they are sustained) from those describing processes (how and why something develops or changes) (p. 102). He also distinguishes between those questions which seek to confirm existing hypotheses or assumptions and those which seek to discover or allow new assumptions or hypotheses (p. 102), the latter being Strauss's (1987) 'generative questions', which are those that 'stimulate the line of investigation in profitable directions; they lead to hypotheses, useful comparison, the collection of certain classes of data, even to general lines of attack on potentially important problems' (Strauss, 1987, p. 22).

Agee (2009, p. 433) reports four kinds of research question: exploratory, explanatory, descriptive and emancipatory. Denscombe (2009a) identifies six types, articulated with their concern: description, prediction, explanation, evaluation, development-related and empowerment. De Vaus (2001) adds 'comparison' to these. Research questions can concern, for example:

- prediction ('what if' and 'what will' types of question), understanding, exploration, explanation (reasons for: 'why-type' questions; 'how-type' questions), description ('what-type' questions) and causation;

- testing and evaluation;
- comparisons/relations/correlations (between variables, people, events);
- processes, functions and purposes; stages of something;
- factors, structures, properties and characteristics of something;
- classification, types of something, trends and patterns;
- how to achieve certain outcomes; how to do, achieve, improve and develop something; alternatives to something;
- empowerment (of individuals and groups).

White (2009, pp. 42–4) argues that 'metaphysical questions' (those which cannot be answered completely through empirical research and observation) and 'normative questions' (those concerning judgements of values, what 'should' or ought to be the case or should happen, ethical and moral matters: what is desirable, good, bad, right, wrong, defensible) are typically beyond the scope of empirical social science, being 'deliberative' questions (p. 43) to which there are multiple answers deriving from people's opinions. Similarly, Hammersley (2014) comments that such questions are out of court for social scientists. Social science, he avers, should concern itself with factual data (descriptions and explanations), and social scientists have no more authority than others to determine what is good or bad (pp. 94, 144).

10.4 Devising your research question(s)

Research questions should enable the researcher to make a significant and innovative contribution to the field of study, say something new and interesting and contribute to the concerns and current topics in the academic community (see Chapter 4). Researchers should check that their research question will yield useful, relevant and significant data on matters that recipients (widely defined) of the research will care about (the 'so what?' criterion). It is also useful to consider whether the research question is 'gap filling', 'neglect filling', a new formulation of an existing idea or an entirely new idea, and how the facts which the answers to the research yield will match relevant theory.

Researchers need to decide exactly what they need to know about the matter in hand and make sure that, together, the research questions address all the required scope of the research. Though it sounds like common sense, it is important to check that it is possible to answer the research questions and that the answers to the research questions stem from data. The research questions must be manageable, practicable and answerable, fully operationalized, with a clear delineation of their scope and boundaries, and that they can be answered within the time frame and scope of the research.

With regard to the formulation of the research questions there are several points to make:

- Make sure that the types of research questions are fit for purpose (e.g. descriptive, explanatory, causal, evaluative, exploratory etc.) and that the research questions suggest an appropriate methodology. Where relevant, ensure that your research questions will be amenable to formulating hypotheses.
- Make your research questions as brief, clear, specific, concise and precise as possible (no more than a single sentence) (White, 2009, pp. 66–70), ensuring that they address (a) the focus: the 'what'; (b) the persons: the 'who' (the population and the sample as appropriate); (c) the location (the 'where'); and (d) the timing (the 'when' or the (historical) period studied) of the research (pp. 71–2).
- If you have more than one research question, make clear the relationship (e.g. logical) between them and the relative status of each question (is one question more important than another, and, if so, why or do they have equal status?) (cf. Andrews, 2003, p. 35).
- If you have one research question with several subsidiary questions (discussed later in this chapter), make clear the relationship (such as logical, chronological, empirical) not only between the subsidiary questions but between them and the main research question. Identify the main research question and the contributing subsidiary research questions (if there are any) (cf. Andrews, 2003).
- Check whether some of your research questions are more general/specific than others, and, if so, why. Check the scope of the research question: make sure your research questions are very focused, neither too narrow nor too broad. Avoid questions that require a simply binary response (yes/no). Avoid personal pronouns in the research questions.

Lipowski (2008, p. 1669) suggests that researchers can examine the four s's of research questions in order to determine their importance: size (the magnitude of an effect); scope (the overall effect on existing practice); scalability (how the findings may have expanded – wider – impact); and sustainability (long-term effects and support). It is useful to ask a colleague to review one's research questions and to give feedback on them.

White (2009) provides some useful cautions in constructing research questions:

- Only ask one question at a time (p. 37). Avoid putting two questions into the same single question, as it is important to see which answer refers to which part of the question. For example, avoid putting into the same research question a 'what' and 'why' question; they are asking for two different kinds of response/data, for example, 'what are the test scores of females and males in such-and-such an international test of reading comprehension at age 14 in such-and-such a country and how can we account for such findings?'. Combining descriptive, explanatory, causal, comparison, correlational, evaluative or other types of question into a single research question builds in questionable ambiguity. However, as discussed in Chapter 2, mixed methods research often suggests combining more than one question in a research question.
- Avoid 'false dichotomies' (p. 37). For example, in the question 'is a country's centralized university entrance examination a narrowing of the curriculum or a fair basis for comparing student performance?', neither or both statements may be true, partially true, irrelevant, or, indeed, there may be a less polarized position.
- Avoid making false assumptions (p. 38). For example, in the question 'why do males prefer multiple choice questions to essay questions in public English language examinations at age 16?', there are suppressed assumptions that such a preference exists, that multiple-choice questions are all of a single type (and the same applies to essay questions), that English language examinations are of a single type, and so on – many questionable assumptions and ambiguities underlie the research question. Whilst it may be impossible, because language and terminology inherently carry ambiguities, to render research questions unambiguous, nevertheless the researcher should avoid making false assumptions; in other words, the assumptions made should be warrantable.
- Avoid tautological questions (p. 40), i.e. those questions which say the same thing in more than one way. For example, in the question 'why do so many wealthy students study in elite universities?', one of the criteria (among others, of course) for a university to be regarded as 'elite' is that it recruits from among the wealthy groups in society. In other words, the research question here could be rewritten as 'why do so many wealthy students study in universities which recruit mainly wealthy students?' As White (2009, p. 41) remarks, this type of question is redundant because it already supplies its answer.

One can add to these cautions:

- Avoid making the research question too broad. For example, a research question such as 'what are the effects of such-and-such an intervention on students?' is far too broad, and could be replaced by, for example: 'how does such-and-such an intervention relate to sixteen-year-olds' examination performance in mathematics?'.
- Avoid making research questions too simple. For example, 'how are schools addressing student under-achievement?' could be answered by a simple Internet search, whereas a more complex question could be 'what are the effects of such-and-such an intervention in upper primary schools on the achievement of students at age 11?'.
- Avoid biased and leading questions (Agee, 2009), avoid 'can'/'how can' questions, as these are hypothetical and limitless (Andrews, 2003, p. 34).
- Avoid making your research question your questionnaire question; the former is overall and the latter is specific (Andrews, 2003, p. 69).

Some authors set out a linear process of devising research questions (cf. Alvesson and Sandberg, 2013, pp. 21–2), for example:

Step 1: Identify the field of study/subject area.
Step 2: Identify a specific topic within the field of study.
Step 3: Identify the purpose of the particular study.
Step 4: Formulate a research question that relates to the specific topic which is of both theoretical and practical interest/concern.

Leong *et al*. (2012, p. 127) suggest an alternative sequence:

Step 1: Define the domain of the research.
Step 2: Identify the main factors in, attributes of, conceptual frameworks of, influences on, and practical implications of, the topic in question.
Step 3: Plan how to cover these main factors/attributes/influences/conceptual frameworks/implications in formulating your research question, including which ones to address or leave aside.
Step 4: Operate a convergent exercise in bringing steps (1) to (3) into a researchable question (the authors recommend mixed methods in preference to either quantitative or qualitative methods, as this is consistent with their advocacy of 'multiple and convergent operationalism').

However, Alvesson and Sandberg (2013) suggest that, in reality, the formulation of a research question is much more iterative, interactive and evolutionary than that which is set out in a simple linear approach, and includes greater reference to literature, current debates and policy concerns. Leong *et al*. (2012) advocate brainstorming ideas, from which practicable, interesting and novel research questions can be selected; this might involve connecting ideas that may not have previously been connected ('novel links') (p. 120) and trying to look at a phenomenon as an outsider might view it. In this respect, mixed methods may possess greater potential for effective research questions than mono-methods approaches (see Chapter 2).

Similarly, researchers should evaluate their research questions and be prepared to modify them either before or during the research (if appropriate). As research progresses, matters may arise which indicate that the initial research question was too broad, or that the focus needs to shift, or that a more specific question needs to be asked. Research questions can change over time, as the researcher becomes more immersed in the research and as the research unfolds over time. This is commonplace and is almost to be expected: as the research becomes more refined, so the research questions will become more refined. The point here is that, at the start of the research it is not always clear where the research will go, and this means that the research question(s) could well change over time as the phenomenon in question is unpacked.

Similarly, what the researcher initially planned or wished to do in the research may have to be modified as the actual research is negotiated or unfolds. As Chapter 13 makes clear, this is not uncommon in sensitive research, but it is not confined to that: what the researcher wishes to do and what he/she can do in reality are not the same, and this may affect the research questions. A range of practical constraints, such as time, resources, access, scope can lead to research questions being modified over time. Further, as the research unfolds, unforeseen avenues for important exploration may open up, or what the researcher had initially thought was the 'correct' research question may turn out to need modification in order to get to the heart of the matter. This, too, is not uncommon; indeed in some kinds of research (e.g. ethnographic and qualitative research) it may even be expected to occur.

Some research – often qualitative (Bryman, 2007b) – may not have research questions. Similarly, it is important to recognize that research methods are not always driven by the research questions (p. 18), and that one should avoid the 'dictatorship of the research questions' (p. 14) in steering the design and conduct of the enquiry. Nevertheless, in many kinds of research the research questions figure significantly, and hence the chapter moves to considering their importance.

Some kinds of research (e.g. ethnography) might not begin with research questions but, in their closing stages, might use the open-ended research (e.g. an ethnography, interviews, focus groups) to raise research questions for further study in subsequent investigations. Such research, being exploratory in nature, might not wish to steer the inquiry too tightly, and indeed one of the features of naturalistic research (see Chapter 15) is that it endeavours not to disturb the everyday, natural setting for the participants. However, for many kinds of research, one of the early considerations that researchers can address in choosing a project is the research questions that the study might generate (or indeed should, as they derive from the overall purposes of the research).

In considering the proposed research, a useful approach is to brainstorm the possible areas of the field, moving from a general set of purposes to a range of specific, concrete issues and areas to be addressed in the research, and, for each, to frame these in terms of one or more research questions (or indeed in terms of a thesis to be defended or a hypothesis to be tested).

10.5 Making your research question answerable

There are many different kinds of research questions that derive from different purposes of the research. For example, research questions may seek:

- to describe what a phenomenon is and what is, or was, happening in a particular situation (e.g. in ethnographies, case studies, complexity theory-based studies, surveys);
- to explain why something happened;
- to predict what will happen (e.g. in experimentation, causation studies, research syntheses);
- to investigate what should happen (e.g. in evaluative research, policy research, ideology critique, participatory research);
- to examine the effects of an intervention (e.g. in experimentation, ex post facto studies, case studies, action research, causation studies);
- to examine perceptions of what is happening (e.g. in ethnography, survey);
- to compare the effects of an intervention in different contexts (experimentation, comparative studies);
- to test a theory or hypothesis;
- to develop, implement, monitor and review an intervention (e.g. in participatory research, action research).

In all of these the task of the researcher is to turn the general purposes of the research into actual practice, to operationalize the research. We discuss the process of operationalization in Chapter 11. In the present chapter we note that operationalization in terms of research questions means moving from very general, broad questions to very specific, concrete, practicable questions to which specific answers can be given. Thus the researcher breaks down each general research purpose or general aim into more specific research purposes and constituent elements, continuing the process until specific, concrete questions have been reached to which specific answers can be provided. This is not unproblematic; for example, Leong *et al*. (2012) note that operationalization, whilst valuable, may be prone to rendering issues biased or simplistic, and that, to overcome this, it is important to consider multiple perspectives on, and methodologies for researching, the topic (triangulation) (p. 127). Two examples of operationalization are provided below.

Let us imagine that the overall research aim is to ascertain the continuity between primary and secondary education (Morrison, 1993, pp. 31–3). This is very general, and needs to be translated into more specific terms. Hence the researcher might deconstruct the term 'continuity' into several components, for example, experiences, syllabus content, teaching and learning styles, skills, concepts, organizational arrangements, aims and objectives, ethos, assessment. Given the vast scope of this, the decision is taken to focus on continuity of pedagogy. This is then broken down into its component areas: the level of continuity of pedagogy; the nature of continuity of pedagogy; the degree of success of continuity of pedagogy; the responsibility for continuity; record-keeping and documentation of continuity; resources available to support continuity.

The researcher might take this further into investigating: the *nature* of the continuity (the provision of information about continuity); the *degree* of continuity (a measure against a given criterion); the *level of success* of the continuity (a judgement). An operationalized set of research questions, then, might be:

- How much continuity of pedagogy is occurring across the transition stages in each curriculum area? What kind of evidence is required to answer this question? On what criteria will the level of continuity be decided?
- What pedagogical strategies operate in each curriculum area? What are the most frequent and most preferred? What is the balance of pedagogical strategies? How is pedagogy influenced by resources? To what extent is continuity planned and recorded? On what criteria will the nature of continuity be decided? What kind of evidence is required to answer this question?
- On what aspects of pedagogy does planning take place? By what criteria will the level of success of continuity be judged? Over how many students/teachers/curriculum areas will the incidence of continuity have to occur for it to be judged successful? What kind of evidence is required to answer this question?
- Is continuity occurring by accident or design? How will the extent of planned and unplanned continuity be gauged? What kind of evidence is required to answer this question?
- Who has responsibility for continuity at the transition points? What is being undertaken by these people?
- How are records kept on continuity in the schools? Who keeps these records? What is recorded? How frequently are the records updated and reviewed? What kind of evidence is required to answer this question?
- What resources are there to support continuity at the point of transition? How adequate are these resources? What kind of evidence is required to answer this question?

It can be seen that these questions, several in number, have moved the research from simply an expression of interest (or a general aim) into a series of issues that lend themselves to being investigated in concrete terms. This is precisely what we mean by *operationalization*. The questions above also deliberately avoid the precision that one might be seeking in some research questions, such as the delineation of the locale of the research and the schools in question.

It is now possible to identify not only the specific questions to be posed, but also the instruments that might be needed to acquire data to answer them (e.g. semi-structured interviews, rating scales on questionnaires, or documentary analysis). By operationalization we thus make a general purpose amenable to investigation, be it by measurement or some other means. The number of operationalized research questions is large here, and may have to be reduced to maybe four or five at most, in order to render the research manageable.

Take another example of operationalizing a research question: 'do students work better in quiet rather than noisy conditions?' Here it is important to define who are the 'students', what is meant by 'work better', 'quiet' and 'noisy'. 'Students' might be fifteen-year-old males and females in school, 'work better' might mean 'obtain a higher score on such-and-such a mathematics test', 'quiet' might mean 'silence', and 'noisy' might mean 'having moderately loud music playing'. Hence the fully operationalized research questions might be 'do fifteen-year-old male and female students in school obtain a

higher score on such-and-such a mathematics test when tested when there is silence rather than when there is moderately loud music playing?' Now we have defined – and thereby narrowed – the scope, terms, field, focus, location, participants, indicators (a measurable score) and the conditions (silence and moderately loud music).

In this example the process of operationalization is to break down the constructs (or abstract terms) in question into component variables (categorical, continuous, dependent and independent), which, as the term suggests, can vary, and which are describable, observable and, in this case, measurable.

Hypotheses

An alternative way of operationalizing research questions takes the form of hypothesis raising and hypothesis testing. A 'good' hypothesis has several features:

- It is clear on whether it is directional or non-directional: a directional hypothesis states the kind or direction of difference or relationship between two conditions or two groups of participants (e.g. students' performance increases when they are intrinsically motivated). A non-directional hypothesis simply predicts that there will be a difference or relationship between two conditions or two groups of participants (e.g. there is a difference in students' performance according to their level of intrinsic motivation), without stating whether the difference, for example, is an increase or a decrease. (For statistical purposes, a directional hypothesis requires a one-tailed test whereas a non-directional hypothesis uses a two-tailed test; see Part 5.) Directional hypotheses are often used when past research, predictions or theory suggest that the findings may go in a particular direction, whereas non-directional hypotheses are used when past research or theory is unclear or contradictory or where prediction is not possible, i.e. where the results are more open-ended.
- It is written in a testable form, that is, in a way that makes it clear how the researcher will design an experiment or survey to test the hypothesis (e.g. 'fifteen-year-old male and female students in school obtain a higher score on such-and-such a mathematics test when tested when there is silence rather than when there is moderately loud music playing'). The concept of interference by noise has been operationalized in order to produce a testable hypothesis.
- It is written in a form that can yield measurable results.

Here it is a small step from a research question to a research hypothesis. Both specify and manipulate variables. In the example above, converting the research question into a hypothesis leads to the following hypothesis: *people work better in quiet rather than noisy conditions*. The fully operationalized hypothesis might be *fifteen-year-olds obtain a higher score on a mathematics test when tested when there is silence rather than when there is music playing.* One can see here that the score is measurable and that there is zero noise (a measure of the noise level).

In conducting research using hypotheses, one has to be prepared to use several hypotheses (Muijs, 2004, p. 16) in order to catch the complexity of the phenomenon being researched, and not least because mediating variables have to be included in the research. For example, the degree of 'willing cooperation' (dependent variable) in an organization's staff is influenced by 'professional leadership' (independent variable) and the 'personal leadership qualities of the leader' (mediating variable) which needs to be operationalized specifically.

There is also the need to consider the null hypothesis and the alternative hypothesis (discussed in Part 5) in research that is cast into a hypothesis testing model. The *null hypothesis* states that, for example, there is *no* relationship between two variables, or that there has been *no* difference in participants' scores on a pre-test and a post-test of history, or that there is *no* difference between males and females in respect of their science examination results. The *alternative hypothesis* states, for example: there *is* a correlation between motivation and performance; there *is* a difference between males' and females' scores on science; there *is* a difference between the pre-test and post-test scores on history. The alternative hypothesis is often supported when the null hypothesis is 'not supported': if the null hypothesis is not supported then the alternative hypothesis is. The two kinds of hypothesis are usually written thus:

H_0: the null hypothesis
H_1: the alternative hypothesis

We address hypothesis-testing fully in Part 5, particularly Chapters 38 and 39.

Contrary to statements that hypotheses are the province of only quantitative methods, we hold that hypotheses can be developed and tested in both quantitative and qualitative research; we see no reason why not. Nor do we concur with the view that a 'variable' is not a property of qualitative research. Theories and hypotheses can be tested in both qualitative and quantitative research, singly and together, and variables can comfortably be found and explored in both types (cf. White, 2013, p. 231). There is no exclusivity.

10.6 How many research questions should I have?

Whilst there are no hard and fast rules, a general principle is to have as few as necessary, but no fewer. Some researchers suggest having only one central research question with or without several subsidiaries (e.g. Andrews, 2003; Simon, 2011; Creswell, 2012). Others suggest no more than three or four (e.g. White, 2009); Creswell (2012) also suggests five to seven in qualitative research, whilst yet others (e.g. Miles and Huberman, 1994) extend this into double figures.

Andrews (2003) is very clear that there should be only one main research question, though a main research question may require 'subsidiary questions' (which are more specific and contribute to the answer to the main research question; p. 26) and 'ancillary questions' (which may not answer the main research question but which may be a consequence of, lead on from or broaden out the main research question; p. 81). Subsidiary questions, he avers (p. 43), are those that are '*on the way*' (his italics) to answering the main research question, whilst ancillary questions (those that provide useful but not strictly necessary material to answer the main research question) flow from, rather than contribute to, the main research question (p. 81). He cautions against having more than one main research question and, indeed, against having too many subsidiary questions, as these risk making the study too broad or ambitious in scope.

Whether one has several research questions or one research question with one or more subsidiary questions, Andrews (2003, p. 80) makes the important point that it is essential to establish the relationship (e.g. logical, chronological) between them and to identify which are the main questions and which questions are closely related or more distantly related to each other (p. 80), and how and why. His suggestion of having only one main research question is useful in identifying and focusing on the key purpose of the research.

Answering 'how many research questions do I need?' concerns the purposes of the research, the research design, the scope and magnitude of the research and each research question (and, where relevant, its subsidiaries and ancillaries) and, hence, its manageability. If the researcher wishes to avoid Andrews' suggestion of only a single, main research question, a general guide might be to have no more than four main research questions (though some would suggest that this is too many) with only two or three subsidiaries for each, but this is highly contestable and others would argue for fewer. If you have too many research questions then this might indicate that the scope of the research is too broad and ambitious, is impractical, lacks focus, lacks precision and specificity, is poorly operationalized and is insufficiently thought through. In our experience, many novice researchers have maybe three research questions, but this is very fluid.

Many studies may have one research question that asks for descriptive data, together with another that asks for explanations (causal – why – or 'how' questions), together with a third that asks for the implications/recommendations that derive from the answers to the preceding two research questions, moving from description to analysis/explanation to evaluation/implications/recommendations, i.e. three research questions (cf. Gorard, 2013, p. 37). Or the research questions may comprise: (i) a question that asks for descriptive data (what, who, where, when); followed by (ii) a question that requires comparisons, differences, relations to be drawn; followed by (iii) a question that asks 'so what?' (implications and recommendations).

10.7 A final thought

Researchers may wish to ponder on whether they want to embark on investigations that have no clearly defined research questions (cf. Andrews, 2003, p. 71) or indeed any research questions, for example an ethnography, a naturalistic observational study, studies in the humanities and arts (p. 71), or qualitative research (Bryman, 2007b). A research question may lead to a subsequent hypothesis, but that is an open question.

Companion Website

The companion website to the book provides PowerPoint slides for this chapter, which list the structure of the chapter and then provide a summary of the key points in each of its sections. This resource can be found online at: **www.routledge.com/cw/cohen**.

Research design and planning

CHAPTER 11

This chapter sets out a range of key issues in planning research, including:

- research design and methodology
- approaching research planning
- a framework for planning research
- conducting and reporting a literature review
- searching for literature on the Internet
- how to operationalize research questions
- data analysis
- presenting and reporting the results
- a planning matrix for research
- managing the planning of research
- ensuring quality in the planning of research

It also provides an extended worked example of planning a piece of research.

Research design has to take account of the context of research and constraints on it, as these will inform orienting decisions. Such decisions are strategic; they set the general nature of the research. Here, questions that researchers may need to consider are:

- Who wants the research?
- Who will receive the research/who is it for?
- Who are the possible/likely audiences of the research?
- What powers do the recipients of the research have?
- What are the general aims and purposes of the research?
- What are the main priorities for and constraints on the research?
- Is access realistic?
- What are the timescales and time frames of the research?
- Who will own the research?
- At what point will the ownership of the research pass from the participants to the researcher and from the researcher to the recipients of the research?
- Who owns the data?
- What ethical issues are to be faced in undertaking the research?
- What resources (e.g. physical, material, temporal, human, administrative) are required for the research?

Decisions here establish some key parameters of the research, including some political decisions (e.g. on ownership and on the power of the recipients to take action on the basis of the research). At this stage the overall feasibility of the research will be addressed.

11.1 Introduction

A research design is a plan or strategy that is drawn up for organizing the research and making it practicable, so that research questions can be answered based on evidence and warrants. Some researchers argue that a research design should go into considerable detail on data-collection instruments and data types; others argue that this is a logistical rather than a logical matter, and that a design comprises only, or mainly, a logical argument in which all the elements of the argument cohere (e.g. issues of research questions, methodologies/kinds of research suitable to answer the research questions). As Labaree (2013) remarks, the research design

> refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.
>
> (p. 1)

There is no single blueprint for planning research. Research design is governed by 'fitness for purpose'. The purposes of the research determine the design of the research which, in turn, informs the methodology. For example, if the purpose of the research is to map the field, or to make generalizable comments, then a survey design might be desirable, using some form of stratified sample; if the effects of a specific intervention are to be evaluated then an experimental or action research design may be appropriate; if an in-depth study of a particular situation or group is important then an ethnographic design might be suitable.

It is possible to identify a set of issues in design that researchers need to address, regardless of the specifics

of their research. This chapter indicates those matters which need to be addressed in practice so that an area of research interest can become practicable and feasible. The chapter indicates how research can be operationalized, i.e. how a general set of research aims and purposes can be translated into a practical, researchable topic.

It is essential to try as far as possible to plan every stage of the research. To change the 'rules of the game' in midstream once the research has commenced is a sure recipe for problems, though sometimes matters arise which necessitate this. The terms of the research and the mechanism of its operation must be ironed out in advance as far as possible if it is to be credible, legitimate and practicable. Once they have been decided, the researcher is in a positive position to undertake the research. The setting up of the research is a balancing act, for it requires the harmonizing of *planned possibilities* with *workable, coherent practice*, i.e. the resolution of the difference between what could be done/what one would like to do and what will actually work/what one can actually do, for, at the end of the day, research has to work. In planning research there are two phases – a divergent phase and a convergent phase. The divergent phase will open up a range of possible options facing the researcher, whilst the convergent phase will sift through these possibilities, see which ones are desirable, which ones are compatible with each other, which ones will actually work in the situation, and move towards an action plan that can realistically operate. This can be approached through the establishment of a framework of planning issues.

11.2 Approaching research planning

What the researcher does depends on what the researcher wants to know and how she or he will go about finding out about the phenomenon in question. The planning of research depends on the kind(s) of questions being asked or investigated. This is not a mechanistic exercise, but depends on the researcher's careful consideration of the purpose of the research (see Chapter 10) and the phenomenon being investigated (see Table 11.1).

Chapters 1 and 2 set out a range of paradigms which inform and underpin the planning and conduct of research, for example:

- positivist, post-positivist, quantitative, scientific and hypothesis-testing
- qualitative
- interpretive, naturalistic, phenomenological and existential, interactionist and ethnographic, qualitative
- experimental
- ideology critical
- participatory
- feminist
- political
- evaluative
- mixed methods.

It was argued that these paradigms rest on different ontologies (e.g. different views of the essential nature or characteristics of the phenomenon in question) and different epistemologies (e.g. theories of the nature of knowledge, its structure and organization, and how we investigate knowledge and phenomena: how we know, what constitutes valid knowledge, our cognition of a phenomenon). For example:

- a positivist paradigm rests, in part, on an objectivist ontology and a scientific, empirical, hypothesis-testing epistemology;
- a post-positivist paradigm rests on the belief that human knowledge is conjectural, probabilistic, influenced by the researcher and the theoretical lenses being used (i.e. there are no absolute truths or value-free enquiry), and that the warrants used to

TABLE 11.1 PURPOSES AND KINDS OF RESEARCH

Kinds of research purpose	*Kinds of research*
Does the research want to test a hypothesis or theory?	Experiment, survey, action research, case study
Does the research want to develop a theory?	Ethnography, qualitative research, grounded theory
Does the research need to measure?	Survey, experiment
Does the research want to understand a situation?	Ethnographic and interpretive/qualitative approaches
Does the research want to see what happens if…?	Experiment, participatory research, action research
Does the research want to find out 'what' and 'why'?	Mixed methods research
Does the research want to find out what happened in the past?	Historical research

support conjectures are mutable. Like positivism, it holds to a realist ontology and, unlike positivism, it holds to a conjectural, falsificationist epistemology;

- an interpretive paradigm rests, in part, on a subjectivist, interactionist, socially constructed ontology and on an epistemology that recognized multiple realities, agentic behaviours and the importance of understanding a situation through the eyes of the participants;
- a paradigm of ideology critique rests, in part, on an ontology of phenomena as organized both within, and as outcomes of, power relations and asymmetries of power, inequality and empowerment, and on an epistemology that is explicitly political, critiquing the ideological underpinnings of phenomena that perpetuate inequality and asymmetries of power to the advantage of some and the disadvantage of others, and the need to combine critique with participatory action for change to bring about greater social justice;
- a mixed methods paradigm rests on an ontology that recognizes that phenomena are complex to the extent that single methods approaches might result in partial, selective and incomplete understanding, and on an epistemology that requires pragmatic combinations of methods – in sequence, in parallel, or in synthesis – in order to fully embrace and comprehend the phenomenon and to do justice to its several facets.

Researchers need to consider not only the nature of the phenomenon under study, but also what are or are not the ontological premises that underpin it, the epistemological bases for investigating it and conducting the research into it. These are points of reflection and decision, turning the planning of research from being solely a mechanistic or practical exercise into a reflection on the nature of knowledge and the nature of being.

On the other hand some researchers argue against the need for the articulation of research paradigms in conducting research. For example, Gorard (2012) remarks:

> [i]in buying a house we would not start with epistemology, and we would not cite an 'isms' or Grand Theory. Nor would we need to consider the 'paradigm' in which we were working.… We would collect all available and any evidence available to us as time and resources allow, and then synthesize it quite naturally and without considering mixed methods as such.
>
> (p. 6)

Having a paradigm as a whole approach to research is, for him, simply a 'red herring' (p. 7); this is contestable.

11.3 Research design and methodology

Having a rigorous research design is crucial in the research process. In planning research, the researcher commences with the overall purposes of the research and then constructs a research design to address these. De Vaus (1999) contends that a research design functions to ensure that the evidence that research obtains enables them to 'answer the initial question as unambiguously as possible' (p. 9) and to indicate the kind of evidence required to answer the research questions.

Research design is, as White (2013, p. 221) notes, a logical rather than a logistical matter, i.e. concerned with the overall blueprint – the architecture – rather than the 'nuts and bolts' of how to carry out that plan (the implementation of the plan and the building materials to be used). The 'logic' here is the sequence which connects the data (typically empirical data) to the research questions and its conclusions (Yin, 2009, p. 26). It ensures that evidence is linked to research questions and conclusions and it makes clear the logic which connects the data to the evidence.

The research design identifies the evidence needed to address the research purposes, objectives and questions, i.e. the logic that underpins the connections between purposes, objectives, questions, data and conclusions drawn. Evidence requires an indication of the warrants that will be used to support the case made from the findings of the research. In other words, the research design connects the idea and the conclusions with the evidence; it sets out the 'chain of reasoning' and the warrants that link together these elements (White, 2009, p. 112). A claim about, or conclusion from, the research needs not only an evidence base but also a logical warrant that renders the evidence a fair defence of the claim or conclusion. A warrant, then, provides the link, the 'backing' between the evidence and the proposition under study (Andrews, 2003, p. 30). Imagine a court of law: a case is made for such-and-such, and the evidence is brought to support that case. The evidence is a defensible selection of the data available.

A research design includes research questions and the nature of, and warrants for, the evidence required to answer those questions. Research design does not dictate the kinds of *data* (de Vaus, 1999, p. 9), but it indicates the kinds of *evidence* (see also Gorard, 2013, p. 6). Research design precedes decisions on data types.

Evidence is not the same as data. Data are neutral, an unsorted collection of any information or facts. Evidence is what you derive from those data, i.e. once selected, processed, organized and brought into the service of supporting a claim, argument, interpretation, proof, theory, conclusion or answer to a question, then data become evidence. Data require a warrant in order to become evidence. A warrant is

> an argument leading from the evidence to the conclusion.… [It is] the form in which people furnish rationales as to why a certain voice … is to be granted superiority … on the grounds of specified criteria.… The warrant of an argument can be considered to be its general principle – an assumption that links the evidence to the claim made from it.
>
> (Gorard, 2002, p. 137)

Data/Information + Warrant (criteria for an evidential relationship) → Evidence.

Data are just facts, states of affairs, or propositions expressing facts; data become evidence once they enter into evidential relationships; and evidential relationships are typified by *prediction*, *confirmation/refutation* and *explanation*. Suppose we have our hypothesis H, and then there are many data/propositions available; let us call them D1, D2, D3, D4 etc. Data D3 will enter into an evidential relationship with H (will be 'evidential' with respect to H), which, if true, would: *predict* that D3 would occur; be supported (*confirmed*) or *disconfirmed* (refuted, falsified) by D3; *explain* why D3 occurs (cf. Mayo, 2004, p. 79). Data are evidential by a theoretical connection made between the hypothesis and data, and this theoretical connection 'warrants' the data; it gives the data this particular kind of normative power termed 'evidential'. Hence theory is important.

An example of using a warrant might be as follows, simplified for ease of understanding. Imagine that a research study focuses on male and female student performance in the upper end of secondary schools, and finds that upper secondary school males outperform females in mathematics. The researcher concludes that teachers are responsible for the differential mathematics achievement of upper secondary school males and females. How are the data connected to the conclusion drawn? What is the warrant linking the evidence to the conclusion, and how sound is the warrant?

The data are, for example, examination results, classroom observations and interviews. The warrant here might be that teachers operate a self-fulfilling prophecy in their differential expectations of males and females and that this self-fulfilling prophecy is the major factor responsible for the differential mathematics performance. But other warrants/acceptably justified and defensible explanations are also possible, for example: (a) student motivation exerts a major influence on mathematics performance; (b) teachers' pedagogical strategies exert a major influence on mathematics performance; (c) home conditions for study exert a major influence on mathematics performance; (d) parental influence tracks males and females into different subject preferences; (e) students' intended careers track/steer males and females into according differential significance to mathematics and so on. The list of possible warrants/defensible explanations is endless, and so it is incumbent on the researcher to demonstrate that the warrant chosen – the operation of the self-fulfilling prophecy and teacher expectation – trumps the other rival warrants. Applying the logic of the present warrant will need to show that it pulls its weight in offering a more defensible explanation than other warrants. In turn, this may require additional data and evidence not only to support the warrant given but to demonstrate that rival warrants (e.g. (a) to (e) above) are not supported, or are less well supported, by relevant evidence. Gorard (2002) provides useful examples of faulty warrants in published research.

A research design will include items such as:

- the research purposes;
- the research questions;
- the problem, issue, phenomenon, matter to be addressed and the focus of the research;
- the kind of research to be undertaken (methodology(ies)), for example, longitudinal, experimental, action research, survey, ethnographic, case study, mixed methods, together with a justification for the kind chosen;
- the timing and duration of the research;
- the content of the research (which may lie on a continuum from interventionist to non-interventionist);
- the people, groups/sub-groups or cases involved and how these are decided;
- how to ensure reliability and validity in the kinds of evidence needed to meet the requirements of the warrants required (i.e. why should we believe that the answers given to the research questions provide us with fair evidence or conclusions; how convincing are the answers; how does the evidence, the findings of the research, lead to the conclusions drawn, and how safe is this, e.g. in comparison to possible alternative conclusions and interpretations);
- addressing the ethical issues in the research;
- the organization of the research.

Creswell (2012) adds to these elements of research design the data collection, analysis and reporting procedures to be used (p. 20), though this implies that the design will move beyond statements of evidence to statements of data types and instrumentation (see also Wellington, 2015), i.e. it moves towards logistical as well as logical matters. Similarly, Ragin (1994a, p. 191) and Flick (2009) note that a research design includes fine detail that ranges from data collection to techniques of data analysis.

There appears to be little consensus on the level of detail or scope of what to include in the research design, particularly in respect of whether it should include instrumentation for data collection, data types and methods of data analysis. Whether a design should include logistical rather than simply logical matters is an open question; there are powerful arguments to support and counter both views (cf. Gorard, 2013).

There are many different kinds of design, and we introduce several of these in this book, for example: experimental, survey, ethnographic, action research, case study, longitudinal, cross-section, causal, correlational. None of these indicate data types, and indeed each or all of these might use questionnaires, observational data, interviews, documents, tests, accounts and so on.

11.4 From design to operational planning

If the preceding comments are strategic then decisions in this field are tactical; they establish the practicalities of the research, assuming that, generally, it is feasible (i.e. that the orienting decisions have been taken). Decisions here include addressing such questions as:

- What are the specific purposes of the research?
- Does the research need research questions?
- How are the general research purposes and aims operationalized into specific research questions?
- What are the specific research questions?
- What needs to be the focus of the research in order to answer the research questions?
- What is the main methodology of the research (e.g. a quantitative survey, qualitative research, an ethnographic study, an experiment, a case study, a piece of action research etc.)?
- Does the research need mixed methods, and if so, is the mixed methods research a parallel, sequential, combined or hierarchical approach?
- Are mixed methods research questions formulated where appropriate?
- How will validity and reliability be addressed?
- What kinds of data are required?
- From whom will data be acquired (i.e. sampling)?
- Where else will data be available (e.g. documentary sources)?
- How will the data be gathered (i.e. instrumentation)?
- Who will undertake the research?

11.5 A framework for planning research

Planning research depends on the design of the research which, in turn, depends on: (a) the kind of questions being asked or investigated; (b) the purposes of the research; (c) the research principles informing how one is working, and the philosophies, ontologies and epistemologies which underpin them. Planning research is not an arbitrary matter. There will be different designs for different types of research, and we give three examples here.

For example, a piece of quantitative research that seeks to test a hypothesis could proceed thus:

> Literature review → generate and formulate the hypothesis/the theory to be tested/the research questions to be addressed → design the research to test the hypothesis/theory (e.g. an experiment a survey) → conduct the research → analyse results → consider alternative explanations for the findings → report whether the hypothesis/theory is supported or not supported, and/or answer the research questions → consider the generalizability of the findings.

A qualitative or ethnographic piece of research could have a different sequence, for example:

> Identify the topic/group/phenomenon in which you are interested → literature review → design the research questions and the research and data collection → locate the fields of study and your role in the research and the situation → locate informants, gatekeepers, sources of information → develop working relations with the participants → conduct the research and the data collection simultaneously → conduct the data analysis either simultaneously, on an ongoing basis as the situation emerges and evolves, or conduct the data analysis subsequent to the research → report the results and the grounded theory or answers to the research questions that emerge from the research → generate a hypothesis for further research or testing.

One can see in the examples that for one method, the hypothesis drives the research, whilst for another the

hypothesis (if, in fact, there is one) emerges from the research, at the end of the study (some qualitative research does not proceed to this hypothesis-raising stage).

A mixed methods research might proceed thus:

> Identify the problem or issue that you wish to investigate → identify your research questions → identify the several kinds of data and the methods for collecting them which, together and/or separately, will yield answers to the research questions → plan the mixed methods design (e.g. parallel mixed design, fully integrated mixed design, sequential mixed design) (see Chapter 2) → conduct the research → analyse results → consider alternative explanations for the findings → answer the research questions → report the results.

These three examples proceed in a linear sequence; this is beguilingly deceptive, for rarely is such linearity so clear. The reality is that:

- different areas of the research design influence each other;
- research designs, particularly in qualitative, naturalistic and ethnographic research, change, evolve and emerge over time rather than being a 'once-and-for-all' plan that is decided and finalized at the outset of the research;
- ethnographic and qualitative research starts with a very loose set of purposes and research questions, indeed there may not be any;
- research does not always go to plan, so designs change.

In recognition of this, Maxwell (2005, pp. 5–6) develops an interactive (rather than linear) model of research design (for qualitative research), in which key areas are mutually informing and shape each other. The five main areas of his model are:

1. *Goals* (informed by perceived problems, personal goals, participant concerns, funding and funder goals, and ethical standards);
2. *Conceptual framework* (informed by personal experience, existing theory and prior research, exploratory and pilot research, thought experiments and preliminary data and conclusions);
3. *Research questions* (informed by participant concerns, funding and funder goals, ethical standards, the research paradigm);
4. *Methods* (informed by the research paradigm, researcher skills and preferred style of research, the research setting, ethical standards, funding and funder goals, and participant concerns); and
5. *Validity* (informed by the research paradigm, preliminary data and conclusions, thought experiments, exploratory and pilot research, and existing theory and prior research).

At the heart of Maxwell's model lie the research questions (3), but these are heavily informed by the four other areas. Further, he attributes strong connections between goals (1) and conceptual frameworks (2), and between methods (4) and validity (5). The links between conceptual frameworks (2) and validity (5) are less strong, as are the links between goals (1) and methods (4). His model is iterative and recursive over time; the research design emerges from the interplay of these elements and as the research unfolds.

Though the set of issues that constitute a framework for planning research will need to be interpreted differently for different styles of research, nevertheless it is useful to indicate what those issues might be. These are outlined in Box 11.1.

BOX 11.1 THE ELEMENTS OF RESEARCH DESIGN

The elements of research design

1. A clear statement of the problem/need that has given rise to the research;
2. A clear grounding in literature for construct and content validity: theoretically, substantively, conceptually, methodologically;
3. Constraints on the research (e.g. access, time, people, politics);
4. The general aims and purposes of the research;
5. The intended outcomes of the research: what the research will do and what the 'deliverable' outcomes are;
6. Reflecting on the nature of the phenomena to be investigated, and how to address their ontological and epistemological natures;
7. How to operationalize research aims and purposes;

8 Generating research questions (where appropriate) (specific, concrete questions to which concrete answers can be given) and hypotheses (if appropriate);
9 Statements of the warrants for the research (the rationale that links evidence and conclusions);
10 The foci of the research;
11 Identifying and setting in order the priorities for the research;
12 Approaching the research design;
13 Focusing the research;
14 Research methodology (approaches and research styles, e.g.: survey; experimental; ethnographic/naturalistic; longitudinal; cross-sectional; historical; correlational; *ex post facto*);
15 Ethical issues and ownership of the research (e.g. informed consent; overt and covert research; anonymity; confidentiality; non-traceability; non-maleficence; beneficence; right to refuse/withdraw; respondent validation; research subjects; social responsibility; honesty and deception);
16 Politics of the research: who is the researcher; researching one's own institution; power and interests; advantage; insider and outsider research;
17 Audiences of the research;
18 Instrumentation, e.g.: questionnaires; interviews; observation; tests; field notes; accounts; documents; personal constructs; role-play;
19 Sampling: size/access/representativeness; type – probability: random, systematic, stratified, cluster, stage, multi-phase; non-probability: convenience, quota, purposive, dimensional, snowball;
20 Piloting: technical matters: clarity, layout and appearance, timing, length, threat, ease/difficulty, intrusiveness; questions: validity, elimination of ambiguities, types of questions (e.g. multiple choice, open-ended, closed), response categories, identifying redundancies; pre-piloting: generating categories, grouping and classification;
21 Time frames and sequence (what will happen, when and with whom);
22 Resources required;
23 Reliability and validity:
validity: construct; content; concurrent; face; ecological; internal; external;
reliability: consistency (replicability); equivalence (inter-rater, equivalent forms); predictability; precision; accuracy; honesty; authenticity; richness; dependability; depth; overcoming Hawthorne and halo effects;
triangulation: time; space; theoretical; investigator; instruments;
24 Data analysis;
25 Verifying and validating the data;
26 Reporting and writing up the research.

A possible sequence of consideration is:

Preparatory issues	→	*Methodology*	→	*Sampling and instrumentation*	→	*Piloting*	→	*Timing and sequencing*
Ontology, epistemology, constraints, purposes, foci, ethics, research question, politics, literature review	→	Approaches Reliability and validity	→	Reliability and validity Pre-piloting	→		→	

Clearly this need not be the actual sequence; for example, it may be necessary to consider access to a possible sample at the very outset of the research.

These issues can be arranged into four main areas:

1 orienting decisions;
2 research design and methodology;
3 data analysis;
4 presenting and reporting the results.

These are discussed later in this chapter. Orienting decisions are those decisions which set the boundaries or the constraints on the research. For example, let us say that the overriding condition of the research is that it has to be completed within six months; this will exert an influence on the enterprise. On the one hand it will 'focus the mind', requiring priorities to be settled and data to be provided in a relatively short time. On the other hand it may reduce the variety of possibilities

available to the researcher. Hence questions of timescale will affect:

- the research questions which might be answered feasibly and fairly (e.g. some research questions might require a long data-collection period);
- the number of data-collection instruments used (e.g. there might be enough time for only a few instruments to be used);
- the sources (people) to whom the researcher might go (e.g. there might be enough time to interview only a handful of people);
- the number of foci which can be covered in the time (e.g. for some foci it will take a long time to gather relevant data);
- the size and nature of the reporting (there might be time to produce only one interim report).

By clarifying the timescale a valuable note of realism is injected into the research, which enables questions of practicability to be answered.

Let us take another example. Suppose the overriding feature of the research is that the costs in terms of time, people and materials for carrying it out must be negligible. This, too, will exert an effect on the research. On the one hand it will inject a sense of realism into proposals, identifying what is and what is not manageable. On the other hand it will reduce, again, the variety of possibilities which are available to the researcher. Questions of cost will affect:

- the research questions which might be feasibly and fairly answered (e.g. some research questions might require: (a) interviewing, which is costly in time both to administer and to transcribe; (b) expensive commercially produced data-collection instruments, e.g. tests, and costly computer services, which may include purchasing software);
- the number of data-collection instruments used (e.g. some data-collection instruments, such as postal questionnaires, are costly for reprographics and postage);
- the people to whom the researcher might go (e.g. if teachers are to be released from teaching in order to be interviewed then cover for their teaching may need to be found);
- the number of foci which can be covered in the time (e.g. in uncovering relevant data, some foci might be costly in researcher's time);
- the size and nature of the reporting (e.g. the number of written reports produced, the costs of convening meetings).

Certain timescales permit certain types of research, for example, a short timescale permits answers to short-term issues, whilst long-term or large questions might require a long-term data-collection period to cover a range of foci. Costs in terms of time, resources and people might affect the choice of data-collection instruments. Time and cost will require the researcher to determine, for example, what will be the minimum representative sample of teachers or students in a school, as interviews are time-consuming and questionnaires are expensive to produce. These are only two examples of the real constraints on the research which must be addressed. Planning the research early on will enable the researcher to identify the boundaries within which the research must operate and what are the constraints on it.

Further, some research may be 'front-loaded' whilst other kinds are 'end-loaded'. 'Front-loaded' research is that which takes a considerable time to set up, for example to develop, pilot and test instruments for data collection, but then the data are quick to process and analyse. Quantitative research is often of this type (e.g. survey approaches) as it involves identifying the items for inclusion on the questionnaire, writing and piloting the questionnaire, and making the final adjustments. By contrast, 'end-loaded' research is that which may not take too long to set up and begin, but then the data collection and analysis may take a much longer time. Qualitative research is often of this type (e.g. ethnographic research), as a researcher may not have specific research questions in mind but may wish to enter a situation, group or community and only then discover – as they emerge over time – the key dynamics, features, characteristics and issues in the group (e.g. Turnbull's (1972) notorious study of the descent into inhumanity of the Ik tribe in their quest for daily survival as *The Mountain People*). Alternatively, a qualitative researcher may have a research question in mind but an answer to this may require a prolonged ethnography of a group (e.g. Willis's (1977) celebrated study of 'how working class kids get working class jobs, and others let them'). Between these two types – 'front-loaded' and 'end-loaded' – are many varieties of research that may take different periods of time to set up, conduct, analyse data and report the results. For example, a mixed methods research project may have several stages (see Table 11.2).

In example one in Table 11.2, in the first two stages of the research, the mixed methods run in sequence (qualitative then quantitative), and are only integrated in the final stage. In example two, in the first two stages the quantitative and qualitative stages run in parallel, i.e. they are separate from each other, and they only combine in the final stage of the research. In example

TABLE 11.2 THREE EXAMPLES OF PLANNING FOR TIME FRAMES FOR DATA COLLECTION IN MIXED METHODS RESEARCH

Example one	*Example two*	*Example three*
Qualitative data to answer research questions in total or in part, or to develop items for quantitative instruments (e.g. a numerical questionnaire survey)	Quantitative data and qualitative data in parallel to answer research questions in total or in part, or to identify participants for qualitative study	Quantitative and qualitative data together to answer research questions in total or in part and to raise further research questions
↓	↓	↓
Quantitative data to answer research questions in total or in part, or to identify participants for qualitative study (e.g. interviews)	Quantitative and qualitative data in parallel to answer research questions in total or in part	Quantitative and qualitative data to answer research questions in total or in part
↓	↓	↓
Quantitative and qualitative data to answer one or more research questions	Quantitative and qualitative data to answer one or more research questions	Quantitative and qualitative data to answer research questions in total or in part

three, the mixed methods are synthesized – combined – from the very start of the research.

The researcher must look at the timescales that are both required and available for planning and conducting the different stages of the research project.

Let us take another important set of questions: is the research feasible? Can it actually be done? Will the researchers have the necessary access to the schools, institutions and people? These issues were explored in the previous chapter. This issue becomes a major feature if the research is in any way sensitive (see Chapters 5 and 13).

11.6 Conducting and reporting a literature review

Before one can progress very far in planning research it is important to ground the project in validity and reliability. This is achieved, in part, by a thorough literature review of the state of the field and how it has been researched to date. Chapters 9 and 10 indicated that it is important for a researcher to conduct and report a literature review. A literature review should establish a theoretical framework for the research, indicating the nature and state of the theoretical and empirical fields and important research that has been conducted and policies that have been issued, defining key terms, constructs and concepts, and reporting key methodologies used in other research into the topic. The literature review also sets out what the key issues are in the field to be explored, and why they are, in fact, key issues, and it identifies gaps that need to be plugged in the field. All of this contributes not only to the credibility and validity of the research but to its topicality and significance, and it acts as a springboard into the study, defining the field, what needs to be addressed in it, why, and how it relates to – and extends – existing research in the field. The literature review, then, leads into, and is a foundation for, all areas and stages of the research in question: purpose, foci, research questions, methodology, data analysis, discussion and conclusions.

A literature review may report contentious areas in the field and why they are contentious, contemporary problems that researchers are trying to investigate in the field, difficulties that the field is facing from a research angle, new areas that need to be explored in the field.

A literature review synthesizes several different kinds of materials into an ongoing, cumulative argument that leads to a conclusion (e.g. of what needs to be researched in the present research, how and why). It can be like an extended essay that sets out:

- the argument(s) that the literature review will advance;
- points in favour of the argument(s) or thesis to be advanced/supported;
- points against the argument(s) or thesis to be advanced/supported;
- a conclusion based on the points raised and evidence presented in the literature review.

There are several points to consider in conducting, researching and writing a literature review (cf. University of North Carolina, 2007; Heath, 2009; University of Loughborough, 2009; Creswell, 2012; Wellington, 2015). A literature review:

- defines the field of the research;
- identifies the relevant key concepts, topics, theories, issues, research and ideas in the field under study (including, where relevant, gaps in the field);
- indicates the 'state of the art' in the field chosen;
- sets out the context – temporal, spatial, political etc. – of the research;
- identifies seminal and landmark ideas and research in the field;
- establishes and justifies the need for the research to be conducted, and establishes its significance and originality;
- sets out a rationale for the direction in which the study will go;
- establishes and justifies the methodology to be adopted in the research;
- establishes and justifies the focus of the research;
- sets out and justifies the warrants to be used in the research design.

The literature review is not just a descriptive summary, but an organized and developed argument, usually with subtitles, such that, if the materials were presented in a sequence other than that used, the literature review would lose meaning, coherence, cogency, logic and purpose. It presents, contextualizes, analyses, interprets, critiques and evaluates sources and issues, not just accepting what they say (e.g. it exposes and addresses what the sources overlook, misinterpret, misrepresent, neglect, say something that is contentious, about which they are outdated). It presents arguments and counter-arguments, evidence and counter-evidence about an issue and reveals similarities and differences between authors about the same issue. It sets out and justifies a theoretical framework for the research.

A literature review must state its purposes, methods of working, organization and how it will move to a conclusion, i.e. what it will do, what it will argue, what it will show, what it will conclude and how this links into or informs the subsequent research project. Further, it must state its areas of focus, maybe including a statement of the problem or issue that is being investigated, the hypothesis that the research will test, the themes or topics to be addressed, or the thesis that the research will defend.

A literature review, then, must be conclusive; it must be focused yet comprehensive in its coverage of relevant issues; it must present both sides of an issue or argument; it should address theories, models (where relevant), empirical research, methodological materials, substantive issues, concepts, content and elements of the field in question; and it must include and draw on many sources and types of written material and kinds of data (see, for example, Box 11.2).

In conducting the literature review, Creswell (2012) suggests that the researcher needs to identify key terms, followed by locating the literature, followed by a critical examination of the sources found, for example, for relevance, topicality, accuracy, scope and coverage, followed by the organization of the literature and then subsequent writing of the literature review. For a fuller treatment of conducting and reporting a literature review, we refer readers to Ridley (2010).

A distinction can be drawn between a literature review and a systematic review (cf. Denscombe, 2014). Both collect and synthesize literature, but the former is typically eclectic and even serendipitous, casting its net wide and synthesizing the results, whilst the latter is very focused, typically on empirical research studies (i.e. evidence-based for 'what works'), often those which report research trials (e.g. randomized controlled trials), with stated, often quite narrow or stringent selection and quality criteria, and often requiring measurement and metrics as evidence (though qualitative data are also possible). Systematic reviews are stand-alone documents in their own right, in contrast to literature reviews which tend to be a precursor to an empirical study, clearing the ground for the study to begin. Further, systematic reviews have a narrowly defined scope and focus on a specific question or questions, whereas literature reviews have a wider focus of study.

Systematic reviews typically make explicit the methodologies and criteria they have used in selecting the studies for inclusion (often based on the types and quality of the studies included and their relevance). This is not to argue for literature reviews not being systematic and stringent, or not making clear the criteria used for selecting the literature, or not being rigorous in evaluation of the literature; rather it is to point to the difference in the breadth/narrowness of inclusion criteria and kinds of studies.

Denscombe (2014, pp. 142–3) notes that systematic reviews tend to focus on already-published studies or studies which are publicly available. Whereas in medicine the studies might be of a similar kind (e.g. randomized controlled trials), in the social sciences this may not be the case, rendering comparison and evaluation of studies more problematic (see Chapter 21).

BOX 11.2 TYPES OF INFORMATION IN A LITERATURE REVIEW

Books: hard copy and e-books.

Articles in journals: academic and professional: hard copy and online.

Empirical and non-empirical research.

Reports: from governments, NGOs, organizations, influential associations.

Policy documents: from governments, organizations, 'think tanks'.

Public and private records.

Research papers and reports, for example, from research centres, research organizations.

Theses and dissertations.

Manuscripts.

Databases: searchable collections of records, electronic or otherwise.

Conference papers: local, regional, national, international.

Primary sources: original, first-hand, contemporary source materials such as documents, speeches, diaries and personal journals, letters, autobiographies, memoirs, public records and reports, emails and other correspondence, interview and raw research data, minutes and agendas of meetings, memoranda, proceedings of meetings, communiqués, charters, acts of parliament or government, legal documents, pamphlets, witness statements, oral histories, unpublished works, patents, websites, video or film footage, photographs, pictures and other visual materials, audio-recordings, artefacts, clothing, or other evidence. These are usually produced directly at the time of, close to, or in connection with, the research in question.

Online databases.

Electronic journals or media.

Secondary sources: second-hand, non-original materials, materials written about primary sources, or materials based on sources that were originally elsewhere or which other people have written or gathered, where primary materials have been worked on or with, described, reported, analysed, discussed, interpreted, evaluated, summarized or commented upon, or which are at one remove from the primary sources, or which are written some time after the event, for example, encyclopaedias, dictionaries, newspaper articles, reports, critiques, commentaries, digests, textbooks, research syntheses, meta-analyses, research reviews, histories, summaries, analyses, magazine articles, pamphlets, biographies, monographs, treatises, works of criticism (e.g. literary, political).

Tertiary sources: distillations, collections or compilations of primary and secondary sources, for example, almanacs, bibliographies, catalogues, dictionaries, encyclopaedias, fact books, directories, indexes, abstracts, bibliographies, manuals, guidebooks, handbooks, chronologies.

11.7 Searching for literature on the Internet

The storage and retrieval of research data on the Internet play an important role not only in keeping researchers abreast of developments across the world, but also in providing access to data which can inform literature searches to establish construct and content validity in their own research. Indeed, some kinds of research are essentially large-scale literature searches (e.g. the research papers published in the journals *Review of Educational Research* and *Review of Research in Education*, and materials from the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) at the University of London (http://eppi.ioe.ac.uk/cms) and the What Works Clearinghouse in the United States (http://ies.ed.gov/ncee/wwc)). Online journals, abstracts and titles enable researchers to keep up with the cutting edge of research and to conduct a literature search of relevant material on their chosen topic. Websites and email correspondence enable networks and information to be shared. For example, researchers wishing to gain instantaneous global access to literature and recent developments in research associations can reach all parts of the world in a matter of seconds through websites.

In what follows we indicate the main sources of literature by *kind* only. The companion website to this book gives websites of sources within each kind. Given that websites change and often go out of date quickly, we

strongly recommend that readers go to this companion website, as it is updated and provides many websites, organized by type and source of information. Below we provide websites only for those which have stood the test of time and have not gone out of date for many years.

Researchers wishing to access *educational research associations, organizations and centres* can visit websites such as:

American Educational Research Association: www.aera.net;
Educational Resources Information Center (ERIC): http://eric.ed.gov;
British Educational Research Association: www.bera.ac.uk;
Australian Council for Educational Research: www.acer.edu.au;
European Educational Research Association: www.eera-ecer.de;
National Foundation for Educational Research (UK): www.nfer.ac.uk;
Economic and Social Research Council in the UK: www.esrc.ac.uk.

Researchers wishing to access online journal indices and references for published research results have a variety of websites which they can visit to see *catalogues*, *gateways* and *databases*, and we indicate key sites here on the companion website. These include: the British Education Index; the Organisation for Economic Co-operation and Development (OECD); Social Science Citation Indexes; national statistics services; government departments of education; archives (including statistics databases); the UK's Data Service and Data Archive; UNESCO databases and reports; the Council of European Social Science Data Archive; the gateway to the European Union's sites for data and reports; the United States National Center for Educational Statistics; and the World Bank's gateway to data and statistics.

With regard to searching *libraries*, there are several useful websites for: the British Library and all its online catalogues; the Library site, linking to 18,000 libraries; the United States Library of Congress; the gateway to US libraries; search engines for UK libraries; the Virtual Library; and the Online Computer Library Center. The websites for all these are given in the companion website to this book.

With regard to *items in print*, the website for Books in Print is: www.booksinprint.com, which provides a comprehensive listing of current books in print.

Additional useful *educational research resources* can be found from the National Academies Press (both in total and in its Education Section); centres for the provision of free educational materials and related websites; merged Internet Public Library and the Librarians' Internet Index; and the UK's Research Councils. The websites for all these are given in the companion website to this book.

For *theses*, researchers can go to: the British Library Electronic Theses Online (http://ethos.bl.uk/Home.do); the DART portal for European E-theses; the Aslib Index to Theses; and the Networked Digital Library of Theses and Dissertations (including e-theses). The websites for all of these are given in the companion website to this book.

Most *journals* provide access to abstracts, free online and free alerting services (an email to provide readers with the table of contents of each new issue as it appears), though access to the full article is typically by subscription only. Online journals also provide a comprehensive searching service, in which researchers can search either the specific journal in question or, indeed, the entire range of journals provided by that publisher, using keywords, authors, titles, the digital object identifier (DOI), date and date range, tables of contents, access to articles which appear online before they appear in hard copy etc. Particularly useful here is the facility provided to search the journal in question, or all of that publisher's journals, by keyword. Here the articles can be returned in order by relevance, date, authors, title. It is a first-class facility.

There are many providers of online journals, and we list these, with their websites, in the companion website to the book, including: EBSCO; Emerald Insight; Ingenta; Kluweronline; ProQuest; ProQuest Digital Dissertations and Theses; Science Direct; Web of Knowledge; the Directory of Open Access Journals; the Bath Information and Data Services (BIDS); JSTOR; Journal TOCs (tables of contents). Google Scholar (http://scholar.google.com) is a widely used search engine for articles and books, and it can be interrogated by topic, year, range of years, relevance and the number of citations.

With regard to *statistics*, the companion website to this book provides websites of: the portal to the UK's national statistics; the US National Center for Education Statistics; the UK's Data Service Census Support; and the UK's Office for National Statistics.

When searching the Internet it is useful to keep in mind several points:

- placing words, phrases or sentences inside inverted commas ("…") will keep those words together and in that order in searching for material; this helps to reduce an overload of returned sites;
- placing an asterisk (*) after a word or part of a word will return sites that start with that term but which

have different endings, for example, teach* will return sites on teach, teaching, teacher;
- placing a tilde mark (~) before a word will identify similar words to that which have been entered, for example, ~English teaching will return sites on English language as well as English teaching;
- placing the words *and*, *not*, *or* between phrases or words will return websites where the command indicated in each one of these words is addressed.

Finding research information, where not available from databases and indices on CD-ROMs, is often done through the Internet by trial and error and serendipity, identifying the keywords singly or in combination (between inverted commas). The system of 'bookmarking' websites enables rapid retrieval of these websites for future reference.

Evaluating websites

The use of the Internet for educational research requires an ability to evaluate websites. The Internet is a vast store of disorganized and often unvetted material, and researchers need to be able to ascertain quite quickly how far the web-based material is appropriate. There are several criteria for evaluating websites, including the following (e.g. Tweddle *et al.*, 1998; Rodrigues and Rodrigues, 2000):

- the purpose of the site, as this enables users to establish its relevance and appropriateness;
- the authority and authenticity of the material, which should both be authoritative and declare its sources;
- the content of the material: its up-to-dateness, relevance and coverage;
- the credibility and legitimacy of the material (e.g. is it from a respected source or institution?);
- the correctness, accuracy, completeness and fairness of the material;
- the objectivity and rigour of the material being presented and/or discussed.

In evaluating educational research materials on the web, researchers and teachers can ask themselves several questions:

- Is the author identified?
- Does the author establish her/his expertise in the area, and institutional affiliation?
- Is the organization reputable?
- Is the material referenced; does the author indicate how the material was gathered?
- What is this website designed to do (e.g. to provide information, to persuade)?
- Is the material up-to-date?
- Is the material free from biases, personal opinions and offence?
- How do we know that the author is authoritative on this website?

It is important for the researcher to keep full bibliographic data of the website material used, including the date on which it was retrieved and the website address.

With these preliminary comments, let us turn to the four main areas of the framework for planning research.

11.8 How to operationalize research questions

Chapter 10 indicated that there are many different kinds of research questions that derive from different purposes of the research. For example, research questions may seek:

- to describe what a phenomenon is and what is, or was, happening in a particular situation (e.g. ethnographies, case studies, complexity theory-based studies, surveys);
- to predict what will happen (e.g. experimentation, causation studies, research syntheses);
- to investigate values (e.g. evaluative research, policy research, ideology critique, participatory research);
- to examine the effects of an intervention (e.g. experimentation, ex post facto studies, case studies, action research, causation studies);
- to examine perceptions of what is happening (e.g. ethnography, survey);
- to test a theory;
- to compare the effects of an intervention in different contexts (experimentation, comparative studies);
- to develop, implement, monitor and review an intervention (e.g. participatory research, action research).

Research questions can ask 'what', 'who', 'why', 'when', 'where' and 'how' (cf. Newby, 2010, pp. 65–6). As mentioned in Chapter 10, the researcher has to turn the general purposes of the research into actual practice, i.e. to operationalize the research, turning a general research aim or purpose into specific, particular concrete research questions (or hypotheses) to which exact, specific, concrete answers can be given. It involves specifying a set of operations, elements or behaviours that can be identified, measured or manipulated. The process moves from the general to the particular, from the abstract to the concrete, checking each research question against the research aims until exact, specific, concrete questions have been reached, in all likelihood through an iterative, recursive process (i.e. backwards

and forwards between research aims and emerging research questions) to enable exact, specific, concrete answers to be provided. We provide examples of this in Chapter 10.

11.9 Distinguishing methods from methodologies

In planning research it is important to clarify the distinction between methodology and methods, approaches and instruments, styles of research and ways of collecting data. Simply put, methodology concerns how we find out about the phenomenon, the approach to be used, the principles which underpin it and the justification for using the kind of research approach adopted, the type of study to be conducted, how the research is undertaken (with its associated issues of kinds of research, sampling, instrumentation, canons of validity etc.). Methods concern instrumentation: how data are collected and analysed, whilst methodology justifies the methods used.

The decision on which instrument (method) to use for data collection frequently follows from an earlier decision on which kind (methodology) of research to undertake, for example: a survey; an experiment; an in-depth ethnography; action research; case study research; testing and assessment.

Subsequent chapters of this book set out each of these research styles, their principles, rationales and purposes, and the instrumentation and data types that may be suitable for them. For conceptual clarity it is possible to set out some key features of these (Table 11.3). When decisions have been reached on the stage of research design and methodology, a clear plan of action will have been prepared.

Several of the later chapters of this book are devoted to specific instruments for collecting data, for example: interviews; questionnaires; observation; tests; accounts; biographies; case studies; role-playing; simulations; personal constructs.

11.10 Data analysis

The prepared researcher will need to consider how the data will be analysed. This is important, as it has a specific bearing on the form of the instrumentation. For example, a researcher will need to plan carefully the layout and structure of a questionnaire survey in order to assist data entry for computer reading and analysis; an inappropriate layout may obstruct data entry and subsequent analysis by computer. The planning of data analysis will need to consider:

- What will be done with the data when they have been collected – how will they be processed and analysed?
- How will the results of the analysis be verified, cross-checked and validated?

Decisions will need to be taken with regard to the statistical tests that will be used in data analysis as this will affect the content, type and layout of research items (e.g. in a questionnaire), and the computer packages that are available for processing quantitative and qualitative data, for example, SPSS and NVivo respectively. For statistical processing the researcher will need to ascertain the level of data being processed – nominal, ordinal, interval or ratio (see Chapter 38). Part 5 addresses issues of data analysis and which statistics to use; the choice is not arbitrary (Siegel, 1956; Cohen and Holliday, 1996; Hopkins *et al*., 1996). For qualitative data analysis researchers have at their disposal a range of techniques, for example:

- coding and content analysis of field notes (Miles and Huberman, 1984);
- cognitive mapping (Jones, 1987; Morrison, 1993);
- seeking patterning of responses;
- looking for causal pathways and connections (Miles and Huberman, 1984);
- presenting cross-site analysis (ibid.);
- case studies;
- personal constructs;
- narrative accounts (Flick, 2009; Creswell, 2012);
- action research analysis;
- analytic induction (Denzin, 1989);
- constant comparison and grounded theory (Glaser and Strauss, 1967; Flick 2009; Creswell, 2012);
- discourse analysis (Stillar, 1998);
- biographies and life histories (Atkinson, 1998; Flick, 2009; Creswell, 2012).

The criteria for deciding which forms of data analysis to undertake are governed both by fitness for purpose and legitimacy – the form of data analysis must be appropriate for the kinds of data gathered. For example, it would be inappropriate to use certain statistics with certain kinds of numerical data (e.g. using means with nominal data), or to use causal pathways on unrelated cross-site analysis.

11.11 Presenting and reporting the results

As with the stage of planning data analysis, the prepared researcher will need to consider the form of the

TABLE 11.3 ELEMENTS OF RESEARCH DESIGNS

Model	*Purposes*	*Foci*	*Key terms*	*Characteristics*
Survey	Gathering large-scale data in order to make generalizations Generating statistically manipulable data Gathering context-free data	Opinions Scores Outcomes Conditions Ratings	Measuring Testing Representativeness Generalizability	Describes and explains Represents wide population Gathers numerical data Much use of questionnaires and assessment/test data
Experiment	Comparing under controlled conditions Making generalizations about efficacy Objective measurement of treatment Establishing causality	Initial states, intervention and outcomes Randomized controlled trials	Pre-test and post-test Identification, isolation and control of key variables Generalizations Comparing Causality	Control and experimental groups Treats situations like a laboratory Causes due to experimental intervention Does not judge worth Simplistic
Ethnography	Portrayal of events in subjects' terms Subjective and reporting of multiple perspectives Description, understanding and explanation of a specific situation	Perceptions and views of participants Issues as they emerge over time	Subjectivity Honesty, authenticity Non-generalizable Multiple perspectives Exploration and rich reporting of a specific context Emergent issues	Context-specific Formative and emergent Responsive to emerging features Allows room for judgements and multiple perspectives Wide database gathered over a long period of time Time consuming to process data
Action research	To plan, implement, review and evaluate an intervention designed to improve practice/solve local problem To empower participants through research involvement and ideology critique To develop reflective practice To promote equality democracy To link practice and research To promote collaborative research	Everyday practices Outcomes of interventions Participant empowerment Reflective practice Social democracy and equality Decision making	Action Improvement Reflection Monitoring Evaluation Intervention Problem solving Empowering Planning Reviewing	Context-specific Participants as researchers Reflection on practice Interventionist – leading to solution of 'real' problems and meeting 'real' needs Empowering for participants Collaborative Promoting praxis and equality Stakeholder research

continued

TABLE 11.3 CONTINUED

Case study	To portray, analyse and interpret the uniqueness of real individuals and situations through accessible accounts To catch the complexity and situatedness of behaviour To contribute to action and intervention To present and represent reality – to give a sense of 'being there'	Individuals and local situations Unique instances A single case Bounded phenomena and systems: ■ individual ■ group ■ roles ■ organizations ■ community	Individuality, uniqueness In-depth analysis and portrayal Interpretive and inferential analysis Subjective Descriptive Analytical Understanding specific situations Sincerity Complexity Particularity	In-depth, detailed data from wide data source Participant and non-participant observation Non-interventionist Empathic Holistic treatment of phenomena What can be learned from the particular case
Testing and assessment	To measure achievement and potential To diagnose strengths and weaknesses To assess performance and abilities	Academic and non-academic, cognitive, affective and psychomotor domains – low order to high order Performance, achievement, potential, abilities Personality characteristics	Reliability Validity Criterion-referencing Norm-referencing Domain-referencing Item-response Formative Summative Diagnostic Standardization Moderation	Materials designed to provide scores that can be aggregated Enables individuals and groups to be compared In-depth diagnosis Measures performance

reporting of the research and its results, giving due attention to the needs of different audiences (e.g. an academic audience may require different contents from a wider professional audience and, a fortiori, from a lay audience). Decisions here address:

- How to write up and report the research;
- When to write up and report the research (e.g. ongoing or summative);
- How to present the results in tabular and/or written-out form;
- How to present the results in non-verbal forms;
- To whom to report (the necessary and possible audiences of the research);
- How frequently to report.

For an example of setting out a research report, see the accompanying website.

11.12 A planning matrix for research

In planning a piece of research, the range of questions to be addressed can be set into a matrix. Table 11.4 provides such a matrix, in the left-hand column of which are the questions which figure in the four main areas set out so far:

1 orienting decisions;
2 research design and methodology;
3 data analysis;
4 presenting and reporting the results.

Questions 1–10 are the orienting decisions, questions 11–22 concern the research design and methodology, questions 23–4 cover data analysis, and questions 25–30 deal with presenting and reporting the results. Within each of the thirty questions there are several sub-questions which research planners may need to address. For example, within question 5 ('What are the

TABLE 11.4 A MATRIX FOR PLANNING RESEARCH

Orienting decisions

Question	*Sub-issues and problems*	*Decisions*
1 Who wants the research?	Is the research going to be useful? Who might wish to use the research? Are the data going to be public? What if different people want different things from the research? Can people refuse to participate?	Find out the controls over the research which can be exercised by respondents. Set out the scope and audiences of the research. Determine the reporting mechanisms.
2. Who will receive the research?	Will participants be able to veto the release of parts of the research to specified audiences? Will participants be able to give the research to whomsoever they wish? Will participants be told to whom the research will go?	Determine the proposed internal and external audiences of the research. Determine the controls over the research which can be exercised by the participants. Determine the rights of the participants and the researcher to control the release of the research.
3. What powers do the recipients of the research have?	What use will be made of the research? How might the research be used for or against the participants? What might happen if the data fall into the 'wrong' hands? Will participants know in advance what use will and will not be made of the research?	Determine the rights of recipients to do what they wish with the research. Determine the respondents' rights to protection as a result of the research.
4 What are the timescales of the research?	Is there enough time to do all the research? How to decide what to be done within the timescale?	Determine the timescales and timing of the research.
5 What are the purposes of the research?	What are the formal and hidden agendas here? Whose purposes are being served by the research? Who decides the purposes of the research? How will different purposes be served in the research?	Determine all the possible uses of the research. Determine the powers of the respondents to control the uses made of the research. Decide on the form of reporting and the intended and possible audiences of the research.
6 What are the research questions?	Who decides what the questions will be? Do participants have rights to refuse to answer or take part? Can participants add their own questions?	Determine the participants' rights and powers to participate in the planning, form and conduct of the research. Decide the balance of all interests in the research.
7 What must be the focus in order to answer the research questions?	Is sufficient time available to focus on all the necessary aspects of the research? How will the priority foci be decided? Who decides the foci?	Determine all the aspects of the research, prioritize them, and agree on the minimum necessary areas of the research. Determine decision-making powers on the research.

continued

TABLE 11.4 CONTINUED

8 What costs are there – human, material, physical, administrative, temporal?	What support is available for the researcher? What materials are necessary?	Cost out the research.
9 Who owns the research?	Who controls the release of the report? What protections can be given to participants? Will participants be identified and identifiable/traceable? Who has the ultimate decision on what data are included?	Determine who controls the release of the report. Decide the rights and powers of the researcher. Decide the rights of veto. Decide how to protect those who may be identified/identifiable in the research.
10 At what point does the ownership pass from the respondent to the researcher and from the researcher to the recipients?	Who decides the ownership of the research? Can participants refuse to answer certain parts if they wish, or, if they have the option not to take part, must they opt out of everything? Can the researcher edit out certain responses?	Determine the ownership of the research at all stages of its progress. Decide the options available to the participants. Decide the rights of different parties in the research, e.g. respondents, researcher, recipients.

Research design and methodology

Question	*Sub-issues and problems*	*Decisions*
11 What are the specific purposes of the research?	How do these purposes derive from the overall aims of the research? Will some areas of the broad aims be covered, or will the specific research purposes have to be selective? What priorities are there?	Decide the specific research purposes and write them as concrete questions.
12 How are the general research purposes and aims operationalized into specific research questions?	Do the specific research questions together cover all the research purposes? Are the research questions sufficiently concrete as to suggest the kinds of answers and data required and the appropriate instrumentation and sampling? How to balance adequate coverage of research purposes with the risk of producing an unwieldy list of sub-questions?	Ensure that each main research purpose is translated into specific, concrete questions that, together, address the scope of the original research questions. Ensure that the questions are sufficiently specific as to suggest the most appropriate data types, kinds of answers required, sampling and instrumentation. Decide how to ensure that any selectivity still represents the main fields of the research questions.
13 What are the specific research questions?	Do the specific research questions demonstrate construct and content validity?	Ensure that the coverage and operationalization of the specific questions addresses content and construct validity respectively.
14 What needs to be the focus of the research in order to answer the research questions?	How may foci are necessary? Are the foci clearly identifiable and operationalizable?	Decide the number of foci of the research questions. Ensure that the foci are clear and can be operationalized.

15 What is the main methodology of the research?	How many methodologies are necessary? Are several methodologies compatible with each other? Will a single focus/research question require more than one methodology (e.g. for triangulation and concurrent validity)?	Decide the number, type and purposes of the methodologies to be used. Decide whether one or more methodologies is/are necessary to gain answers to specific research questions. Ensure that the most appropriate form of methodology is employed.
16 How will validity and reliability be addressed?	Will there be the opportunity for cross-checking? Will the depth and breadth required for content validity be feasible within the constraints of the research (e.g. time constraints, instrumentation)? In what senses are the research questions valid (e.g. construct validity)? Are the questions fair? How does the researcher know if people are telling the truth? What kinds of validity and reliability are to be addressed? How will the researcher take back the research to respondents for them to check that the interpretations are fair and acceptable? How will data be gathered consistently over time? How to ensure that each respondent is given the same opportunity to respond?	Determine the process of respondent validation of the data. Decide a necessary minimum of topics to be covered. Subject the plans to scrutiny by critical friends ('jury' validity). Pilot the research. Build in cross-checks on data. Address the appropriate forms of reliability and validity. Decide the questions to be asked and the methods used to ask them. Determine the balance of open and closed questions.
17 How will reflexivity be addressed?	How will reflexivity be recognized? Is reflexivity a problem? How can reflexivity be included in the research?	Determine the need to address reflexivity and to make this public. Determine how to address reflexivity in the research.
18 What kinds of data are required?	Does the research need words, numbers or both? Does the research need opinions, facts or both? Does the research seek to compare responses and results or simply to illuminate an issue?	Determine the most appropriate types of data for the foci and research questions. Balance objective and subjective data. Determine the purposes of collecting different types of data and the ways in which they can be processed.
19 From whom will data be acquired (i.e. sampling)?	Will there be adequate time to go to all the relevant parties? What kind of sample is required (e.g. probability/non-probability/random/ stratified etc.)? How to achieve a representative sample (if required)?	Determine the minimum and maximum sample. Decide on the criteria for sampling. Decide the kind of sample required. Decide the degree of representativeness of the sample. Decide how to follow up and not to follow up on the data gathered.

continued

TABLE 11.4 CONTINUED

20 Where else will data be available?	What documents and other written sources of data can be used? How to access and use confidential material? What will be the positive or negative effects on individuals of using certain documents?	Determine the necessary/desirable/possible documentary sources. Decide access and publication rights and protection of sensitive data.
21 How will the data be gathered (i.e. instrumentation)?	What methods of data gathering are available and appropriate to yield data to answer the research questions? What methods of data gathering will be used? How to construct interview schedules/questionnaires/tests/ observation schedules? What will be the effects of observing participants? How many methods should be used (e.g. to ensure reliability and validity)? Is it necessary or desirable to use more than one method of data collection on the same issue? Will many methods yield more reliable data? Will some methods be unsuitable for some people or for some issues?	Determine the most appropriate data-collection instruments to gather data to answer the research questions. Pilot the instruments and refine them subsequently. Decide the strengths and weaknesses of different data-collection instruments in the short and long term. Decide which methods are most suitable for which issues. Decide which issues will require more than one data-collection instrument. Decide whether the same data-collection methods will be used with all the participants.
22 Who will undertake the research?	Can different people plan and carry out different parts of the research?	Decide who will carry out the data collection, processing and reporting.
Data Analysis		
Question	*Sub-issues and problems*	*Decisions*
23 How will the data be analysed?	Are the data to be processed numerically or verbally? What computer packages are available to assist data processing and analysis? What statistical tests will be needed? How to perform a content analysis of word data? How to summarize and present word data? How to process all the different responses to open-ended questions? Will the data be presented person by person, issue by issue, aggregated to groups, or a combination of these? Does the research seek to make generalizations? Who will process the data?	Clarify the legitimate and illegitimate methods of data processing and analysis of quantitative and qualitative data. Decide which methods of data processing and analysis are most appropriate for which types of data and for which research questions. Check that the data processing and analysis will serve the research purposes. Determine the data protection issues if data are to be processed by 'outsiders' or particular 'insiders'.

24 How to verify and validate the data and their interpretation?	What opportunities will there be for respondents to check the researcher's interpretation? At what stages of the research is validation necessary? What will happen if respondents disagree with the researcher's interpretation?	Determine the process of respondent validation during the research. Decide the reporting of multiple perspectives and interpretations. Decide respondents' rights to have their views expressed or to veto reporting.
Presenting and reporting the results		
Question	*Sub-issues and problems*	*Decisions*
25 How to write up and report the research?	Who will write the report and for whom? How detailed must the report be? What must the report contain? What channels of dissemination of the research are to be used?	Ensure that the most appropriate form of reporting is used for the audiences. Keep the report as short, clear and complete as possible. Provide summaries if possible/fair. Ensure that the report enables fair critique and evaluation to be undertaken.
26 When to write up and report the research (e.g. ongoing or summative)?	How many times are appropriate for reporting? For whom are interim reports compiled? Which reports are public?	Decide the most appropriate timing, purposes and audiences of the reporting. Decide the status of the reporting (e.g. formal, informal, public, private).
27 How to present the results in tabular and/or written-out form?	How to ensure that everyone will understand the language or the statistics? How to respect the confidentiality of the participants? How to report multiple perspectives?	Decide the most appropriate form of reporting. Decide whether to provide a glossary of terms. Decide the format(s) of the reports. Decide the number and timing of the reports. Decide the protection of the individual's rights, balancing this with the public's rights to know.
28 How to present the results in non-verbal forms?	Will different parties require different reports? How to respect the confidentiality of the participants? How to report multiple perspectives?	Decide the most appropriate form of reporting. Decide the number and timing of the reports. Ensure that a written record is kept of oral reports. Decide the protection of the individual's rights, balancing this with the public's rights to know.
29 To whom to report (the necessary and possible audiences of the research)?	Do all participants receive a report? What will be the effects of not reporting to stakeholders?	Identify the stakeholders. Determine the least and most material to be made available to the stakeholders.
30 How frequently to report?	Is it necessary to provide interim reports? If interim reports are provided, how might this affect the future reports or the course of the research?	Decide on the timing and frequency of the reporting. Determine the formative and summative nature of the reports.

purposes of the research?') the researcher would have to differentiate major and minor purposes, explicit and maybe implicit purposes, whose purposes are being served by the research and whose interests are being served by the research. An example of these sub-issues and problems is contained in the second column.

At this point the planner is still at the divergent phase of the research planning, dealing with *planned possibilities*, opening up the research to all facets and interpretations. In the column headed 'decisions' the research planner is moving towards a convergent phase, where planned possibilities become visible within the terms of constraints available to the researcher. Here the researcher moves down the column marked 'decisions' to see how well the decision which is taken in regard to one issue/question fits in with the decisions in regard to other issues/questions. For one decision to fit with another, four factors must be present:

1. All of the cells in the 'decisions' column must be coherent – they must not contradict each other;
2. All of the cells in the 'decisions' column must be mutually supporting;
3. All of the cells in the 'decisions' column must be practicable when taken separately;
4. All of the cells in the 'decisions' column must be practicable when taken together.

Not all of the planned possibilities might be practicable when these four criteria are applied. It would be of very little use if the methods of data collection listed in the 'decisions' column of question 21 ('How will the data be gathered?') offered little opportunity to fulfil the needs of acquiring information to answer question 7 ('What must be the focus in order to answer the research questions?'), or if the methods of data collection are impracticable within the timescales available in question 4.

In the matrix of Table 11.4 the cells have been completed in a deliberately content-free way, i.e. the matrix as presented here does not deal with the specific, actual points which might emerge in a particular research proposal. If the matrix were to be used for planning an actual piece of research, then, instead of couching the wording of each cell in generalized terms, it would be more useful if *specific, concrete* responses were given which address particular issues and concerns in the research proposal.

Many of these questions concern rights, responsibilities and the political uses (and abuses) of the research. This underlines the view that research is an inherently political and moral activity; it is not politically or morally neutral. The researcher has to be concerned with the uses as well as the conduct of the research.

11.13 Managing the planning of research

It should not be assumed that research will always go according to plan. For example, the attrition of the sample might happen (participants leaving during the research), or a poor response rate to questionnaires might be encountered, rendering subsequent analysis, reporting and generalization problematical; administrative support might not be forthcoming, or there might be serious slippage in the timing. This is not to say that a plan for the research should not be made; rather it is to suggest that it is dangerous to put absolute faith in it. For an example of what to include in a research proposal, see the accompanying website.

To manage the complexity in planning outlined above, a simple four-stage model can be proposed:

Stage 1: Identify the purposes of the research.
Stage 2: Identify and give priority to the constraints under which the research will take place;
Stage 3: Plan the possibilities for the research within these constraints.
Stage 4: Decide the research design.

Each stage contains several operations. Figure 11.1 clarifies this four-stage model, drawing out the various operations contained in each stage.

Research planners can consider which instruments will be used at which stage of the research and with which sectors of the sample population. Table 11.5 sets out a matrix of these for planning, for example, a small-scale piece of research.

A matrix approach such as this enables research planners to see at a glance their coverage of the sample and of the instruments used at particular points in time, making omissions clear and promoting such questions as:

- Why are certain instruments used at certain times and not at others?
- Why are certain instruments used with certain people and not with others?
- Why do certain times in the research use more instruments than other times?
- Why is there such a concentration of instruments at the end of the study?
- Why are certain groups involved in more instruments than other groups?
- Why are some groups apparently neglected (e.g. parents), for example, is there a political dimension to the research?
- Why are questionnaires the main kinds of instrument to be used?

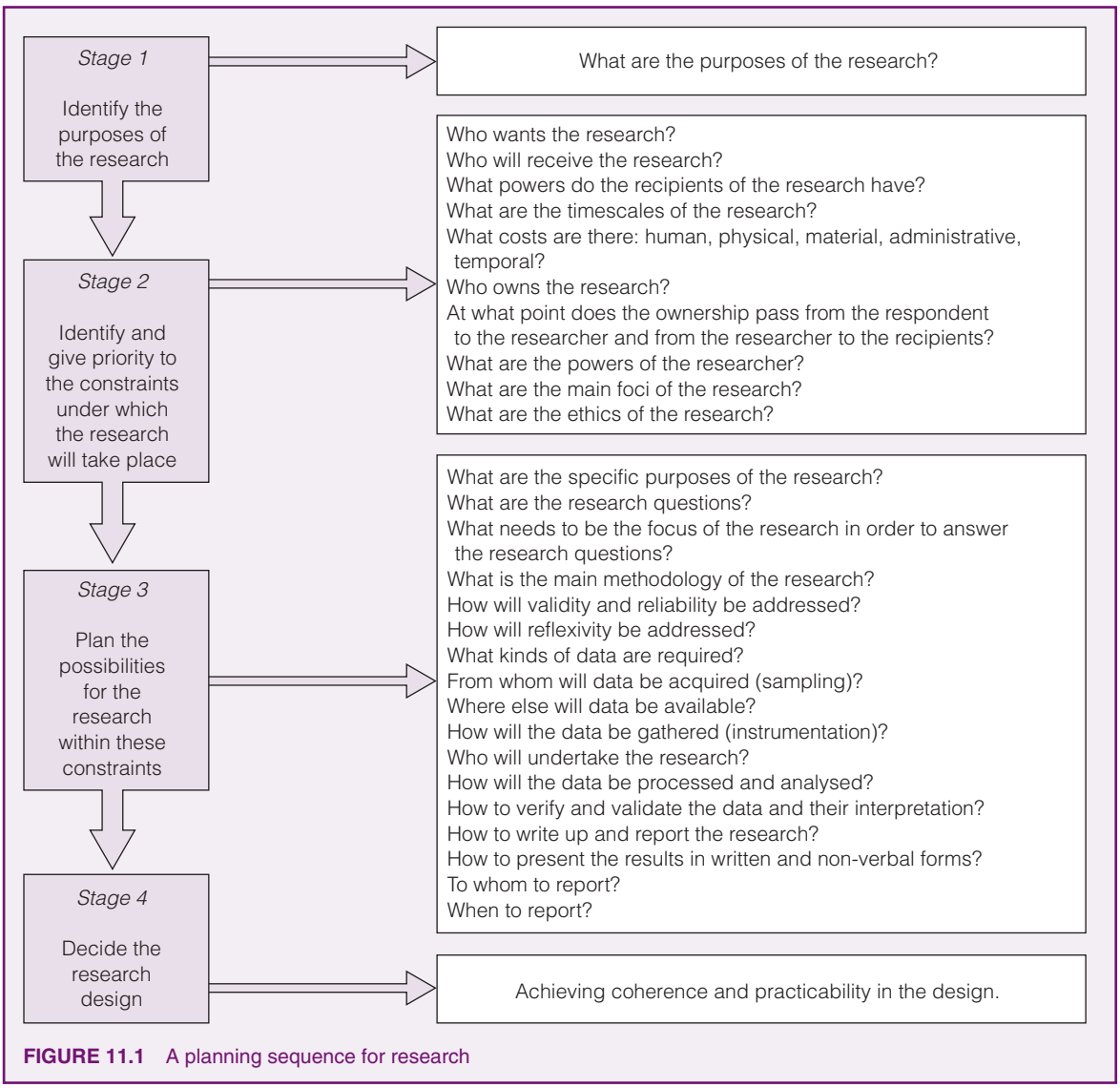


FIGURE 11.1 A planning sequence for research

- Why are some instruments (e.g. observation, testing) not used at all?
- What makes the five stages separate?
- Are documents only held by certain parties (and, if so, might one suspect an 'institutional line' to be revealed in them)?
- Are some parties more difficult to contact than others (e.g. university teacher educators)?
- Are some parties more important to the research than others (e.g. school principals)?
- Why are some parties excluded from the sample (e.g. school governors, policy makers, teachers' associations and unions)?
- What is the difference between the three groups of teachers?

Matrix planning is useful for exposing key features of the planning of research. Further matrices might be constructed to indicate other features of the research, for example:

- the timing of the identification of the sample;
- the timing of the release of interim reports;
- the timing of the release of the final report;
- the timing of pre-tests and post-tests (in an experimental style of research);

TABLE 11.5 A PLANNING MATRIX FOR RESEARCH

Time sample	*Stage 1 (start)*	*Stage 2 (3 months)*	*Stage 3 (6 months)*	*Stage 4 (9 months)*	*Stage 5 (12 months)*
Principal/ Headteacher	Documents Interview Questionnaire 1	Interview	Documents Questionnaire 2	Interview	Documents Interview Questionnaire 3
Teacher group 1	Questionnaire 1		Questionnaire 2		Questionnaire 3
Teacher group 2	Questionnaire 1		Questionnaire 2		Questionnaire 3
Teacher group 3	Questionnaire 1		Questionnaire 2		Questionnaire 3
Students			Questionnaire 2		Interview
Parents	Questionnaire 1		Questionnaire 2		Questionnaire 3
University teacher educators	Interview Documents				Interview Documents

- the timing of intensive necessary resource support (e.g. reprographics);
- the timing of meetings of interested parties.

These examples cover timings only; other matrices might be developed to cover other combinations, for example: reporting by audiences; research team meetings by reporting; instrumentation by participants etc. They are useful summary devices.

11.14 A worked example

Let us say that a school is experiencing low morale and the researcher has been brought in to investigate the school's organizational culture as it impacts on morale. The researcher has been given open access to the school and has five months from the start of the project to producing the report. (For a fuller version of this, see the accompanying website.) She plans the research thus:

1 Purposes

i To present an overall and in-depth picture of the organizational culture(s) and subcultures, including the prevailing cultures and subcultures, within the school;
ii To provide an indication of the strength of the organizational culture(s);
iii To make suggestions and recommendations about the organizational culture of, and its development at, the school.

2 Research questions

i What are the major and minor elements of organizational culture in the school?
ii What are the organizational cultures and subcultures in the school?
iii Which (sub)cultures are the most and least prevalent in the school, and in which parts of the school are these most and least prevalent?
iv How strong and intense are the (sub)cultures in the school?
v What are the causes and effects of the (sub)cultures in the school?
vi How can the (sub)cultures be improved in the school?

3 Focus

Three levels of organizational cultures will be examined:

i underlying values and assumptions;
ii espoused values and enacted behaviours;
iii artefacts.

Organizational culture concerns values, assumptions, beliefs, espoused theories, observed practices, areas of conflict and consensus, the formal and hidden messages contained in artefacts, messages, documents and language, the 'way we do things', the physical environment, relationships, power, control, communication, customs and rituals, stories, the reward system and motivation, the micro-politics of the school, involvement in decision making, empowerment and exploitation/manipulation, leadership, commitment, and so on.

In terms of the 'possible sequence of considerations' set out earlier in the chapter, the 'preparatory issues' here include: (i) a literature review on organizational culture, organizational health, leadership of organizations, motivation, communication and empowerment; (ii) the theoretical framework underpinning the research

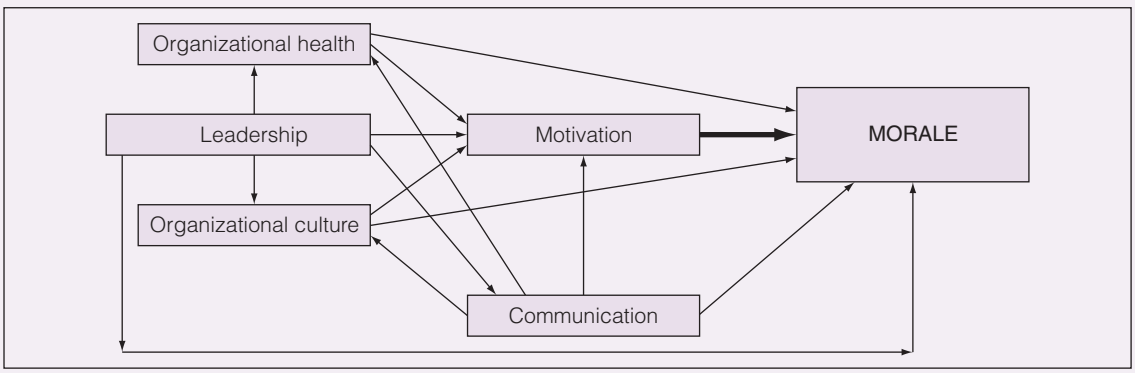
(see Figure 11.2); and (iii) the devising of the conceptual framework to include: levels of organizational culture (artefacts, enacted values and underlying assumptions; see Figure 11.3); key features of organizational health; key issues in, and styles of, leadership; key features of communication (e.g. direction, content, medium); and motivation (intrinsic and extrinsic). Together these constitute the ontological dimension of the 'preparatory issues' of the 'possible sequence of considerations'.

4 Methodology

The methodologies here address the epistemological dimension of the 'preparatory issues' of the 'possible sequence of considerations' set out earlier in the chapter: how we can know about, and research, the phenomenon. Here organizational culture is intangible, yet its impact on a school's operations and morale is very tangible. This suggests that, whilst quantitative measures may be used, they are likely only to yield comparatively superficial information about the school's culture. In order to probe beneath the surface of the school's culture, to examine the less overt aspects of the school's culture(s) and subcultures, it is important to combine quantitative and qualitative methodologies for data collection. A mixed methodology will be used for the data collection, using numerical and verbal data, in order to gather rounded, reliable data. A survey approach will be used to gain an overall picture, and a more fine-grained analysis will be achieved through qualitative approaches (Figure 11.3).

5 Instrumentation

The data gathered will be largely perception-based, and will involve gathering employees' views of the (sub)cultures. As the concept of organizational culture is derived,



Though at first sight the graphic looks complex, because there are many arrows, in fact it is not complicated. The theory underpinning this, which derives from a literature review of empirical studies of organizational behaviour, leadership, individual and social psychology, is that these five identified key factors influence morale: organizational health, organizational culture, leadership, communication and motivation. Of course, there are many, many more factors, but the research has assumed that these are key factors in the present study. This highlights an important feature of theory: it is selective in what it includes and it operates at a high level of generality (a conceptual model would provide much closer detail here, breaking down the main areas into more specific elements).

The arrows indicate the assumed directions of influence of key factors in morale which derive from literature. Here *organizational health* and *organizational culture* have a direct effect on morale and motivation; *leadership* has a direct effect on organizational health, organizational culture, motivation, communication and morale – in other words it is a key factor; *communication* has a direct effect on motivation, organizational culture, organizational health and morale – in other words, it is an important factor; and *motivation* has a direct effect on morale. Note that the direction of inferred causality is one-way, even though, in reality, the causality is multi-directional and reciprocal. This indicates another key feature of the theory: it is selective in its inferred or assumed direction of causality (and, indeed, in causal modelling).

The theory here is also that leadership is a key driver: note that the causal arrows lead *from*, rather than *to*, leadership. Further, motivation is a key recipient of factors, and, in turn, it is assumed to influence morale. One can infer from this that motivation exerts an important influence on morale, and this is reflected in the thickness of the causal arrow from motivation to morale.

The graphic here, then, is a portrayal of the theoretical assumptions that underpin the research on morale.

FIGURE 11.2 Theoretical framework for investigating low morale in an organization

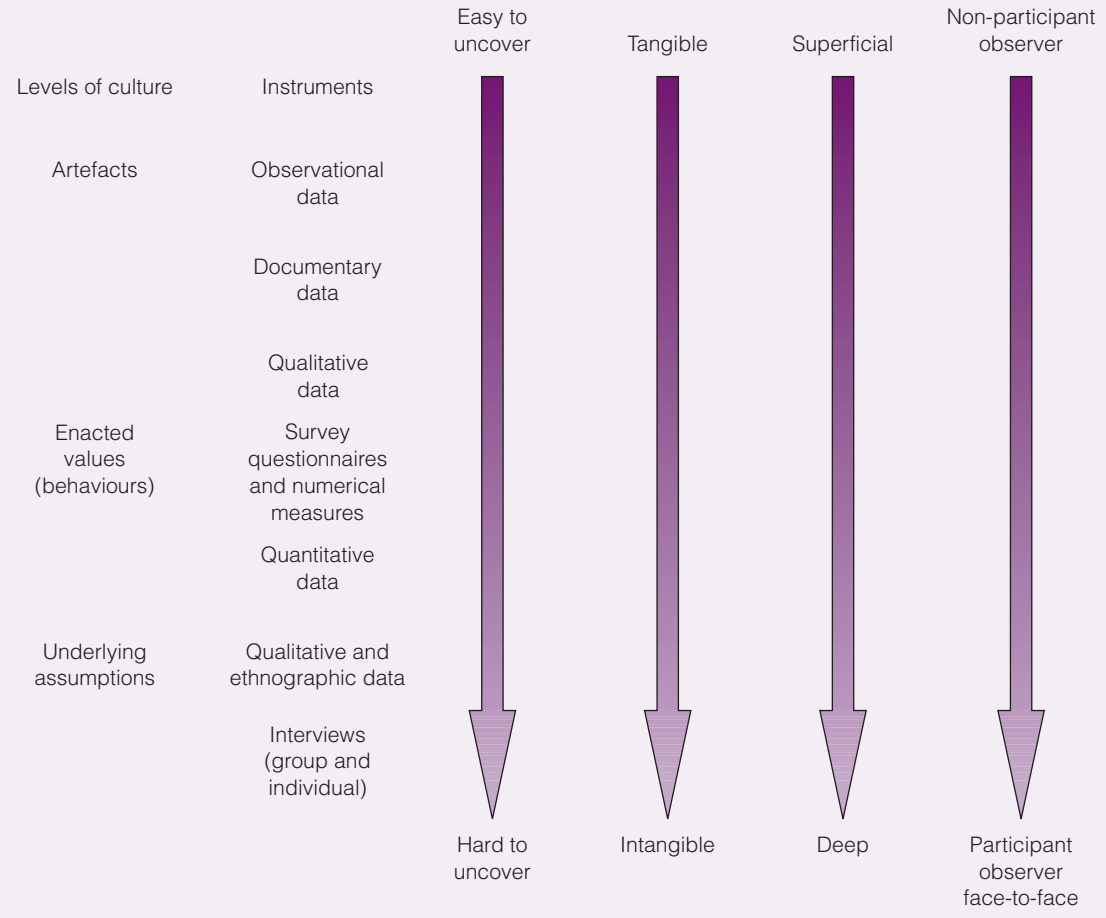


FIGURE 11.3 Understanding the levels of organizational culture

in part, from ethnography and anthropology, the research will use qualitative and ethnographic methods.

One of the difficulties anticipated is that the less tangible aspects of the school might be the most difficult on which to collect data. Not only will people find it harder to articulate responses and constructs, but they may also be reluctant to reveal these in public. The more the project addresses intangible and unmeasurable elements, and the richer the data that are to be collected, the more there is a need for increased and sensitive interpersonal behaviour, face-to-face data-collection methods, and qualitative data.

There are several instruments for data collection: questionnaires, semi-structured interviews (individual and group), observational data, documentary data and reports will constitute a necessary minimum, as follows (see also Figure 11.3):

i *Questionnaire surveys*, using commercially available instruments, each of which measures different aspects of school's culture, in particular:

- the organizational culture questionnaire by Harrison and Stokes (1992), which looks at overall cultures and provides a general picture in terms of *role*, *power*, *achievement* and *support* cultures, and examines the differences between existing and preferred cultures;
- the Organizational Culture Inventory by Cooke and Lafferty (1989), which provides a comprehensive and reliable analysis of the presenting organizational cultures.

Questionnaires, using rating scales, will catch articulated, espoused, enacted, visible aspects of organizational

culture, and will measure, for example, the extent of sharedness of culture, congruence between existing and ideal, and strength and intensity of culture.

ii *Semi-structured qualitative interviews for individuals and groups*, gathering data on the more intangible aspects of the school's culture, for example, values, assumptions, beliefs, wishes, problems. Interviews will be semi-structured, i.e. with a given agenda and open-ended questions. As face-to-face individual interviews might be intimidating for some groups, group interviews will be used. In all of the interviews the important part will be the supplementary question, 'why?'.

iii *Observational data* will comment on the physical environment, and will then be followed up with interview material to discover participants' responses to, perceptions of, messages contained in, and attitudes to, the physical environment. Artefacts, clothing, shared and private spaces, furniture, notices, regulations etc. all give messages to participants.

iv *Documentary analysis and additional stored data*, reporting the formal matters in the school, examined for what they include and what they exclude.

6 Sampling

i The questionnaire will be given to all employees who are willing to participate;

ii The semi-structured interviews will be conducted on a 'critical case' basis, i.e. with participants who are in key positions and who are 'knowledgeable people' about the activities and operations of the school.

There will be stratified sampling for the survey instruments, in order to examine how perceptions of the school's organizational culture vary according to the characteristics of the sub-samples. This will enable the levels of congruence or disjunction between the responses of the various sub-groups to be charted. Nominal characteristics of the sampling will be included, for example, age, level in the school, departments, gender, ethnicity, nationality and years of working in the school.

7 Parameters

i The data will be collected on a 'one-shot' basis rather than longitudinally;

ii A multi-method approach will be used for data collection.

8 Stages in the research

There are five stages in the research:

Stage one: Development and operationalization, including

i A review of literature and commercially produced instruments;

ii Clarification of the research questions;

iii Clarification of methodology and sampling;

Stage two: Instrumentation and the piloting of the instruments

i Questionnaire development and piloting;

ii Semi-structured interview schedules and piloting;

iii Gathering of observational data;

iv Analysis of documentary data;

Because of the limited number of senior staff, it will not be possible to conduct pilot interviews with them, as this will preclude them from the final data collection.

Stage three: Data collection, which will proceed in the following sequence

Administration of the questionnaire → Analysis of questionnaire data to provide material for the interviews → Interviews to be conducted concurrently.

Stage four: Data analysis and interpretation

Numerical data will be processed with SPSS, which will also enable the responses from sub-groups of the school to be separated for analysis. Qualitative data will be analysed using protocols of content analysis.

Stage five: Reporting

A full report on the findings will include conclusions, implications and recommendations.

9 Ethics and ownership

Participation in the project will be on the basis of informed consent, and on a voluntary basis, with rights of withdrawal at any time. Given the size and scope of the cultural survey, it is likely that key people in the school will be identifiable, even though the report is confidential. This will be made clear to the potential participants. Copies of the report will be available for all the employees. Data, once given to the researcher, are his/hers, and she/he may not use them in any way which will publicly identify the school; the report is the property of the school.

10 Time frames

The project will be completed in five months:

BOX 11.3 A CHECKLIST FOR PLANNING RESEARCH

1. How have you taken account of the ontological and epistemological characteristics of the phenomenon to be investigated?
2. Have you clarified the purposes of the research?
3. What do you want the research to do, to 'deliver', to find out?
4. What are the purposes and objectives of the research?
5. Have you identified the constraints on your research? What are they?
6. Is your research feasible within the required time frames?
7. What approaches to the research (methodologies) are most suitable for the research, in terms of the ontology and epistemology of the phenomenon under investigation, and the purposes of the research?
8. What warrants have you provided to link evidence to conclusions?
9. What are the methodology(ies) and paradigm(s) on which the research is built? How comfortably do they fit the research purposes and the nature of the phenomena under investigation?
10. Does your research seek to test a theory or hypothesis, to develop a theory, to investigate and explore, to understand, to describe, to develop specific practices, to evaluate, to investigate?
11. Will your research best be accomplished by research that is naturalistic, interpretive, positivist, post-positivist, mixed methods-based, participatory, evaluatory, ideology critical, feminist, complexity theory-based, either alone or in combination?
12. Will your research use survey, documentary research, quantitative methods, ethnographic or qualitative methods, experiments, historical sources, action research, case studies, *ex post facto* designs, either alone or in combination?
13. Do you need to identify independent and dependent variables?
14. Is your research seeking to establish causation?
15. Are you seeking to generalize from your research?
16. In planning your research, have you indicated how you will address validity and reliability in the conceptualization, planning, methodology, instrumentation, data analysis, discussion, the drawing of conclusions and reporting?
17. Who will gather, enter, process, analyse, interpret and verify your data?
18. Have you identified how you will address reflexivity?
19. Have you identified what you need to focus on in order to answer the research questions and conduct the research?
20. Have you identified whom you need to contact in connection with conducting the research?
21. Have you checked that all the ethical issues in the research have been addressed with all the necessary parties? Have you gained ethical clearance to conduct the research?
22. Is your research overt or covert? If it is covert, or involves intentional deceit, how is this justified?
23. Have you conducted a literature review, and how does the literature review inform your research?
24. Does your research need research questions? If not, why not? If so, what are they and have they been operationalized comprehensively, concretely and fairly?
25. Have you operationalized your research purposes into research questions?
26. What are the timescales for the different stages of your research?
27. Have you identified what kinds of data you need at different stages of the research, and why?
28. Have you identified the instruments that you will need for data collection at the different stages of the research, for example: interviews, questionnaires, observations, role-plays, accounts, personal constructs, tests, case studies, field notes, diaries, documents, etc.?
29. Is your research 'front-loaded' or 'end-loaded' in terms of planning, conduct and analysis?
30. Who are the participants?
31. Do you need a sample or a population? What is the population and what are the sample and the sampling strategy?
32. Have you planned how you will analyse the data, and at what stages of the research?
33. Have you planned how you will validate your data and interpretation of the data?
34. Have you planned when and how you will report and present the research findings, and to whom?
35. Have you planned how you will disseminate your research findings?
36. Have you identified what controls you will place on the release of your findings, and to whom, why and for how long, and who owns the research and the data?

- the first month for a review of the relevant literature;
- the second month to develop the instrumentation and research design;
- the third month to gather the data;
- the fourth month to analyse the data;
- the fifth month to complete the report.

The example indicates a systematic approach to the planning and conduct of the research that springs from a perceived need in the school. It works within given constraints and makes clear what it will 'deliver'. Though the research does not specify hypotheses to be tested, nevertheless it would not be difficult to convert the research questions into hypotheses if this style of research were preferred.

11.15 Ensuring quality in the planning of research

'Fitness for purpose' reigns in planning research; the research plan must suit the purposes of the research. If the reader is left feeling, at the end of this chapter, that the task of research is complex, then that is an important message, for rigour and thoughtful, thorough planning are necessary if the research is to be worthwhile and effective. For a checklist for evaluating research, see Box 11.3 and the accompanying website.

The intention of the research planning and design is to ensure that rigour, fitness for purpose and high quality are addressed. Furlong and Oancea (2005, pp. 11–15) identify several clear dimensions of quality in educational research. For theoretical and methodological robustness they identify quality in terms of: (a) the 'trustworthiness' of the research; (b) its 'contribution to knowledge'; (c) its 'explicitness in designing and reporting'; (d) its 'propriety' (conformance to legal and ethical requirements); and (e) the 'paradigm-dependence' (fidelity to the paradigm, ontology and epistemological premises of the research).

For 'value for use' (the 'technological dimension'), Furlong and Oancea (2005, pp. 12–13) identify key indicators of quality as: (a) the 'salience/timeliness' of the research; (b) its 'purposivity' (fitness for purpose); (c) its 'specificity and accessibility' (scope, responsiveness to user needs, and predicted usage); (d) its 'concern for enabling impact' (dissemination for impact); and (e) its 'flexibility and operationalisability' (development into practical terms and utility for audiences).

For 'capacity building and value for people' (Furlong and Oancea, 2005, pp. 13–14), they identify key indicators of quality as residing in: (a) 'partnership, collaboration and engagement'; (b) 'plausibility' ('from the practitioner's perspective'); (c) 'reflection and criticism' (research that develops reflexivity and self-reflection); (d) 'receptiveness' (research that enhances the receptiveness of practitioners and a wider audience); and (e) 'stimulating personal growth'.

For their 'economic dimension', Furlong and Oancea (2005, pp. 14–15) indicate six elements of quality in research: (a) 'cost-effectiveness'; (b) 'marketability' and 'competitiveness' (e.g. in the research market); (c) 'auditability'; (d) 'feasibility'; (e) 'originality'; and (f) 'value-efficiency'.

The sections of this chapter and the preceding chapter, separately and together, have indicated how these can be addressed in the planning of research.

Companion Website

The companion website to the book provides PowerPoint slides for this chapter, which list the structure of the chapter and then provide a summary of the key points in each of its sections. This resource can be found online at: **www.routledge.com/cw/cohen**.

Sampling

CHAPTER 12

Sampling is a crucial element of research, and this chapter introduces key issues in sampling, including:

- sample size
- statistical power
- sampling error
- sample representativeness
- access to the sample
- sampling strategy
- probability samples
- non-probability samples
- sampling in qualitative research
- sampling in mixed methods research
- planning the sampling

12.1 Introduction

The quality of a piece of research stands or falls by the appropriateness of its methodology and instrumentation and by the suitability of the sampling strategy that has been adopted. Questions of sampling arise directly out of the issue of defining the population on which the research will focus.

Researchers must take sampling decisions early in the overall planning of research, not least of which is whether to have a sample or an entire population. However, as this chapter concerns sampling we keep to this topic, and here factors such as expense, time and accessibility frequently prevent researchers from gaining information from the whole population. Therefore they often need to be able to obtain data from a smaller group or subset of the total population in such a way that the knowledge gained is representative of the total population (however defined) under study. This smaller group or subset is the *sample*. Experienced researchers start with the total population and work down to the sample. By contrast, less experienced researchers often work from the bottom up, that is, they determine the minimum number of respondents needed to conduct the research (Bailey, 1994). However, unless they identify the total population in advance, it is virtually impossible for them to assess how representative the sample is that they have drawn.

Suppose that a class teacher has been released from her teaching commitments for one month in order to conduct some research into the abilities of thirteen-year-old students to undertake a set of science experiments. The research is to draw on three secondary schools which contain 300 such students each, a total of 900 students, and the method that the teacher has been asked to use for data collection is a semi-structured interview. Because of the time available to the teacher it would be impossible for her to interview all 900 students (the total population being all the cases). Therefore she has to be selective and to interview fewer than all 900 students. How will she decide that selection; how will she select which students to interview?

If she were to interview 200 of the students, would that be too many? If she were to interview just twenty of the students, would that be too few? If she were to interview just the males or just the females, would that give her a fair picture? If she were to interview just those students whom the science teachers had decided were 'good at science', would that yield a true picture of the total population of 900 students? Perhaps it would be better for her to interview those students who were experiencing difficulty in science and who did not enjoy science, as well as those who were 'good at science'. Suppose that she turns up on the days of the interviews only to find that those students who do not enjoy science have decided to absent themselves from the science lesson. How can she reach those students?

Decisions and problems such as these face researchers in deciding the sampling strategy to be used. Judgements have to be made about several key factors in sampling, for example:

- the sample size;
- statistical power;
- the representativeness and parameters of the sample;
- access to the sample;
- the sampling strategy to be used;
- the kind of research that is being undertaken (e.g. quantitative/qualitative/mixed methods).