A handbook for research in adult and vocational education

EDITED BY
ROBERT FUNNELL

NCVER

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Foreword

Twenty-one years ago the Kangan Committee said there should be a three-pronged approach to improving research in vocational education. First, it recommended the formation of what has become the National Centre for Vocational Education Research (NCVER). Second, it recommended further funding for research (separate from funding for NCVER). Third, it recommended that funds should be allocated for training TAFE teachers in research methods. The first two of these have been achieved, but the third has never been followed through.

The purpose of this publication is to provide background information to help those trainers and TAFE teachers who want to learn about conducting research in vocational education and training. There are many other books which deal with research methodologies, educational statistics, curriculum evaluation, questionnaire design, and so on; this publication will supplement them. It will also be used in workshops conducted by NCVER.

Authors of the chapters which comprise this book are employed at Griffith University, which houses the National Centre for Skills Formation Research and Development. The centre's head is Professor John Stevenson, who is editor of the NCVER's *Australian and New Zealand Journal of Vocational Education Research*. This journal is essential reading for those wanting to carry out vocational education and training research.

It is hoped that this will be the first of many publications which are designed to strengthen research in an area of such vital importance to the country's future well-being.

William Hall
NCVER, Adelaide

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Introduction

Many books on research methods have been published in the last forty years. Most have come out of North American universities where courses in research methodology proliferate. There are now nearly as many books on how to do research as there are books on how to write. Few people learn to write from reading such books and it is improbable that you will learn to be a researcher by simply reading this and other books on research methods.

Book learning is only a small part of the process. Getting the feel for an occupation comes from being immersed in it, learning from example, from trial and error, by talking with others when things do not turn out as expected so that we can, hopefully, avoid mistakes in the future. We may undergo 'baptism of fire', but in time we arrive at a point where we are confident that we can pass some of what we know on to others who are starting out. This is also the case with research. Prior to the late 1950s (and even now) knowledge about how research should be done was passed on to newcomers by those already practised in the craft.

This book will not turn its readers into researchers, but it will provide insights into how research can be best approached in a changing sector that is now being referred to as 'VET'—vocational education and training. Through reading, it is possible to think about the types of research methods that interest you most and possible research projects—either to write proposals for or to actually carry out. In doing research it is essential, especially initially, to find someone, or a group, who can advise, instruct and act as a sounding board at different stages. Further skills can be gained through further study.

As with learning any other craft, you should understand how different types of research are conducted, what are the strengths and weaknesses of the various approaches and the extent to which research 'findings' can be believed. Much of the 'research' published today has been undertaken in a commercial environment that seeks to convince us of what to eat, buy, wear, be entertained by, etc. Market imperatives drive much of what is researched and published. These imperatives go beyond sales markets. They extend to a political and personal agenda too. Those who carry out polling surveys at election times, for example, convince us they can predict voting patterns, and yet so often prove incorrect. Why are such surveys undertaken? Why are they so often wrong? What agenda are being played out? How do the research methods undertaken flaw the process and the results? In considering the answers to such questions, we need to be informed about how the methodologies employed will influence the results and how we interpret them. Often this means seeing through slick presentations, uses of statistics, and unfamiliar language.

In VET we can also see how, within the current training agenda, that market imperatives are playing an increasing part in funding, course offerings, methods of teaching and learning and where training is carried out. We can again see that within such a context, personal and political agenda will drive much of our practice. Well-timed research, can and does influence some of the training agenda. We hope that insights gained in your doing and reading about various research approaches will provide a means for better understanding the present agenda in VET and for joining into the ensuing debates.

This handbook has been written by researchers with expertise in quantitative (statistical) research and with qualitative (descriptive) research, with contributions from a practising TAFE teacher and a recent university graduate. We have tried to strike a mid-way stance between the everyday logic of vocational education and the often complex theory and language of research studies which people can find off-putting. We hope to give you a taste of research methods and a greater understanding of their application within VET. Because of the nature of research, to give you step-by-step checklists for performing within such a complex field would be like Picasso writing a painting-by-numbers book! We hope our compromise will be useful for people tackling research within VET for the first time and recommend that if you wish to take up further research that you consult further readings (please see our reference list) or enrol in a research methodology course.

It is difficult to advise on how you should read what is written in this book as people differ in their motives for doing research and for finding ways for entering the subject. The first four chapters contain information about vocational education and how research might be approached within this field. Chapters five to nine outline the range of methods that are normally used in research and suggest how these might be applied to vocational education. Chapters ten to twelve show how research can be made more valid and how it can be analysed. Chapters thirteen and fourteen provide examples of how research should be written and presented.

Attention is given here to the types of writing which will be required of staff in vocational education as they will have to do research, make the general public aware of their offerings and tender for funding from various bodies. Chapter fifteen considers the ethical dimensions of research, while the appendices look at the national vocational education and training database and current research studies that relate to VET. It might be best to work your way through the first four chapters then consult the other chapters as you seek information from them in doing your own research.

Finally, this book is aimed primarily at those who either work within vocational education or who have an interest in learning more about the sector through the doing of research.

Bob Funnell, 1996.

1 What is vocational education and training research?

Bob Funnell

What is VET?

Vocational education and training is a newly coined term. In the language of the Commonwealth bureaucracy in which it was devised, 'VET' is meant to represent a new system of training, one different from the TAFE system of the last twenty years and the system of technical colleges which preceded it. The logic of previous transformations of technical education has often not been clear to the general public. So too at the present. The public, many employers, as well as those in training, education and in workplaces are only partly aware of what the new agenda is, what it can do and what it may mean to them. Some basic questions are still not clear. To what extent is TAFE to remain the government's traditional source of training? What is its proposed new identity in a VET system? To what extent are these changes a benefit, hindrance or threat to me—as a person, as part of an occupational group or as an employer? Many players across this spectrum are partially aware, others are still not aware or not sure and are insecure about what VET actually is and might be. So what comprises the study of VET contains many unanswered questions. These misunderstandings of what VET is might be a sound basis for research.

Why do research in VET?

Why might teachers in TAFE and trainers in other areas want to conduct research, particularly if they have no 'academic' training—or their undergraduate studies have not suitably prepared them to conduct research? If we argue that doing research means gathering information to think about and help in the solving of problems, then reasons can be proposed. We show later that what we know about something is gained from four sources. These are from personal experience and commonsense, authority, tradition and from the social sciences. In terms of commonsense, people want access to information that will help them to hold on to their jobs, do their jobs better, gain new jobs and better positions in the new order, all by getting a better grip on what is changing in the

system. Their research seeks to find why things are as they are, what they might do about it for their own interests and how this affects those they teach and interact with in the course of their work. One means of controlling one's position in a period of change is to gain some form of authority—acquire knowledge that is respected, and perhaps a position that will go with that knowledge. Here, another form of research is appropriate. It is about learning an in-depth amount about areas in which expertise is relatively thin, knowing how it can be best applied and be of most benefit for a section, a college, the system. This applies for instance, in competency-based training, flexible delivery, recognition of prior learning, strategic planning, needs analysis, writing and developing proposals for funding.

At another level, much that has been traditional to the TAFE system is under constant change—the system is continually being restructured, management is being 'flattened', areas that were once the foundation of the college system are being rationalised, working conditions and patterns of employment are very different from those of the previous generation. This is occurring in a period of decreased funding. Combined with these changes, the official ideology of TAFE is shifting. This is shown in the reports by Dawkins (1988), Finn (1991), Mayer (1992), Carmichael (1992), where there is a often a push for things that may not fit comfortably and, when they do, are difficult to handle along with other changes. Little has been written to describe these aspects of change and to show how they alter people's personal stance to 'working for TAFE' and being a part of VET. This information would give some reasons as to why some aspects of the reform agenda are being followed and others are not.

Social science can assist here on two levels. Research can be used to deduce, to test the propositions of the national agenda for their general and specific truth. Will CBT, a training market or new forms of accreditation, secure the benefits being proposed and if so, where and in which situations? Research can also be employed to describe strengths and weaknesses of implementation in case studies and suggest new ways for thinking about the agenda. Strategies used to develop a training market might work well with some private providers and companies, but be shown to be ineffective when applied in country areas and in small business. The types of knowledge that research can be based in and for what purposes are shown in the table opposite. They are further discussed in chapter three.

Knowledge sought	Purpose for research
Commonsense reasons	Job related—improve teaching and learning, hold position.
Gain authority	Gain specialised expertise for advantage of self, section, college, system.
Understand change to tradition	Make sense of new structures and ideologies.
Test truth of propositions of new agenda	Systematic studies that measure and can be generalised across the agenda.
Show strengths and weaknesses in the form of cases	Descriptive studies that demonstrate anomalies in implementation.

In the examples described above, all of us should keep in perspective what research actually is and not see it as something done only by so-called 'experts'. Research, as the Australian sociologist Bob Connell observes; 'is something that anyone can, and everyone ought to do'.

> *It is, simply, collecting information and thinking systematically about it. The word 'research' carries overtones of abstruse statistics and complex methods, white coats and computers. Some social research is highly specialised, but most is not; much of the best work is logically very straightforward. Useful research on many problems can be done with small resources, and should be a regular part of the life of any thoughtful person involved in social action . . .*
>
> (Connell 1975, p.1)

For our purposes, vocational educational research is that which is concerned with the problems and issues confronting those who work in the field. The ideas underlining this handbook are that TAFE teachers and people involved in training should experience research first hand in much the same way as Connell is proposing. The handbook is directed to those in vocational education who might like to embark on beginning research projects. What is written here will not provide instant results, just as a manual for writing fiction is unlikely to lead to the publication of a novel at first attempt. Some of the advice and direction suggested will have to be scaled down or adapted to meet your own situations and requirements. Some of what is advised will fit and other aspects will not. It must be stressed here that research is a craft, a trade that is best learnt with the assistance and guidance of others who have practised it for some time. So look for others who will help you piece a research project together, no matter how small or large. It is in doing research that the process can be learnt and applied at another stage. The scope is not so important as the understanding that results from completion of a project, at any scale, that is done well.

Ken Wiltshire, after an analysis of the role of research in policy making in TAFE, says that a number of factors:

> *. . . signal the need for greater research for the TAFE system. The question is where to locate the research capacity, how to focus and energise it. Some of the research can be complementary to that done for the university and school sectors but much will have to stand alone. University researchers will only be of limited value . . . On the other hand there are academic researchers whose research skills and areas of interest would be of considerable relevance and usefulness. However, it would be ideal if TAFE could develop further its own in-house research capacity as well; there are many people in current TAFE systems capable and willing to perform this role with the benefit of vast experience; it may simply be a matter of unearthing them.*
>
> (Wiltshire 1993, p.41).

The research load should, as Wiltshire suggests, be shared across a number of areas but with the intention of developing research as an enterprise within the TAFE system. In dealing with the TAFE system and its move into the VET system, it is useful to consider these two systems as part of a field that is emerging in this present era.

Locating an identity and a place in the game

John Stevenson has argued that TAFE and VET are the sectors of education most in search of identity because they are politically and economically reliant on other educational and occupational areas with which they interface. For John, TAFE can be likened to a large jelly. It changes shape in line with external pressures but has a tendency to fall back into its initial position once the policy pressures are off, only to take a new shape that is in line with the next policy and funding initiative.

> *TAFE's eagerness to respond to changing government concerns has been welcomed by governments who have injected funds into the sector. These funds have reinforced responsiveness. Governments have accepted responsiveness as a defining feature of TAFE, and have expanded and reshaped it to achieve political, economic and other social goals . . . Responsiveness has also had adverse effects. It has created, frequent, abrupt, incoherent and unsustainable changes in the shape of the sector.*
>
> (Stevenson 1994, p.15)

The manner in which TAFE interfaces with other areas can be employed to understand the changes that have taken place and

continue to take place within VET. Taking this notion of interfaces a little further, education and training can be seen as a field—much like a playing field—and as a game—softball, table tennis, or a board or a card game. Each field or game has its own prescribed positions within the field or on a board or table. The roles of the different players are often determined to a great degree by their position within the field and the state of play within the game. In many sports, goalkeepers defend and forwards attack the opposing goal. In other games all players can score, but it is usually the swiftest, or the most agile, who score most and the slowest and heaviest who defend and give opportunity to others. In contrast, a small player such as the two of spades in card games has a low value at the beginning of a game but can have crucial value towards the end—e.g. when combined with three other two's in poker or when it is the remaining trump card in 500, euchre or bridge. Thus different fields and games have their own logic—the logic for playing hockey cannot be read into that of Monopoly and neither translates well into a game of poker. The most successful players in a field therefore, are those who gain a 'feel for the game' as a result of the position played, the strategies they use and the knowledge they bring to it from other games and fields. A number of cricket players adapt well to baseball and to golf, as those who have been parents, tradespeople or late academic developers take well to teaching. The feel for one game can transpose into another in ways that are predictable and in contrast, in ways that cannot be foreseen (Arnold Schwarzenegger, as a successful European body builder, would seem unlikely to break into the field of acting, as he has done, and then marry into the rich and politically powerful Kennedy family in the United States).

Vocational education and training is a field into which players from diverse occupations have entered and changed by virtue of their previous experiences. The appearance of TAFE teachers, as teachers, has for instance forced other teachers to re-evaluate what teaching is and should be about. The fact that TAFE senior bureaucrats can now have a say in the formulation of government policy changes the position in the game they have with similar players in other areas of education. That TAFE and vocational education and training are gaining more of a stake in stating what education should be directed towards indicates that TAFE has established a new position in the game that is now being played. The present and the future positions of TAFE in the field of education and training is of issue to all the players in this game at present. The notion of a field has been used by the French sociologist Pierre Bourdieu to analyse educational as well as occupational systems and sectors. We use it now to show something of the logic of the changes in vocational education and training over the past twenty or so years.

VET as a field

Politicians, the bureaucracy, industry, as well as community pressure groups (such as business groups and unions) are key players from other fields who traditionally, have had the most influence in shaping the field of education. Through an influence on policy and the direction and redirection of funding priorities, they have the political and economic power to alter the boundaries to the field of education and training. In so doing, they can bring new players into the field and force changes to the rules under which the game of education and training is played. The main players within the field have been schools, universities, technical institutes and colleges as well as private and industry training enterprises. To take our analogy of a game a little further, each of these players enters the field with different starting capital—reputation in the workplace, status within different social classes, prestige of its courses, government and private sector funding, and so on. This starting capital, like stacks of gambling chips or properties owned in a game such as Monopoly, provides the wherewithal to capture a section of the market. In so doing the players compete to make it appear that they have a right to their existing place in the field or, that they should (rightfully) take on and assume the places held by others.

In the 1960s and into the early 1970s, education, in primary and secondary schools was a central policy and public issue in Australia and in other countries. One spur to this focus on education was the links seen between education and national development in post Second World War economies. A second incentive was found in the pressures of the Cold War, culminating in Russia's achieving a lead in the 'space race' in 1956 by launching a satellite (Sputnik) into space ahead of the United States. Thirdly, shortages for skilled labour were filled more through immigration and learning on the job than by formal training. Finally, the political and the public ethos of the time was one of social mobility. Governments wanted, through scholarships and extended secondary education, to draw 'wasted talent up' from previously underprivileged groups and classes to fill the increasing numbers of jobs in middle management, and in State public services such as education and health. The large voting population of parents (sometimes called the new middle classes), who wanted their children to do better than they had, saw opportunity in the expansion of primary, secondary and university education systems. The policy and funds flowed in these directions. The economy, major industries and State and federal bureaucracies saw little need to establish a formal training and education sector apart from that done by the technical colleges through apprenticeships, office skills, some adult matriculation and advanced diplomas, such as in engineering. Without pressures from large business and politics and a public opinion directed to an expanding school system, technical education remained a small part of what was considered as education.

In 1974, before the Kangan report, federal government and industry, the holders of political and economic power, saw university education as

the best system, followed by colleges of advanced education (CAEs), then schools, with technical colleges and private providers being of least priority.

Economics		**Politics**
Industry	Universities	Federal Government
	CAEs	The Bureaucracy
	Schools	*Theme of open access* (see p.11)
	Technical colleges	
	Private providers	

No real place in the field was available for a 'TAFE' system. Technical colleges were considered a political low priority in terms of State, and especially federal, funding and private provision was not a consideration. An example from McKenzie and Wilkins (1979, p.3) shows the extent to which technical education was held at the boundaries of the educational field. As they show, the Technical Teachers' Association of Australia had, each year from 1965 to 1972, made annual requests to the federal government for a national enquiry into technical education. Each year the answer was that technical education was a matter for the States. Nothing was done. Some pressure, was again placed on the newly appointed federal Minister for Education, Kim Beazley, in 1973 by the Technical and Further Education Teachers' Association of Australia (TAFETAA). This resulted in the formation of the Australian Committee on Technical and Further Education Committee (ACOTAFE). Myer Kangan, the chair, tabled the committee's first report in 1974. The 'Kangan Report' placed TAFE on the policy agenda in federal politics for the first time in this era and, by establishing its place as a player with some trump cards and attacking moves, won a more strident place in education. This place was in line with the idea that the first task of education and training was to 'increase the capacity of individuals' 'to contribute to the good of society' and, in so doing to, 'their own good'.

The Kangan era

Kangan opened the report (1974, p.xvii) stating that 'technical and further education . . . does not yet appear to rank officially as an integral part of the nation's education system'. The report found support in its adding 'and Further Education' to the technical field; a factor that fitted well with an educational ethos concerned with breaking institutional and personal restrictions to accessing education. The breaking of restrictions to access was done, however, with an assurance the positions of other players in the field would not be challenged. The charter of TAFE was 'post school education', meaning that it could not move into areas controlled by schools. As well, TAFE would not enter into areas in which the federal government was assisting either the Australian Universities

Commission or the Australian Commission on Advanced Education (the CAEs).

Kangan's often quoted statement about the directions for the TAFE system reflects the ethos of the time of its entry into the field of education. To demonstrate this point about commonalities in educational ethos between that held in the education debate with Kangan's, a comparison is made below with an earlier speech by Peter Karmel on economics and education.

. . . it is my view that education relates to the development of the whole person as an individual, his personality, social skills and manual skills. Training is concerned with a part of education . . . although training has a place in a TAFE institution, it is a narrow place and omits the advantages of an educational approach . *Education is a broad concept, training a narrow concept . . . education is concerned with communications as well as understanding and breadth of knowledge, and with transferable principles of skill, from employer to employer.* **Myer Kangan** 1979, p.16	*. . . I do not hold that the main virtue of education reposes in its economic consequences. Quite the reverse, I should tonight advocate a greater educational effort in Australia, even if its sole consequences were to reduce national production . . . I should do this since I believe that democracy depends on increasing the number of citizens with the capacity for clear and informed thought on political and social issues. Moreover, I hold that the areas of expanded activity which education opens should be made as wide as possible . . .* **Peter Karmel** 1962, 'Some economic aspects of education'.

Cycles of change

It is clear from these quotes that, to gain a position in the field, challengers to the boundaries of the field must fit their challenge into the current debate if they are to have some chance of success. If this can be done, then a fresh position can perhaps be established and legitimated. The table from Stevenson (1992) which follows suggests that historically, educational thought and policy move between concerns for fostering individual development and a stress on the relevance of education to the needs of the nation and the economy. Simon Marginson (1993, p.237), an Australian educational economist, would argue that historical patterns follow 'boom-bust' cycles, as they switch from a liberal emphasis on education as fulfilling individual futures, to a focus on training as the means to acquire the 'human capital' needed to solve problems in the nation's economic destiny.

> *The cycle goes something like this. Commitment to education is built up over several years, in both government circles and the popular mind. Eventually—when economic growth falters, or simply when the number of graduates grows more quickly than the number of opportunities for graduate labour— the promises of both liberal education and investment in human capital start to sound hollow. Education funding is cut. Deep flaws in the processes of education are discovered. Professional education workers become targets for attack . . .*

In the periods of depression shown in John Stevenson's table, 'relevance of education' will direct the debate. As a cycle between relevance and individual development changes, so too does the field, its boundaries and the powers of the key players. Relevance of education pattern 4 in John Stevenson's chart is important here in that high levels of youth unemployment are coinciding with the restructures to workplaces and public service departments which are also placing older adults outside the full-time labour markets as well. Added to this situation, more school leavers are demanding post-compulsory education places. All of these groups pose a problem for governments seeking to reduce their economic overheads in public services and increase involvement in the public sphere—to create a market that will absorb much of the costs of education and training and also ensure that vocational education and training (VET) adopts industry as its primary client.

Between 1987 and 1995 the task of developing a training market has directed federal and State government policies. These changes have altered the nature of the field, altering its boundaries and bringing in those who have long been kept at its periphery—private and enterprise providers commerce and corporations. The changes, pre-Kangan, brought 'tech ed' into the field but mainly as a part of state education departments. Post-Kangan, State TAFE systems had a clearly defined position in field in relation to post-compulsory schooling, CAEs and universities—with private provision a not considered part of the field. TAFE had the task of administering State as well as federal programs, such as the Participation and Equity Program (PEP) in the mid-1980s. With the market orientation introduced in the Dawkins era, the position taken by governments is that their role is about the economic management of change more than it is to administer to the details of programs. ANTA, discussed later in this chapter, has been formed on this premise. Hence there are moves to change the conditions within which each sector of education and training relates to the government, to industry and to those who will pay for education and training. Attempts to form a training market have been through competitive tendering, especially for federal government labour market programs and for ANTA growth funds. Microeconomic reforms have also led TAFE colleges,

Historical patterns of concerns in education (Stevenson, 1992)

Indicators of educational debates	Indicators of national and international governmental concerns	Indicators of Australian vocational educational concerns	Concepts of educational goals
	Depression, 1890	Emergence of mechanics institutes and schools of arts	Stimulus-Response Associationism (Thorndike, 1906)
Individual Development 1: Fullest intellectual and social meaning of work (Dewey 1916)	World War 1	Technical colleges in Departments of Education	Beyond specific skills to problem-solving ability; meaning
Relevance of Education 1: Scientific efficiency (Bobbitt 1924; Charters 1924)	Post-war reconstruction; Great Depression		Routine automated manual dexterity
	World War II	Use of technical colleges in the war effort	Manual dexterity, related to industrial demands
Individual Development 2: Tyler 1949	Post war reconstruction	Financial deprivation of technical education	Plurality of legitimate outcomes
Relevance of Education 2: Behaviourism (Mager, 1962; Skinner 1954)	Depression	Behavioural objectives. Surveying industry's needs. Martin Report (1964), creating a relevant advanced education sector	Observable, measurable performance on predicted tasks
Individual Development 3: Humanism (Maslow 1971; Rogers 1969) Adult learning (Knowles 1979, 1980)	UNESCO Report on Learning to Be (Faure et al. 1972)	Kangan Report (1974), meeting industry's needs through the individual	Holistic individual development
Relevance of education 3:	Depression, 1983	Fast, responsive occupational needs analyses (Broderick,	Functional competence at work
Individual Development 4 and Empowerment: Critical Theory in Adult Education (e.g. Boud 1987; Brookfield 1988)	OECD (1990) Report: Competencies Needed in Working Life	Life skills, participation and equity, social justice	Freedom through learning, empowerment; Adaptability, Creativity, Innovativeness;
Relevance of Education 4: Industry driven education	High levels of youth unemployment	Competency-Based Training (The National Training Board, 1990, 1991) National Skill Levels, Credit Transfer, Consistency; Integration of Post-compulsory education and training (Finn 1991; Mayer 1992a, 1992b)	Observable, measurable performance to industrial standards

schools and universities, as well as private providers to compete for enterprise and international training contracts. State training commissions and authorities have increased the numbers of private providers registered on State and national registers of approved training providers. TAFE-developed courses, materials and credentials are more available to other providers than previously, while some materials are now being sold as a means for raising revenue. The following chart shows something of the changes to the field in its transition from the Kangan era of the 1970s to that in the 1990s.

Economics		**Politics**
Industry	Universities	Federal Government
Commerce	TAFE	The Bureaucracy
Corporations	Schools	*Theme of industry-driven training market*
Unions	Private providers	
	Enterprise and industry providers	

VET in the 1990s, some issues

As can be seen from the diagram above, TAFE came to secure an established position in field while other players such as CAEs, have been taken over. Most significantly, it is the private and enterprise, or company providers who have moved into strong positions by virtue of the favourable relationships they have with industry, commerce and corporations who, along with unions, have themselves secured a strong voice in the vocational education debate. This support can be seen in reports commissioned by the federal government, by the people who have chaired them and by the composition of the working parties within them. The formation of ANTA as the key player has been done to ensure that industry is served and that competition between players is maintained. For more on these developments you should read *The Development of TAFE in Australia* by Gillian Goozee (1990, 1995) and David Lundberg's explanation of market-responsive vocational education in *Calling the tune* (1994). Both publications are easily accessible and readable. A study of the changes in the TAFE system: 'Kangan to Dawkins' has also been written by Bert Beevers from TAFE in Western Australia. The extent that the themes of a training market and competition are understood by players in the newly forming field is far from certain. The report of the Allen Group (1994, pp.28–29), who were commissioned by ANTA to investigate the current state of play in the national training reforms states that:

- It is still not clear the extent to which TAFE should monopolise provision of training, what its relations are with different industries in different localities.

- The Commonwealth, with its own funded labour market programs, is often the sole purchaser of training, which may bring the price down without regard to quality.
- A focus on competition between providers means that training centres on those 'spots' in the market where most profit can be made, hindering a building up of durable supplier/client relationships.
- The strong focus on private providers, has meant that not enough is known about the places of enterprise and industry providers.

You might wish to look more into what has been said in this report at a later date, but we will leave this part of our description of the field of vocational education and training at this point. A few points can be made in summary. The state of play within a field, the placement of its boundaries and the players with the most power can be found by looking at the relations key institutions have with those who control the political and the economic agendas. The place of TAFE and of other providers within vocational education and training in this era is now a struggle to define what positions each should take within the game. The power of some positions will grow and that of others will diminish. It is at this point that we should look briefly at how the field of vocational education and training is changing at the point of delivery—in terms of teaching and learning, colleges, institutes, directors and college councils.

Teaching and learning in TAFE

Teaching and learning are dynamic processes and the contexts in which they take place are varied across and within TAFE institutions. A researcher within the field may wish to investigate, for example, the effectiveness of teaching within a range of institutional contexts. These include the workshop, classroom, restaurant, lecture theatre, onsite in the workplace, in secondary schools and community settings. Similarly, an investigation of the effectiveness of new delivery modes, such as those involved in 'open learning'—video and television programs, tele- and video-conferencing, computer networking—may also prove fruitful. A number of factors make TAFE teaching contexts different from others and worthy of study. TAFE teaching and learning contexts differ in terms from other educational sectors of how time and space are ordered—the physical setting and to the use of available hours within it. Teaching to ensure that learning takes place is part of what can be termed as 'teacher's work'. From another perspective, teaching is an occupation in which people have to be trained, gain registration and as such it is demarcated from other occupations by rules of entry and codes of conduct. Teachers' work is altering due to changes in the training agenda, new curriculum design and teaching methods, new clients, the opening of the field to private and enterprise providers have all altered work as teachers have come to know it. Occupationally,

teaching is being altered through restructuring and by the pushes for a training market. The implications of how teaching will change and what shape it might be in the future are not clear and deserve some considerable amount of research. Staff in TAFE colleges see these changes as involving a swing towards part-time, contract and sessional employment. Others see problems in the 'rationalisation' of certain teaching areas—the discontinuation of some courses and their movement to other colleges. The logic of these move is only beginning to be understood. Much of the argument about changes to teaching as a profession are coming under the banner of what, used to be called 'staffing' but is now referred to as human resource management (HRM). Within a HRM view the staff of an organisation have continually to be brought into line with client needs and with competences and standards in industry. Hence TAFE staffing or HRM policies are being brought into line with those of the industries it is meant to serve. A series of reports, *Staffing TAFE for the 21st Century,* commissioned by the VEETAC working committee on TAFE staffing issues takes this perspective. It is a linking of competences of the workplace with teaching as an 'industry' and HRM that is a focus of these reports. That they are a basis for State government planning and that they are perhaps relatively unknown and not explored by teachers and should be put under some scrutiny in further research.

Colleges, institutes and directors

More research needs to be done that shows how TAFE colleges are organised and what goes on within them. In contrast to primary and secondary schools, colleges deal in the main with students who are past the compulsory years of schooling. Their timetables stretch from the early morning to the mid-evening. Because of safety regulations, some classes are of a smaller size and classes have more of a practical emphasis. TAFE colleges and teachers have to dwell on budgets, on materials and how they will be used, more than do teachers and administrators in other sectors. With an emphasis on micro-economic reform much of college and institute planning revolves around budgeting. When we take VET to be a field, then it is apparent that colleges, and more recently colleges amalgamated into institutes, have to continually respond to economic constraints as well as to political pressures to enter a so-called training market. Increasingly, colleges and institutes are judged on their ability to work within financial parameters and to turn their attention towards the needs of industries requiring staff skilled in what industry requires. The 'flattening' of the structures of TAFE systems has decentralised functions such as curriculum, decisions about staffing and responsibility for college operations. This has been accompanied by a devolution of things that were once done at head office to colleges. Not nearly enough is known about the inner organisational working of TAFE colleges and institutes. This applies as well to the changed roles of directors.

In Queensland, the State where I reside, there was a widely held belief that the founding head of the TAFE system, Roy Wallace, knew the names of nearly all the staff in the system—many on a first-name basis. So too, the then principals of TAFE colleges, more often than not, knew the names of nearly all of their staff and something about their lives inside and outside college. The promotion system in TAFE before the late 1980s was one whereby people's careers alternated between positions in head office and administrative positions in colleges. TAFE principals, through their own movements across the system and those of their staff, were able to be aware to some extent, of what was occurring from the level of the teacher to others at head office. Since the late 1980s, when the position of principal shifted to that of director, the ways in which these new jobs are handled has changed significantly. For a start, there have been a number of amalgamations of colleges into institutes. In New South Wales, 140 or more colleges were amalgamated into 22 regions and then to 11 institutes. South Australia has moved from around 37 colleges to 10 institutes and Queensland from 33 colleges to around 10 institutes. Canberra now has one institute, while the Northern Territory Division of Post-School Education and Training comprises fifteen centres for TAFE teaching and correspondence among which are four tertiary institutions, in which vocational educational provision is a key aspect. The now Department of Training in Western Australia contains 10 colleges.

The numbers and combinations will continue to change for some time. These amalgamations have meant that there is a feeling of ongoing change. Positions have changed and so too have the people in them more often than in earlier times in TAFE. As positioning in this new field is being worked out there has been a considerable amount of people 'acting', or holding a position until the changes are finally put into place. The result now is that the director is often not on the same campus as some staff, and when they are their offices are at some distance—across the campus or in a part of a building where a majority of staff don't often access. More and more colleges and institutes are run on autonomous lines with their links to head office being mainly in terms of government policy and funding. Having to run colleges and institutes on a more commercial basis than in the past has meant that much time has to be spent in planning and at times steering a college in terms of its finances and seeking of funding sources. New government legislation, public sector rules on employment of staff, a tendency towards contract and part-time employment continue to alter the responsibilities of the position of director. Finally, some institutes in size, budget and student numbers are among the largest teaching institutions in Australia. When staff, budget and student numbers are considered, some country institutes are not so 'big' as some schools within larger metropolitan institutes. In contrast, and in terms of area to be covered for service, these country institutes and colleges have campuses dotted across a geographic space that takes in a substantial percentage of the land area in the State. Even as it changes, the position of director differs due to location and areas to be serviced. The position of college

director has altered beyond recognition from when it was that of college principal. So too have the roles and functions of the senior staff who now work in what is located in college staffing plans as 'the directorate'. All staff, from grounds staff to director are adjusting to these changes.

College councils

Where a number of generalisations can be made about colleges as a result of the restructures between 1987 to the present, nowhere near the same can be said about the place and functions of college councils. They vary across each State and Territory and the topic is best traced as a factor in the history of how TAFE developed there over time. In States such as Queensland, college councils only came to prominence in the late 1980s where they were formed to establish a mechanism to ensure more effective communication between key central decision-making bodies and college communities. In contrast, Victorian college councils have for many years been a central part of a contest about how a TAFE college should support a local community and they were tied to the city council of the district in terms of forming their identity. A city and a college council would fight for their own interests and battles could be won on these issues. In Brisbane, the City Council is centralised, there are no localised councils within suburbs and there is less likelihood of a college council and the local council joining forces to put forward a case for the running of the TAFE college in a certain suburb. Take the case of amalgamation of colleges. In South Australia, for instance, where councils are more localised, amalgamation of one college with another has been resisted—because it can be said to mean that 'our college' is being taken away from our community and the right to run it given to a community thirty or forty kilometres away. Here the local council and the college council will put forward arguments for and against the move. In Brisbane, as in Sydney, the local council and the community might have no history of affiliation with the local, suburban TAFE college and any amalgamation could proceed with little interference, if any at all. College councils, if they are to mount their own cases here must demonstrate a close affiliation with the political issue. In Victoria, in contrast, college councils have become employers of staff and have a considerable say in the running of the college. Different college councils have different powers.

Transition

Along with the differences and similarities of the reformulations that we have described as now taking place, there is a drive for national consistency and an understanding of what VET is. This is not a new state of affairs. Myer Kangan, commenting in 1979 on the *TAFE in Australia* report encountered similar confusions, four years after his findings were reported and were being implemented. In this instance

there was still uncertainty about how this new term should be pronounced:

> *This is as good a point as any, and not too late, to say that 'TAFE in Australia' is pronounced like 'safe'. I have heard some people refer to 'TAFEE', which has a French twang, but why they should choose that pronunciation is beyond me.*
>
> (Kangan 1979, p.12)

Such a confusion, which now appears quaint, is evident now when terms such as ACTRAC and VET are used. The extent to which we know and use terminology is often an indication of how much of a transition has been made. In that same publication Kangan (1979, p.16) again raised a problem pertinent to the current debate.

> *The distinction between education and training, subtle that it may be, is particularly pertinent to the updating of policies concerning TAFE institutions and industry, commerce and trade unions. Some rethinking is needed as to what training ought to be excluded from TAFE institutions and returned to industry.*

The changes to TAFE systems now being pursued are to bring a national focus on education and training and also to focus the stake within the field towards industry as the training main client. In this regard the most influential position in the vocation and education field has been given to the Australian National Training Authority (ANTA), a body that is dealing with this aspect of education and training alluded to by Kangan but with a different term of reference.

ANTA

A commitment to establish the Australian National Training Authority (ANTA) was made in July 1992 by Commonwealth, State and Territory heads of government. The formation of ANTA can probably be seen as an attempt to consolidate the many reforms that have been in various stages of implementation since 1988 and to create an environment that transcends the roles of States and focusses policy at a national level. Below are two statements that suggest that this is the case. They can be contrasted with the statements by Kangan and Karmel made earlier to the extent to which the focus on training, the economy and the workforce has shifted. The position of ANTA needs to be understood by those who work and do research within this changing system. In the brief description of ANTA which follows, what is said is taken from Terry Moran's (1993) statements. While more up-to-date positions are available, these statements show something of the ideas that underpinned the initial formation of this national authority.

Dawkins' reform agenda 1988

The importance of developing a highly skilled and adaptable workforce is now widely recognised. Towards this end, the government has introduced many reforms to Australia's education and training system.

A central objective of government policy over the past few years has been to develop the appropriate environment in which Australian industry can become more competitive internationally . . . This will require more expenditure, more responsive and better quality training as well as more expenditure on training. The government will continue to review developments to assess the improvement in the training effort . . .

John Dawkins 1988, Foreword

ANTA's brief in the training agenda 1994–1999

We are at a critical point in the development of vocational education and training in Australia . . . How the education and training sectors respond to these challenges will determine whether we can provide a dynamic learning environment for our young people and, at the same time, meet the growing demands of the economy for a more highly skilled and flexible workforce . . . The timing and content of a number of similar reviews from other countries over the past few years reflects the shared belief that international competitiveness, as well as domestic social well-being, increasingly is dependent on a nation's ability to produce well-trained, flexible workforce and to develop the enterprises which allow employees at all levels to contribute to their full potential . . .

Terry Moran 1993, pp.9–10

One of the problems that ANTA wishes to address is the insulation of vocational education and training from other sectors of education. In Australia, for instance, vocational education and training is seen as being of a lower status than other forms of education when compared with Germany, where there is little apparent distinction between apprenticeships and university education. While this situation persists, it is said that Australia cannot compete economically with other countries. A second problem, from ANTA's perspective (Moran, 1993, p.10), is a disparity between where the emphasis on training is directed when this is compared with the needs of industry. For example:

- 28 per cent of training is in the trades and skilled occupations, which make up 13 per cent of the workforce.
- 53 per cent of training is in the professional or para professional areas, including managers, making up some 27 per cent of the workforce.
- 12 per cent of training is in the preparatory courses for those entering the workforce.
- 7 per cent of effort is directed towards courses relating to operative occupations such as clerks, salespersons, plant operators, drivers and labourers, which make up some 48 per cent of the total workforce.

The role of ANTA is to co-ordinate and to achieve a balance in provision through the construction of profiles which will steer the States 'without becoming involved in operational details'. On its establishment, ANTA was provided with $720 million from the Commonwealth Government over three years and a commitment by States and Territories to have their funding allocated according to

ANTA's national strategic plan over a five-year period. This plan will seek to set directions for delivery of vocational education; allocate funds on a national basis; provide clear statements about training environment, its directions and desired outcomes. In essence the plan seeks to bring about 'an industry-driven system':

> *TAFE exists to provide a direct educational response to the needs of industry and the community. Industry and the community are engaged to establish what those needs are, in turn, TAFE should craft a professional education response. It is not TAFE's role to act as a proxy for industry people in establishing the needs of industry. TAFE must respond to what industry actually wants. This is the core of an industry-driven system.*
>
> (Moran 1993, p.13)

ANTA's place in the field of vocational education and training is clear. It is in the position to create a national and industry-driven system. The fact is that 'ANTA and governments are committed to ensuring that industry voices will be more clearly heard than ever before' (Moran 1993, p.13). Here the roles of industry training advisory bodies (ITABs) are central to its planning and to the creation of a training market. As a field VET is now strongly influenced by the introduction of ANTA as the player with the most political power and control over how the economic stakes to play the game until the end of this century. There are many challenges for doing research in this environment. Why should we be motivated to select topics in VET and take the time to investigate them and who should do the research?

Motivations for conducting research

No Small Change is a book by Rod McDonald, Geoff Hayton, Andrew Gonczi and Paul Hager from the University of Technology in Sydney. The title is meant to indicate the meagre amount of money that is devoted to research into vocational education in Australia—0.2 per cent of the total funding for the sector. There is a perception, also stated by McDonald et al., that research is not considered of use to the sector. A sector that spends so little on research and fails to reward it, is not likely to produce people motivated to do research or even to draw on it to seek solutions to problems they face. In this context TAFE faces a two-edged sword. First, a lack of existing research studies often means that people making decisions about how TAFE should change do so without a sound basis of information about what happens in the system, what its teachers do, how students learn in colleges, about what the differences are between country and metropolitan colleges, and so on. In contrast to primary and secondary schools and universities, too few Australians have been through the TAFE system as students for there to be a public understanding or a general feel for what goes on in a TAFE environment, let alone other parts of the newly forming training market. Aligned with this, TAFE is a relative newcomer to

government policy and to the theoretical debates in universities. It is only recently that vocational education in Australia has been seriously compared with the systems in Germany, Britain, the United States, the Scandinavian countries, Japan and other OECD countries. In this wider context, it can be understood why a motivation to do research and form theory about vocational education has been with those closest to this field—the few specialists whose jobs involve research in education and training. The formation of ANTA, the increased presence of the training debate in the Higher Education Supplement of the newspaper *The Australian*—once the sole domain of the university system, the interest of large corporations and business councils in the debate should ensure that research will follow. It is research that should not and cannot be left to universities, nor solely to research and development sections of government departments. A means should be found to locate those who have access to, and can understand better, areas where the public, academics and policy researchers often do not reach.

We have found that people in vocational education are more than willing to give their time to us when we conduct research and that we are invited to talk about our research—*when it concerns issues that are pertinent to them*. We also find that students in our own courses are motivated to take up research projects with enthusiasm, when they locate the topic that fuels their interest. Many of these students are those who were not particularly interested in theory and research. No one enjoys being forced to make sense of research studies to which they are not disposed. All of us dislike certain forms of research. From our observations, the motivation to do research begins with the locating an issue that sparks our interest and fires imagination about why something is so. How did it get to be the way it is? What can and cannot be done about it? Whatever the motivations for conducting research, whether you have been 'requested' to discover or confirm a situation for planning of course offerings or for pure altruism, at some point the researcher within the field of vocational education and training must consider what it is that is under study. We have probably all encountered students who, when given open slather for topics for assignments, find a great deal of difficulty in finding anything to write about! Nailing the research question can be crucial to the process of finding out.

Conclusion

This chapter has dealt with VET as a newly forming field. Its past history was shown to be tied to TAFE and, in an earlier period to the post Second World War system of technical colleges. The future of VET, while being framed within the economies of a proposed training market, is still not clear and contains elements of cohesion as well as those of tension, misunderstanding and conflict. This chapter raises issues presently being encountered in the transitions from TAFE to VET. The intention has been to place the field of vocational education and training historically and to give reasons why research should and can be done by teachers and others who work in this field. Within the

field we have been describing, there are any number of topics that you and others might like to explore. Some topics will obviously be tied to the areas in which you work and the concerns that you have there. There are also wider issues about which you will want to explore, either for your own work or for private reasons. A number of topics and issues for research are outlined in the next chapter. The methods that we consider be the most appropriate are highlighted, so you can refer back to these topics as you read about these methods in later chapters.

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2 Some research questions in vocational education and training

Bob Funnell and Patricia Funnell

Introduction

This chapter is shorter than others in this book. However, we hope that it will be one that you will read and return to when you get to the tasks of selecting a topic for your own research and when you are deciding an appropriate research method. A table contained in the final section of the chapter is offered as a resource. In this table a number of issues are outlined and research areas, topics and methods suggested. These areas are now discussed in brief.

Selecting a topic

Most often, we will select a topic to help us deal with what is puzzling and to comprehend what is changing. In this respect, the first chapter dealt with VET as a newly forming field. Its past history was shown to be tied to TAFE and in an earlier period to the post-Second World War system of technical colleges. The future of VET, while being framed within the economies of a proposed training market, is still not clear and contains elements of cohesion as well as those of tension, misunderstanding and conflict. This chapter raises issues presently being encountered in the transitions from TAFE to VET. There are more topics described in this and later chapters than there are people, and funds, available to investigate them. The majority of topics that we select for research are of three kinds. Some will stem from personal experience—to be investigated because we are interested in them, for the purposes of further study, to attain a degree or qualification of some kind. Other research will be commissioned—to evaluate courses, perform training analyses, acquire information for colleges and institutes. A third type of research will be critical. It will be aimed at the heart of all the issues raised—not telling good news because it is expected and also not beating up negative accounts to forward one's preferred position.

A topic has to be found, and made sense of, before research can begin. Topics are usually found in our areas of work and other interests,

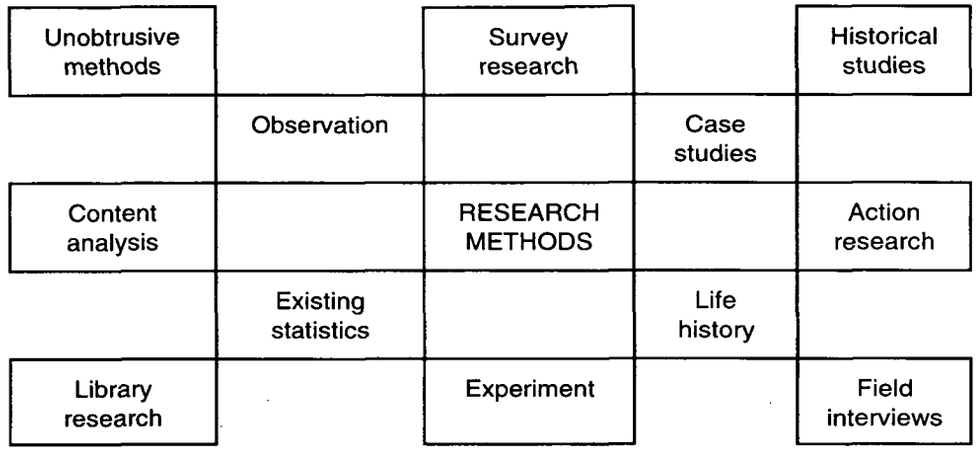
although research tasks are increasingly becoming a part of everyday work. Determining who a college, or section's clients are, for example, is a type of research. So too are destination studies of course graduates and evaluations of courses for funding bodies. Mostly, we know of *areas* we would like to investigate (e.g. flexible delivery of courses). We have probably not thought about which aspect of an area might become a researchable topic (using CD ROM and Authorware to create computer assessment packages). Narrowing an area of interest into a topic for study and designing how that study should be done is the starting point in conducting research. A research project encompasses a number of stages or steps. These are: choosing a topic; focussing the topic by reading about it; designing the steps to take; collecting data; analysing data; drawing conclusions; and informing others by some type of report. The steps in research design are outlined in chapter four.

Nearly all research begins with vague ideas, hunches and guesses. In this chapter, a number of issues that are emerging in vocational education and training are outlined. They are not discussed in any detail. The intention is merely to suggest some issues and the types of research methods that could be used to investigate topics within each of these issues. To avoid confusion, the main issues are grouped into the three areas shown in the box below.

Teaching and learning	**Student needs and course delivery**	**A changing system**
Effectiveness	Access and equity	National training agenda
Evaluation	Social justice	Industry
Classroom management	Flexible delivery	Institutes and colleges
What is taught	Enrolment	Offering new courses
	Health and safety	Human and physical resources
		Best practice

We are suggesting that teaching and learning, student needs and course delivery will remain issues for research in a changing vocational education and training field. Topics such as those listed below our headings in this diagram will alter over time. Some topics will be best suited through the use of one particular method, others will require a mix. Throughout the chapters of this handbook, we have outlined twelve broad methods that are employed in social research. In dealing with the research topics that you might consider, the tables in the final section of the chapter suggest which topics might best align with a number of methods. We have marked which methods could be best used to know more about a topic or issue, and other methods that will be complementary to them. The various methods are shown in the diagram below. If you are reading this chapter for the first time, the methods might not mean a great deal at the present. This chapter may be useful as a reference point to which you return to make more sense of a topic, or to show which methods

can be of most assistance and which research design is most appropriate for your purposes. Finally, don't accept that our categorisations on methods are the most useful for a research topic. Remember that methods are tools and best employed according to the job at hand and the style and preferences of those using them.



Teaching and learning

The major reports, from Kangan to those most influential in the late 1980s and into the 1990s, have focussed on what should be learnt and taught in vocational education and training. This is an interesting phenomena, in that little is known about how teaching and learning operate on a day-to-day basis in TAFE settings and more recently in courses run by private providers. More needs to be known about these areas, because there will be a cross matching of styles and approaches to teaching and learning, with a loosening of boundaries around education and training sectors. With moves to more vocational subjects in upper secondary schools and cross accreditation with TAFE programs, secondary teachers for example, are most interested in the similarities and differences between what they do and what TAFE teachers do. Questions of this type relate also to comparisons of how skills are learnt in the workplace and the extent to which this should copied, extended or built upon in training that is done in educational institutions. In the present climate there is some concern that skills learnt will lead to competences which are effective and can be transported into the workplace and be a basis for further study. Research can help in clarifying such questions. It can be extended to include some study and analysis of how classrooms and workshops are managed and how this could be altered or improved upon. Finally, teaching and evaluation practices are altering with courses being offered in modules, sometimes ones of a very short duration. Teaching courses and subjects is new for most people who have been in vocational education for any period of time and for enrolled students who are used to other forms of teaching. All these factors relating to teaching and learning, and its effectiveness, need to

be described and critically evaluated—that is to show what works, in which contexts, and what might *not* be working in other contexts.

Student needs and course delivery

In contexts where competition between providers is being stressed, the needs of student groups have to be reconsidered, as do issues of course delivery. Competition brings with it variations in how courses are delivered, different groups of students, the introduction of new technologies for flexible delivery—much of which has to be done within existing budgetary constraints. For a college or institute to move to flexible delivery, for example, some documentation is needed of how successful previous attempts have been, whether there is a client group available and motivated to study with us, what delivery mode best suits particular groups and how the content and skills can be learnt for that mode. As well, responsibility for enrolments and for meeting health and safety and access and equity legislations have been devolved to colleges and institutes. Here, notions of service to the community alter as does the amount of 'risk' that colleges and teachers will take in dealing with students—e.g. in terms of out-of-college activities, with enrolment policies and knowledge of health and safety regulations. Finally, when a place in the field is tied to performance, student needs often have to be demonstrated statistically and through positive feedback from those who have completed studies with us. Studies which show which group of students went where and whether or not clients are satisfied are no longer 'something that we should do', but are more and more being done to either legitimate or to apply for funding to run programs. Aligned with this, more studies are required of how people who use the vocational education and training system have 'beaten the odds' in some way—moved into areas that they would not be expected to, achieved in spite of some disability, returned to employment, and so on. As there is yet no clear picture of what happens in teaching and learning, so it is with students needs and course delivery in a competitive VET environment. These two issues are tied to ongoing changes to the system itself.

A changing system

The formation of ANTA has forced a direction for a national system of training. What the training reforms are and how they apply in certain areas is still far from clear. Any type of research project which clarifies this issue is welcome. It could include content analysis from which short and concise overviews can be distributed to interested parties. The magazine *Australian Training Review* published by the National Centre for Vocational Education Research contains examples of such pieces. Beyond this there are practical aspects of the training reform agenda that can be researched. Knowledge of other providers of a college's programs, what funding is available for submission and

tender and in which areas. This is not to say that the question itself has to be specific. As you will have seen from how research is designed in chapter 4, often the method will in part determine the specifics (or lack of) in defining what it is that is under review. For example, in most quantitative research—reliant on measuring, usually using statistics and percentages—it is generally accepted that the research question should be specific, often put forward as an hypothesis. An hypothesis is a statement that the researcher attempts to prove or disprove. Other forms of research, specifically those deemed to be of a more qualitative nature where situations are explored in more depth, often through the use of interviewing or participant observation, generally do not attempt to prove or disprove but rather to generate theory that describes the situation from the perspectives of those in the situation being researched. Whatever our intention for choosing and carrying out a piece of research, we should be careful that our own preconceptions do not override what is actually occurring in the area that we choose. Some points to consider are now briefly discussed.

Watching for pre-determined answers

If the method for investigating has been pre-determined, often how specific the research question needs to be should also be determined. For example, if you were asked to conduct a survey in order to find out why many students, and in particular Aboriginal and Torres Strait Islanders, do not complete courses of study, the specifics of the research question may already have been determined. Framed another way—'why can't TAFE colleges and other providers hold some of their students, in particular Aboriginal and Torres Strait Islanders, to the completion of their courses?'—the cause and effect sequence turns. In this reformulation, it is the teaching and learning practices within colleges that have to be highlighted for their part in the 'problem' as well as the 'poor retention rate' within some groups. It becomes very seductive to frame research questions implicitly in terms of 'why don't *they* fit in with the world as *we* see it'—a great deal of research and everyday reasoning falls into this kind of one way cause and effect. There is the ironic story of the teacher who storms in the staffroom and complains that, 'I've taught them how to do those same maths problems—three times—and they still don't know how to do them'. This teacher, if he decided to do some research into teaching and learning in his own area, would frame the question as being one of the learning difficulties of his students. In so doing he would ignore the more pressing question of, 'what am I overlooking in my teaching that doesn't allow me to get my message across as well as I can?'. In these, and other circumstances, too little notice is given to the fact that both parties contribute to what happens and the parts played by all players have to be taken into account for viable solutions to be found. In the selection of any method, a researcher must ensure that one party is not being set up as ignorant, because this means that the conditions being researched are seen as unquestioned and beyond reproach.

Audience

If the method selected plays a part in defining the research question, so too will your anticipated audience. You may wish to find out about something for your own benefit (and/or the benefit of your students). For example, in planning a course you may wish to investigate the background of your students, their expectations of the course and what topics they may wish to cover. In this case, the projected 'audience' for your research will be you and your students. What you find out will most likely be 'published' in a course overview or in how classes are conducted. In another instance, you may feel that there is a need to offer a specific program and require support from your ITAB, consortia, etc., in order for the course to be approved. The audience you have selected will no doubt influence the specifics of the research question and, secondly, how the findings will be published. In yet another instance, you may have been asked to monitor the performances of fellow teachers/trainers in practice. How you set about this task and what exactly is investigated may be largely determined by who will be privy to your assessment. As you can see, the presumed audience for the research findings from the start of any research can help you determine the specific nature of the research and how it will be carried out.

Conclusions

There are more topics available, described in this and earlier chapters, than there are people, and funds, available to investigate them. The majority of topics that will be selected for research will be of three kinds. Some will stem from personal experience—to be investigated because we are interested in them, for the purposes of further study, to attain a degree or qualification of some kind. Other research will be commissioned—to evaluate courses, perform training analyses, acquire information for colleges and institutes. A third type of research will be critical. It will be aimed at the heart of all the issues raised—not telling good news because it is expected and also not beating up negative accounts to forward one's preferred position. Any research chosen will be across this range of topics. Nearly all research though, begins with vague ideas, hunches and guesses. In the chart which follows, a number of issues that are emerging in vocational education and training are outlined. The intention is not to discuss each of them in detail but rather to suggest how they might be approached and which types of research methods could be used to investigate topics within each of these issues.

Some research questions and appropriate methods for investigation ★ Highly recommended ▲ Recommended ◇ Complementary		***Survey***	***Experiment***	***Field interviews***	***Case study***	***Historical study***	***Life history***	***Unobtrusive measures***	***Library history***	***Existing statistics***	***Observation***	***Content analysis***	***Action research***
Teaching and learning effectiveness and evaluation	How is time used in classrooms and how does this affect learning activities or behaviours?							◇			★	★	
	How is a skill performed? (An analysis)		★	★							★	★	
	How does TAFE teaching compare with that in other sectors —e.g. high schools, private providers?	▲	◇	★	★			★			▲		▲
	How can better use of workshops improve learning?		◇			▲		★		★			
	How useful/effective was the course?	★		▲	▲	★		▲			★		★
	How effective is learning in the workplace?	★	◇	▲	★	◇		▲			◇		★
	How effective is learning in the long term? Are skills learnt transferable and sustainable?	▲	▲	◇	▲	★	★		◇		◇		◇
Classroom management	Professional review (feedback on performance)	★		▲	▲			◇			◇		★
	What might beginner teachers learn from experienced teachers in the classroom/workshop?	▲			★		◇	◇			★		★
	How do students behave in the classroom?	▲	▲	▲	▲	◇	◇	▲			▲		▲

Some research questions and appropriate methods for investigation ★ Highly recommended ▲ Recommended ◊ Complementary		*Survey*	*Experiment*	*Field interviews*	*Case study*	*Historical study*	*Life history*	*Unobtrusive measures*	*Library history*	*Existing statistics*	*Observation*	*Content analysis*	*Action research*
What is taught	Does the syllabus/module embody appropriate content/outcomes?	▲		▲	★	◊	◊	◊			◊	▲	★
	What might we learn from existing curriculum offerings to improve new modules or programs? (A review)	▲		▲	▲	▲			◊	◊		▲	▲
	How suitable are modules (for trial, as they are offered, after program)?	▲		★	▲			◊	◊		◊	▲	▲
	How does CBT teaching and learning compare across learning sites (classroom and workplace)?	★	▲	▲	★	▲	◊				◊		▲
	Which research techniques could be taught in the classroom?							▲	◊	◊	▲	◊	◊
Student needs	What are the student body needs for counselling, recreation, services, library, employment?	★		▲	★	▲	◊	◊	◊	◊	◊		◊
	What are the community needs for short-course ACE programs?	★		★	▲	◊	◊	◊		▲			★
	What are the particular curriculum needs of a group?	★		▲	▲	▲		◊	◊	◊	◊	◊	▲
	How have client groupings changed?	▲		◊	▲	★	◊	◊	◊	★	◊		◊

Some research questions and appropriate methods for investigation ★ Highly recommended ▲ Recommended ◊ Complementary		***Survey***	***Experiment***	***Field interviews***	***Case study***	***Historical study***	***Life history***	***Unobtrusive measures***	***Library history***	***Existing statistics***	***Observation***	***Content analysis***	***Action research***
Access, equity and social justice	What are the odds that students beat to enrol in a program?	◊		▲	▲	▲	★	◊		◊			◊
	What are the experiences in the workplace of women and men in non-traditional work (post-training)?	▲		▲	▲	▲	▲	◊	◊		◊		★
	How many students receive Austudy or hold Health Care Cards?	▲			▲	◊				★		◊	
	What problems do the long-term unemployed have in making transitions through study to employment?	◊		▲	★	◊	★	◊			▲		▲
	How successful are Commonwealth-funded short courses?	★		▲	★		◊			◊			◊
	What are the special needs of differently-abled students?	★		▲	▲	◊	▲	◊	◊		▲		◊
	How do teachers experience teaching differently-abled students—hearing and sighted impaired, etc.?	▲	▲	▲	▲	▲	▲	★	◊		★		
	What are the destinations of the differently-abled post-VET?	★		◊	◊	◊				★			◊
Flexible delivery	What examples of implementation of flexible delivery exist within the college and across the system?	▲	▲	◊	★	◊		◊		◊			◊
	Which mode of delivery is best for particular content, skills, etc.	▲	▲	◊	▲	◊		◊		◊	◊	◊	◊

Some research questions and appropriate methods for investigation ★ Highly recommended ▲ Recommended ◊ Complementary		***Survey***	***Experiment***	***Field interviews***	***Case study***	***Historical study***	***Life history***	***Unobtrusive measures***	***Library history***	***Existing statistics***	***Observation***	***Content analysis***	***Action research***
Enrolment	How does the administration cope in periods of heavy enrolments?	★	▲	◊	▲	◊	◊	▲			▲		◊
	What reasons do students give for entry and withdrawal from courses?	★		▲	★	◊	▲	◊	◊	◊	◊		▲
	What do students have/need at point of entry?	★				▲	◊	◊		◊	◊	◊	◊
Health and safety	What does existing legislation demand? (A review)								★			★	
	What are the perceived health and safety needs of staff?	★		◊	▲	◊		◊			◊		
	What are the current workshop practices? Are they safe?	◊		◊	▲	◊		◊			▲		★
National training agenda	What is the national training agenda?	▲				◊			★	◊		★	
	What is the role of ANTA within the national training agenda?	◊		◊	★	◊			★	▲		▲	◊
	What funding is available for submission/tender?	◊		▲					▲	▲			
	What programs/occupational groups could be targeted for RPL?	★		◊	▲	◊			▲	▲			
	What other providers exist in the field?	▲							★	★		★	
	What do non-system providers offer? How? At what cost?	▲			◊	◊				★		★	

Some research questions and appropriate methods for investigation

★ Highly recommended
▲ Recommended
◇ Complementary

		Survey	*Experiment*	*Field interviews*	*Case study*	*Historical study*	*Life history*	*Unobtrusive measures*	*Library history*	*Existing statistics*	*Observation*	*Content analysis*	*Action research*
Industry	Who are the potential employers of your students/graduates?	★			◇	◇			◇	★		◇	◇
	What possible work experience/industry placement employers exist?	★		◇	◇	◇		◇		▲	◇		◇
	What are the problems that employers have had in interpreting CBT outcomes?	★	▲	▲	★	◇	▲	▲			▲	▲	★
	How responsive is your section/school to client/industry demand?	★		▲	★	◇				◇			★
	What are the demands for user-pays (fee-for-service) corporate programs for training for industry?	★	◇	▲	◇	◇			▲	▲	◇	◇	▲
	What has been the impact on workers/the workplace of new technologies and their implementation?	◇	▲	◇	▲	◇		◇			◇		★
	What have been the effects on your section/school of the growth of the part-time labour market?	▲	▲	▲	▲	▲	▲	◇		▲			▲
	How have workers experienced workplace change?	▲		★	▲	▲	★	◇		◇	◇		▲
	How have occupations/trades changed?	◇			◇	★	◇		◇	◇		◇	

Some research questions and appropriate methods for investigation ★ Highly recommended ▲ Recommended ◊ Complementary		***Survey***	***Experiment***	***Field interviews***	***Case study***	***Historical study***	***Life history***	***Unobtrusive measures***	***Library history***	***Existing statistics***	***Observation***	***Content analysis***	***Action research***
Institutes and colleges	What are the effects from devolution of your college/ institute?	◊		▲	▲	◊	◊	◊	◊	▲	◊	◊	◊
	How does the College Council operate?	◊		◊	◊	◊		◊	◊		◊		
	How does the college management operate?	◊		◊	◊	◊		◊	◊	◊	◊		◊
Offering new courses	What happened to past students? (Destination study)	★		▲	▲	▲	▲			▲			
	How would AVC courses be implemented within your section/school?	◊		▲	★	◊			◊		◊	▲	★
	What are the community's needs for fee-for-service vacation courses?	★		▲	▲	◊			◊	▲	◊		▲
	How feasible will new courses be?	◊			▲	◊			◊	★		◊	◊
Human and physical resources	What human and physical resources currently exist in college community? (An audit)	★		◊		◊				★	◊	◊	
	How are facilities utilised? When?	▲	▲		◊	◊		▲		★	◊		◊
	What impact has teacher casualisation had on your school/section/college/institute?	▲	▲	▲	★	◊	◊	◊		▲	▲		◊
	What are the professional development needs of staff?	★			◊	◊		◊		◊			▲
Best practice	What examples of best practice exist in the college?	◊			▲			◊			◊		

3 Introduction to VET research

Bob Funnell

Introduction

Research is most often done to settle an argument, to work through an issue, to find out whether or not something is as it seems. Properly done, research can inform and sometimes change the theories held on current issues in education and training. A theory, as Peter Berger contends, is a 'defined frame of reference' that guides the actions of those contained within that reference point. All of us have theories that influence how we interpret and act on an issue. Theories about education, training and occupations are evident in most countries seeking an edge in competitive global economic markets. They can be seen in documents about Australia's national training agenda, in the commissioned reports by Deveson, Mayer, Finn and Carmichael. A comparison of this present agenda with Kangan's report commissioned a generation earlier can show the extent to which theories change in different times and economic situations. The theories behind commissioned reports in Australia are generally responses to suggestions from authorities such as the OECD, corporate and industry leaders, unions, employer groups and other authorities consulted by those who form the commissioned group. The government has made policy of some of the recommendations of these commissions—competency-based training, entry-level training, the formation of a training market, and so on. The policies are based on sound authorities and on their defined frames of reference or theories. But this is obviously not enough. If it were, then a new agenda would be put in place much more quickly and efficiently than is the case now and in earlier periods of change in education and training.

The present agenda in education and training are informed by a number of sources of knowledge. One useful way of beginning research in the area is to consider the range of ideas and opinions that inform the debate and then to consider the basis on which they can be either accepted, dismissed or considered further. Some 'ways of knowing' about different aspects of social and personal life are discussed in this chapter and applied where possible to the debates current in VET. These ways of understanding are then contrasted with theory as it is used in the social sciences. It is through linking theory to what is seen to be happening that we find the methods most likely to give us some systematic explanations in our research.

Ways of knowing

We have suggested this far that one way to see what a national training agenda might look like would be to consult the best authorities. This seems to be obvious. But rarely, if ever, does a new agenda fall neatly in place. Many people feel that they are as well informed as, or better than, the 'experts' and so deal with new agenda from their own reference point. We can all cite authorities with different views. All these positions are ways of knowing which have to be cut through by the use of research and theory. Social research differs from other ways of knowing in that it strives to produce a type of knowledge that systematically counter-balances the effects of other perspectives on an issue. We can see how this is done by looking at how an issue can be misconstrued when viewed from such perspectives.

Personal experience

The vocational education and training community contains people with personal experience of a large number of occupations, trades and ways of life. Its strength lies in the ability of those teaching within the system to relate the experiences of their earlier work to that of the students they interact with in classes, workshops and in curriculum design. While experience of work may be a common factor across vocational education staff, personal experience in other areas of life will be different. People will be of different political and religious persuasions, come from different countries, have been socialised in different generations. It is through any number of combinations of these factors that we all personally see something as being true. Personal experience is a strong form of knowledge through which we filter all forms of other information. Its weakness is that we can naively overgeneralise from our own experience. As a teacher I might find that trainees are difficult to motivate, poor attendees and only in a course to avoid the loss of government benefits. I conclude that all trainees are like this on the basis of my own experience. My experience is restricted to a limited number of trainees. Other areas and reports on traineeships can and do say that trainees are the opposite, but I will most probably still disagree and continue to generalise from my own experience.

Along with overgeneralisation, another problem with personal experience is that it constrains what we do and do not see in our interactions. Experience could lead me to believe that students from a certain company or employer are superior to those from another company. When teaching, I might pay more attention to those from this company, praise and encourage them and ignore the others without even realising what I am doing. In teaching, I am then giving strong clues to one group that I expect more of them and less of the others. Ironically, my assessment results will probably continue to reinforce my selective stance. Personal experience can become a self-

fulfilling prophecy. When this happens our experience closes us off from any alternative understanding of what is happening.

Self- closure is the end result of looking at something only through our perspective. We increasingly tend to exclude any competing explanations when personal experience takes over our perspective on an issue. Think about someone doing research only from within their personal experience. In this situation I might set up a study correctly, but chances are that I will either conduct interviews or survey a small number of respondents regarding their views on a topic and be satisfied when they agree with me. The dangers are that I will generalise, be unconsciously selective and close off too early in my investigation of the facts of a situation when personal experience overly guides my day-to-day activities either as a teacher, administrator and manager in a TAFE college or as a head office person implementing a policy. The same applies when a researcher works on a project. *Personal experience is a powerful knowledge source.* It has to be treated with respect and with caution. Our personal knowledge allows us to see a situation better than a naive outsider would and it lets us locate issues that might not ordinarily be brought to the surface. The danger is that personal experience cuts us off from areas which we are not capable of understanding. This danger is extenuated when our experience is accepted by others as common sense.

Common sense

The French talk of common sense as 'savoir', a feel for a subject or an issue that can be generally held to be true. Common sense is an amalgam, a creative and changing fusion of our personal experiences into a widely held logic. It says this is the way things should be, often because doing otherwise seems illogical. People who live outside metropolitan areas will often assume that it is common sense not to have daylight saving. It disrupts what is natural for people on the land and for animals as well. 'If someone wants to enjoy the daylight more in summer, then they should get up an hour earlier.' A young (or older) coastal surfer reasons that anything that gives more daylight hours to time in the ocean must be all right. Common sense can work in two ways. It can be the force pushing for better understanding and it can as forcefully be the barrier against further insights into a problem or issue. Common sense might also suggest that an issue is not worth considering (we'll adapt to whatever happens). Many teachers and other people working public services were in favour of the cutting of central office staff and devolving responsibility to local levels, because the bureaucracy would then have to be more responsive to their needs. That central office people 'did little for us' was part of the common sense of many people in colleges. The realities of devolution set in as resentment grew against extra administrative loads. One common sense opinion then was that administration was not the work of teachers. Other opinions were that all staff should manage devolved tasks. Still other staff did what

had to be done and left what remained to others. What is common sense remains open for debate.

A researcher has to deal with common sense opinions but must also see them for what they are. When we are drawn into one form of common sense, the potential danger is that we exclude other forms and conclude unwittingly that we have an objective picture. Common sense, the attitude that 'everyone knows something to be true', gets in the way of a wider and better understanding of an issue. The outlooks of researchers, as of any one else, are filtered through different versions of common sense. Anyone who does research has been, and is now, part of a number of groups whose common sense knowledge they take as being legitimate and sometimes beyond question. It is the researcher's duty, for these reasons, to seek out all forms of information including those that conflict with ideas that they hold as being personally true. However, all research contains elements of bias attributed to common sense.

Authority and expertise

Authority can be seen as some form of wisdom that is expected from holders of certain positions legally and socially acknowledged as sound sources of objective information. The Prime Minister, the head of a government department, a head of school in a TAFE college, a priest, are all said to be authorities via the duties of their official position in a bureaucracy. Authority in this sense then, is legally tied to office. To work *against* such authority is to risk one's place within the system, while acting *through* it ensures that certain rules are being adhered to. The Australian National Training Authority (ANTA) is an authority of this type, as are State training boards, ITABs and curriculum consortia. The 'flattening' of structures and decentralisation from head offices in most education and training organisations has meant that the traditional roles of those holding positions of authority are still in a period of transition and are still being worked out. As well, those in positions of legal authority in the new structures will possess varying degrees of specific expertise in the areas over which they have jurisdiction. Their areas of expertise are directed more and more to management and financial issues and less to administration and content knowledge. The legal authority of the head of school in a TAFE college will be judged more on an ability to steer the school through difficult financial times than expertise in the curriculum areas of teachers within the school.

In this climate, education and training organisations and institutions are seeking experts *with* skills in the writing of curriculum modules, securing competitive training funds and especially those who might provide all concerned with the skills and knowledge to operate in the new structures of VET. Experts, those with specific skills and knowledge, make claim to a different form of authority, in that it is their skills and knowledge that give them 'authority' over those who do not possess them. Two points should be considered. First, the new

authorities in VET, from ANTA down, are seeking to make clear that new duties are there for those involved—that industry is the main client, courses will be modular, funding will be competitive, in the form of a market and so on. ANTA is, by its name, an 'authority', a statutory body given legal powers to determine the direction of training within all Australian States. Second, those with legal authority are not always in a position to be experts, even when they do possess authority by skill and knowledge. The main option is to consult. Thus, the use of consultants grows alongside the rise of new forms of legal authority. There are many virtues to this situation that are also part of its limitations.

Professional educators, especially university academics, are feeling that their 'authority' is being undermined. They are increasingly being told to keep out of the debate about the national training agenda, if they cannot add to the central agendas of competence and micro-economic reforms. To this end, Terry Moran, the head of ANTA, was reported in the *Australian Higher Education Supplement* (June 23 1993, p.19) as saying that university academics should refrain from 'muddying' the debate about key competencies. Given his position within ANTA, this is a relevant comment to make in that he has been given the legal authority to push the national agenda. From his position within the field, it is expected that such statements will be made. Legal authority can, however, be drawn upon to back a personal opinion; in which case it has to be placed under much closer scrutiny. Take, for example, Bill Mansfield, the assistant secretary of the ACTU, on the critiques of academics on the national agenda:

> *Most of the critics are ivory tower academics who have their own positions of privilege to protect or else are individuals who distinguish themselves through their stupidity rather than intellect.*
>
> (*Australian TAFE Teacher* June 1993, p.25)

Here a position of legal authority within one field being used to forward a personal opinion into another field where this authority has neither basis nor weight. Such statements have to be placed under question. Authorities can be referred to, but a line has to be drawn between what they can say legitimately and where their position of authority is used to forward their personal preferences. Authority as a form of knowledge has to be read in this manner.

Tradition

Tradition is knowledge from the past that is used to explain what we do in the present. Tradition is a hidden form of authority. It makes us feel that we should behave as we do because 'it's the way things have always been'. It is 'natural' to celebrate Christmas and to do so on a certain day in December. What makes traditional knowledge different from the authority mentioned earlier? Anthony Giddens (1993) proposes three reasons. (1) Ritual is central to tradition. At Christmas time, for example, gifts are exchanged, a meal of a certain kind is

served, one's status to some extent determines the part one will play in the ritual and its continuation. (2) There are guardians of traditions. These can be religious people such as priests, parents who sustain the myth of Santa Claus and, more and more, the department store chains whose profits rely on this tradition. (3) The tradition, through ritual and its guardians, must contain and maintain claims to truth. Irrespective of their viewpoints on religion, commercialism and family, enough people go along with a belief that public holidays should be granted, that children should be given extended holidays from school, that stores should be opened for extended hours, to sustain the tradition of Christmas in Australia and other countries. What has this to do with education and training?

The Australian workforce is built on traditional knowledge—the forty-hour week, overtime above forty hours, settlement of wage and other disputes through arbitration, trade unionism, distinctions between manual and mental labour and a separation of management from line workers are some examples. The apprenticeship system is also a good example of tradition in the workplace. In apprenticeships there are formal rituals such as the signing of indentures and required attendance at, until recently, a TAFE college. An apprentice's right to participate in the trade moves through stages that are sometimes marked by initiation and graduation ceremonies that are both formal and informal. Those already in the trade are the guardians of the traditional knowledge that can only be mastered through apprenticeship. So too are apprenticeship boards, employers and unions. It is through traditions within the apprenticeship system that claims to truth can be made that work should, and in many cases must, only be done by those who have passed through this system. It is predominantly through the apprenticeship system that TAFE originated.

Workplace reform, economic restructures and the national training agenda in many ways provide substantial challenges and attacks on traditional knowledge about work and training. Pushes for a training market, for multi-skilling, recognition of prior learning, enterprise bargaining and so on run across the grain of what previous knowledge says should be the case and attempt to weaken former claims to truth. Traditional knowledge offers an important dimension to research about education and training as it raises issues of what parts of the past will still hold true and what other parts must be left behind. Two other forms of knowing, those of legal authority and that of experts, are useful in considering these questions.

Theory

Knowledge, as discussed this far, can be seen as being based on our personal experiences, as contained within positions of authority and, consciously or not, re-enacted as tradition. All societies seek knowledge that will provide answers to problems that go beyond, or are abstracted from, common sense experience. Alchemy and astrology are examples from earlier periods in time. For the last two

centuries, abstractions from everyday experience have been based in what has come to be termed 'science'. The field of science refers to the natural sciences (biology, chemistry and physics), which deal with aspects of the materials of the physical world (chemicals, electrical forces) and with social sciences (anthropology, economics, history, philosophy, psychology, and sociology) where social life is the main object of interest. Science is usually taken to be something done in chemical laboratories by people in white coats. Yet the noted physicist Albert Einstein has said that, 'the whole of science is nothing more than a refinement of everyday thinking'. Indeed, much of science is done to supply answers to puzzling questions of everyday life—'Why do teeth decay?', 'Is it possible for humans to fly, to reach the moon?' 'Why do some groups do better than others in formal education?', 'Why did the former Soviet Union crumble as it did in 1987?', 'Why is there now such a world-wide interest in vocational training?'. Science is organised into theories to supply answers to such questions.

The term theory raises as many alarm bells as does the term science. Any of us who have had to teach 'theory' classes knows the reactions of students to them. However, there is nothing mystical about the term. A theory is an attempt to identify factors that will explain activities that occur regularly. Since the 1980s, a number of theories have been drawn on to explain how vocational education should be funded in a time of economic downturn. A theory contains a set of everyday propositions that can be tested by research evidence. For example, efficiency will result if we raise the number of student contact hours within a teaching/training institution such as a TAFE college; and at the same time, we lower the cost for each hour costed. This is a proposition from a theory within economics which assumes that efficiency can be measured in terms of financial inputs and outputs as products.

Theory is the basis of scientific communication. It is through theory that concepts, propositions and research procedures are tested against evidence that can be observed. Propositions are said to be tested and evaluated against scientific logic, and not by weight of those who support a belief as is often the case in political and everyday life. Stated more simply, a theory should hold on evidence and only be changed by evidence to the contrary. This should be the case irrespective of the weight of public opinion, political or other pressures that can be marshalled against it. This ideal is difficult to attain and maintain. Sciences like other fields import everyday terms and they are influenced by the political debate and beliefs of the era. Galileo, on the verge of inventing the calculus, had to recant his propositions about infinity as a numerical value to the then dominant religious and political beliefs that man should not delve in a realm that was God's alone. A comparable situation occurred in the development of modern psychology. In Russia, psychology took a much different path than in the United States during the period after the First World War. Where socialist ideology was strongly against the individual as the basis of social theory, Western political systems assumed individualism as their starting point. A theory that proposed

otherwise would not have survived in either nation. The influence that dominant political ideas have on theory can be seen by contrasting the views of Myer Kangan and John Dawkins in the two crucial periods of change in vocational education between 1972 and 1987. A theory generated on free market economics could not have survived in the early 1970s, just as Kangan's would struggle to obtain a hearing in the present debate. Irrespective of this situation, the task of theory is to ensure that the concepts, propositions and research approaches used do not become so incorporated into political agendas and everyday common sense that evidence against them is ignored. In outlining a national agenda for training, the federal government and ANTA have presented a number of propositions that need to be tested by research and theory at all levels. These are concerning CBT, training markets and so on. Other propositions are related to how work should be organised and managed, the skills needed to perform work tasks efficiently and how skills should be recognised and renumerated.

When we talk to people in TAFE colleges for example, they often ask questions about the practical logic of the national agenda, why it changes as it does and why people in colleges are being asked to respond in ways that are foreign to them. In contrast, the people who have devised the national agenda are perplexed as to why those in some parts of education and training and industry have little or no interest, or are not aware of the agenda. To address such questions as 'why the national training agenda is not fully understood by those whose job it is to implement it', we have to resort to some theoretical thinking. VET, and the national training agenda, are part of policy and public debates which draw on economics, sociology, government, history, psychology, as their main influence. They produce the subject matter used in the government portfolios of health, welfare, housing, education, industrial relations, employment and training, and so on. Different interest groups from business councils, corporations, small business organisations, trade unions, teachers' unions, community groups, all draw on or distance themselves from the national agenda.

Theory, method and facts

The French sociologist Emile Durkheim said that the task of theory was to devise methods that would uncover observable 'facts'. There is a great deal of factual knowledge available to all of us should we seek it. It is a 'fact' that there is an emphasis on implementing the national training agenda within Australian industries and the developing VET system. Very few people are aware of the complexity of the content of policy, the nature and roles of the various bodies set up to help in its implementation, of the processes of teaching and learning done in institutions, of the client groups etc., to develop a clear picture of what is happening. This factual question needs to be broken down so that tangible research can be carried out and when this occurs finding *the* facts is difficult to achieve. What is seen as a different fact by one person or group is often seen as a different fact from another

perspective. What is required are techniques, methods and theories to help us focus on what information will provide answers to questions about certain aspects of the training agenda and then to relate them to our own situation. As an example, we have all mastered the technique of combing our hair and we can (with some trepidation) snip off a couple of strands that get in the way. We can't often take this technique much further to either cut and style our own hair, or to volunteer to do the hairdressing for the bridal party of the daughter of our boss. Hairdressers 'see' hair differently from others who are not trained in that craft. The methods they have learnt for doing procedures on hair are different from the techniques we employ in our own hair care. They are based in concepts about hair types, colouring, safe and effective use of chemicals, heat and electricity. All of these concepts contribute to theories about hair, styling, fashion, etc. The same case holds for research as a craft. The facts, or what Pelto (1970) more usefully calls the obtaining of 'true and useful information', are found through research methods. All of us possess the basic techniques of research—observing, asking for information, making meaning out of speech and behaviour. To do research, these techniques have to be honed into methods and these methods have to be placed in a framework of concepts. The novice metal fabricator, for instance, has to be able to sort metals into different categories—mild steel, stainless steel, hardened steel—to be able to cut and weld them. The researcher, as observer or interviewer, has to have a conceptual framework to sort and categorise behaviours and written and spoken information. Just as in other occupations, the concepts and propositions researchers make about their data have to be agreed upon in a fashion which applies to those who work in that occupation. This is the function of theory—it provides a touchstone for agreement with others about the phenomena we deal with.

Imagination, objectivity and research tradition

Research should not, however, be seen as dominated by theories and methods; the fields of research would not develop far if this were the case. Not many occupations would advance, maintain and reach a standard of quality, if the concern was only with methods, procedures and techniques. Researchers do a great deal of routine work in their training but they, like other workers, develop a capacity to adapt, shift perspectives and build up a broader view of what they do. This aspect of research is referred to by Mills (1959) as the 'sociological imagination'—a 'playfulness' with methods, rules and concepts rather than a rigorous application for application's sake. Most good and enduring studies are those in which imagination is employed, in which devising methods is done in creative ways and in which the main desire is what Mills calls 'a truly fierce desire to make sense of the world'. Once methods and techniques are made sense of, then a good percentage of research activity is driven by imagination.

The three traditions

One of the features of modern research is that researchers have tended to divide initially into two camps, in which some draw mostly on quantitative methods and others on qualitative methods. Some researchers draw on either to suit their purpose, others stick strictly to one approach, but this is seldom the case as many theories are tied to one specialised methodology. Research, no matter in what circumstance it is carried out, is concerned with giving meaning to what occurs in everyday life. In explaining everyday situations, researchers have come to resort to a number of methods. Some of these methods are taken from the physical sciences (astronomy, biology, physics, mathematics, chemistry etc.). These methods have tended to use the experiment, the laboratory and other scientific methods of observation and recording as their example. They attempt to build theory and generalise from it; that is, they tend to say somethings about what happens to people in general. Their approach then is to quantify (measure) and then to make generalisations about what individuals tend to do. This approach embodies quantitative research methods. Correspondingly, other researchers try to understand and interpret what the world looks like from a person or the group's point of view. Their methods are closer to those employed by the novelist, the journalist, the inquisitive traveller in a foreign culture, the composer. They want to learn from people, more than wanting to measure them. They want to make the experience of everyday life visible. Their research reports describe ways of life and the different conditions in which they occur. Qualitative research, then, embodies the methods whereby the body of knowledge known about an area is enhanced by a closer look at particular situations and the conditions that affect them. Generalisations are made cautiously and kept close to the situation being investigated. Quantitative research is a method which attempts to make broad generalisations about as many individuals as possible. Where qualitative methods attempt to describe and interpret, quantitative methods seek to predict the variables influencing individual behaviour. The history of the research community shows that people and groups have formed to argue that one tradition is superior to the other—this is not the important point. It is a bit like arguing that doctors are more important than chiropractors and nurses in health care. The function that each provides is the important question. This is shown below.

Quantitative	**Qualitative**
Take the few most compelling variables and generalise them across a large number of people	Try to exhaust the wide range of typical and unique factors that operate within a small community of people

If we begin with research into an area such as clothing and fashion for youth, we might make the different functions and purposes of these approaches clearer. In doing quantitative studies into why the wearing of American basketball and baseball caps has captured

Australian youth, for example, we would want to identify a few central considerations. These might be increased participation in these sports, the popularity of superstars such as Michael Jordan and the way they are presented in prime time television advertisements and in youth magazines, the wearing of caps by rock and rap musicians in television clips of their songs and peer pressure. Through quantitative research we could establish the probability that these factors (spelt out in more detail) would show causes for this fashion trend across a large number of the Australian youth population. In qualitative research, across-population generalisations are not the main concern. In contrast it seeks to identify reasons particular to different groups where cap-wearing is a part of group life and operating culture. Here, long-term case studies could be conducted in which researchers might spend time participating and observing the way of life of different groups and communities in which basketball caps were an aspect of a culture. These groups could range from actual players in clubs and in 'pick-up' games in parks where basketball hoops are available to the public, to groups who hang around shopping malls, to some outback communities where caps might be not be expected to be a part of the lifestyle. These studies would provide a multiplicity of reasons and unique reasons for wearing of caps that went far beyond the number found in the quantitative study—but they would not be able to be generalised across the entire population. Their value would be primarily related to that group and community.

To return to the issue of education and training, in quantitative research we might want to show how training providers, in general, favoured one approach to instruction above another because it was, again generally, the most convenient way to teach. The variables might include teaching and assessment procedures used across a population. A qualitative research project might be designed to focus on one course in one college and seek to obtain as many reasons as possible about why learning might be hindered and enhanced in that context. The factors considered could range from reasons students have for doing the course, the ways that they are categorised as fee-paying as opposed to government-funded students, the particular backgrounds of individual students, the interactions between students, teachers and administration etc. The differences vary between providing generalisations and elaborating fine-grained description. Whichever approach is employed, something has to be done as a result of whatever information is obtained.

The critical tradition

Generalisations follow from quantitative research and fine-grained interpretations are the product of qualitative research. A third tradition of research, that draws from both, is the critical one. The critical dimension of research looks at the positions taken by researchers and the funding bodies that commission research. In critical research, the definitions that a government bureaucracy has of a group or of a policy—as long-term unemployed, industry as sole

client, that devolution coincides with empowerment—have to be questioned. So too do the methods, concepts and theories of the researcher's themselves. The 'self-evident' terminology that we are asked to use in our study is an example. In using the terminology of a funding body we may make our study follow the directions of the status quo when we devise our questionnaires and interview schedules. The point of critical research is that when we begin with the assumptions of one group, we are likely to deliver findings that help see the problem from their point of view. In the extreme, the findings may so represent the discipline of the researcher that they are of little or no use to those in the situation being researched. Correspondingly, the terms of reference for research may be so tightly formed that other pertinent and pressing factors are neither sought nor brought to the surface. As a result, limitations are most likely to be seen as a failure in others with little attention given to the part played by the group commissioning the research. 'Good news' research causes a major dilemma. Those in control (either or both the researcher and those requesting the research) live in the illusion that things are 'going to plan'—those in the field see that it is not the case. The result is various forms of concern being masked and complicit agreement being reached about what appears to be happening. Research that shows 'best practice' is required but it should not prevent a 'dig beneath the surface' that brings some, but not all, bad news. In real terms it is better for all concerned that it is known that something is not working—or that it works in some areas and not in others—than it is to implicitly cover weak spots in implementation. Critical research, then, has a central place. It can play the role of questioning disciple as well as critical advocate and so advance the debate. Those driving an agenda require critical findings as much as those involved with those dealing with them on a day-to-day level.

Scientific objectivity—is it possible?

At the back of quantitative, qualitative and critical research traditions lies another question: that of the extent to which scientific objectivity can be adhered. Do the methods and 'detached objectivity' of the natural, biological and physical sciences apply to the study of people who construct their own cultural and social systems? These points are well illustrated in the following excerpt from Alfred Schutz (1962, pp.4–6).

> *. . . All our knowledge of the world, in commonsense as well as in scientific thinking, involves constructs, i.e. a set of abstractions, generalisations, formalisations, idealisations, specific to the respective level of thought organisation. Strictly speaking, there are no such things as facts, pure and simple. All facts are from the outset facts selected from a universal context by the activities of our mind. They are, therefore, always interpreted facts . . . This does not mean that, in daily life or in science, we are unable to grasp the reality of the world. It just means that we grasp merely*

> *certain aspects of it, namely those which are relevant to us whether for carrying on our business of living or from the point of view of a body of accepted rules of procedure of thinking called the method of science . . .*

What is said in this quote brings us back to the main theme of this chapter: that there are various ways of knowing that something is, or is not, as it seems. Scientific knowledge, through research, is a means for transcending commonsense and other forms of thought, but research can only gain a grasp on certain elements of our world and those of others. The challenge is to keep trying to bring each of these areas of knowledge and understanding into some brief cohesion through the research we do ourselves.

Selected readings

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4 Research design

Bob Funnell

The logics of research design

The reality for most people is that they will have limited time available to do research. Some of you may do a research project as a part of a subject in a course you are undertaking. Others will be released from teaching or other duties on a project. Very few people will have the time to conduct a research project, unless it is of personal interest or it arises as a part of one's work duties. In logical terms, the time available for a project will be around 100 hours for short-term research and around 500 hours for those doing further study. The logics of a design done in these parameters is that you will aim only to do what you can in the time available—this is pure common sense. While there is a dilemma here in that most research is often done over longer time spans, all researchers, of whatever status, have had to do their own apprenticeships by completing small-scale research projects. In so doing we are all forced, in many ways, to look at the often grand research designs of others and adapt them to our own purposes. For this reason we will present research design on a large rather than a small scale in the body of this chapter. We do this because research, on any scale and at any dimension of largeness, seeks to conform to a central logic. This logic is referred to by Pelto (1970, pp.1–2) as that of seeking answers about how can I find 'true and useful information' about a certain domain of phenomena? He asks two questions that are worth repeating:

- How can I personally investigate some domain of phenomena in order to obtain 'true and useful information'?
- How can I know with some assurance, what another person (researcher) means when he asserts propositions about information and how can I judge whether I should believe him?

The essence of any research design, modest and ambitious, is contained in these two points. The means through which the points are achieved varies; so too do the types and approaches we have to the designing of a research project.

What is a research design?

Research, we have tried to accentuate, is a craft like any other in which people invest their time, energy and try to make their own distinctive stamp. In all occupations there is always some slippage

between what people who practice the craft do and how what is done appears in textbooks and manuals. Ask those who do the tasks daily about the accuracy of the manual and the answer usually is that: 'it's right in theory but . . . when I do what it says you should be doing here, I get better results by doing something completely different'. Thus doctors seldom encounter patients like the ideal cases in medical texts and teachers who have learnt to teach with the example of the apprentice block will have to redesign their approach when teaching with long-term unemployed students, people from non-English-speaking backgrounds, high school students, diploma courses at night, or when assessing for RPL in industry. Suppose, as teachers, we were asked to provide a model for teaching that covered these situations? We could draw up a design that would show an ideal sequence from the beginning of the process to the end, that would cover all of these areas. If we had to use the design ourselves we could probably be confident that we would adapt as we went and be assured of a good degree of success. It is highly unlikely that we would be as confident of success if we gave this design to a novice teacher as their operational blueprint. The danger is that the novice might treat the design as the one and only way to go and not as a flexible guide whose rules and sequences have to be altered when the situation requires.

Our point should be clear by now. When research designs are shown in research courses and books, they are like written guides for action in the field in any occupation—there are differences in how they are used and adapted in everyday practice. Research design is, in reality, the delicate balance that researchers make between what must be done and what has to be done to solve the problem that is most pressing at the time that the research is conducted. Research design is about following traditional rules, but bending and breaking them as the situation demands. This situation applies across all occupations. All strategies and operational designs must be continually adapted to meet the needs of a context that has to be made sense of. In this chapter, we will provide an illustration of research designed in the traditional manner. From this we will show some of the moves research makes in and out of the traditional design to bring the final object of research into a clear focus.

The fork in the road

Research begins when we try to puzzle our way through something that we have trouble making sense of. We probably 'theorise' our puzzle in talking with others and investigating it through any means at our disposal. To this end, all researchers begin their tasks at the same point by being curious about things that are difficult to understand. Yet they tend to differ on the paths they should take to find solutions. Consider an example of two people on a journey during which both discuss some phenomena that puzzles them. In further discussion they agree that the puzzle is similar to other things that are being talked about by others and that it is important to find answers—for their own benefit and perhaps to assist others who are

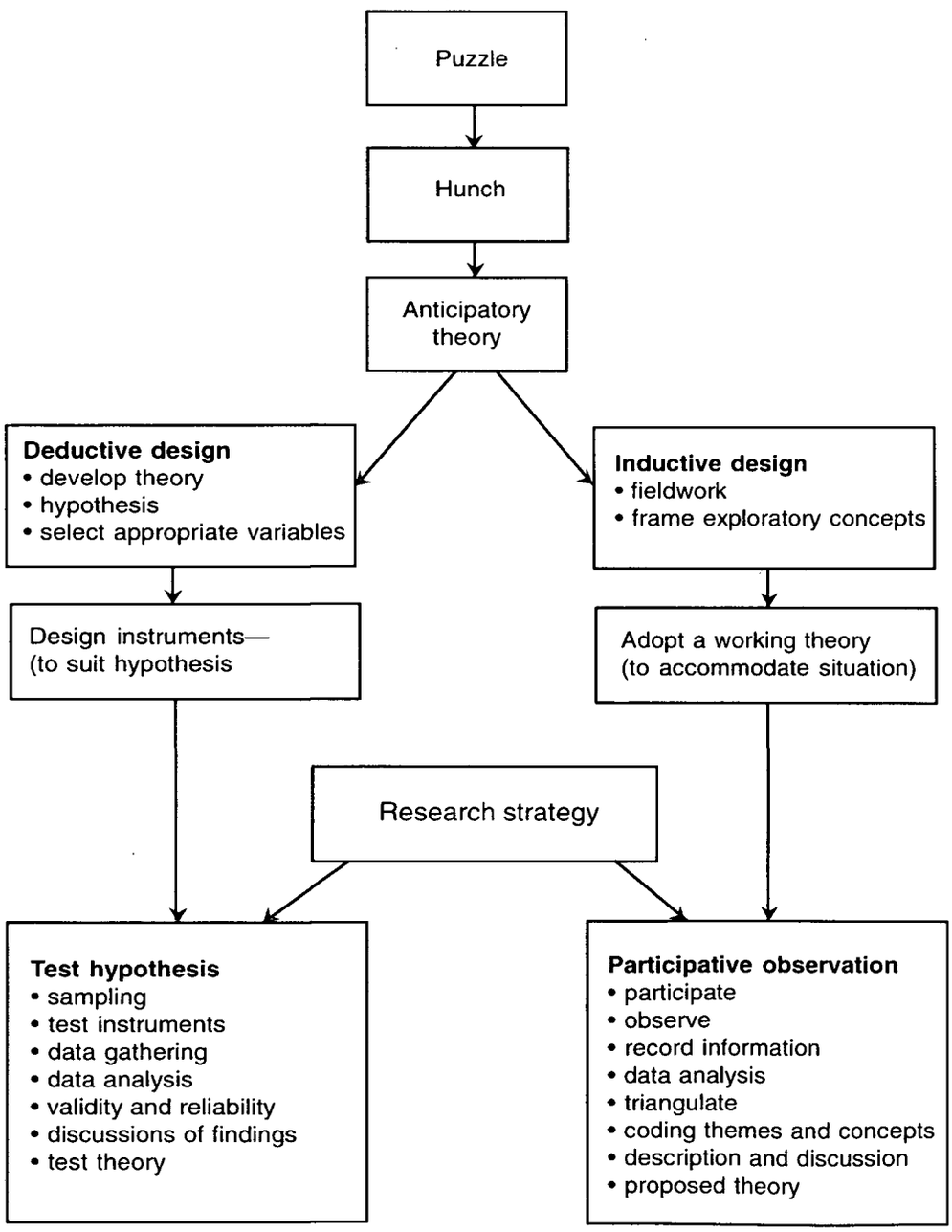
still seeking solutions. Further into the journey they begin to talk about the steps that should be taken to investigate their problem—and here they do not agree at all. As this discussion continues, both are relieved to see a fork in the road ahead and decide to take different paths in order to reach their own conclusions. What were their differences of opinion? One of these people is sure that they can identify a couple of factors that are causing things to be as they are. This person decides that only in the testing and measuring of these factors in a rigorous manner, can we validly say that what we have found applies in some positive way to the problem in general. The answer, this person maintains, will be so compelling that others will do their own tests to try to put the issue beyond doubt. The second person is less sure and thinks it is better to move into the actual situation and try to build up a picture as more information is found. The task here, in contrast, is to keep building and rebuilding from what different people and groups think and feel about the thing that is puzzling them. This second person thinks that it might be the case that the people involved don't see the puzzle in the way that the two travelling companions do. The second response is an attempt to build a new theory that is in line with what those in the situation think. This second person asks others to see if this theory can be used to make sense of what is happening in other situations.

Taking different directions to solve a puzzle as depicted above is a common feature in research design. The signposts above each road may differ—one might read 'positivism', the other 'interpretive', in other cases it will be 'quantitative and 'qualitative'. Others will say there is only one research highway with one signpost 'research', in which case our forks in the road are off-ramps that ultimately lead back onto the central highway, whichever off-shoot is taken. A great deal has been written about why one design, in its ideal state, is superior to the other, but it hasn't done very much to stop a trend that has existed for a long time—people keep taking the fork in the road, or the off-ramp that suits them best. Instead of going further into this argument at this point, we will describe the logic behind the ideal paths to designing research and allow you to think about which seems the most appropriate for you and for different research topics you might follow yourself.

Before doing this, let's look first at the journey and the point where the fork in the road occurs. The two diverging paths are meant to represent two approaches to gathering information—by deduction and by induction. The design in figure 4.1 is an adaptation of Julienne Ford's (1976) setting out of the stages of a quantitative (or deductive) research design. As you can see, the journey runs the same path through puzzling, developing some hunches and searching about for a beginning or anticipatory theory which might lead to a worthwhile explanation. It is in taking either a deductive or an inductive approach after the anticipatory theory that the paths change quite a lot. As will be explained in what follows, this leads to taking up either of two basic research designs. One design begins with a hypothesis that is used to *test* a theory. The design process is one of *hypothesis and*

deduction. This design is used to deduce what is true and false about the hypothesis in the case of this research topic. Generalisations can then be made to other cases and so on. The second design attempts to develop a theory as information is found in the area or field being investigated. Here the design process is one of *fieldwork and induction;* to work within the given context and draw a theory that is built to a large degree on the realities as seen by those involved. Each design has its place. One design is usually chosen over the other because it either suits the methods most preferred by a researcher or, because it best suits the problem at hand. Both designs are now briefly outlined before going on to a more detailed explanation of them in later sections.

Figure 4.1 Deductive and inductive design



Two approaches to designing research

Let's return to what has been stated so far. Despite all the different ways in which research is presented and the number of theories that direct it, nearly all research is said to follow two basic designs. Alan Kellehear (1993, pp.26–27) sums each approach up rather neatly. The philosophy behind hypothesis and deductive research, for Kellehear, is to secure a 'rational' solution. To adapt from Kellehear, a purely deductive design takes the pattern of a researcher:

- identifying a group or population within which to test an hypothesis; and establish a set of cause and effect relations.

A study reaches the deductive phase in design when a researcher is fairly sure there are clear patterns that can be tested across a population. This can be as small as a class of students or as large as a college or an educational system. An inductive design is employed, in contrast, when we want to keep our options open, when it would be inappropriate and misleading to impose an hypothesis on an area of study. The task with inductive research is to keep seeking information, try to find as many different meanings and viewpoints as possible and then establish how they can be pieced together. With an inductive design, we need to know more about how to enter the subjective 'lived in' worlds of those in the research context. The philosophy backing field and inductive studies, once more adapting from Kellehear, is one of:

- going out into the world (into people's habitats);
- describing the insider's point of view, developing a theory;
- the ways people interpret their worlds.

The differences in philosophy are said to be what leads researchers to follow the diverging paths that have been alluded to this far. This is true—but up to a point—as we said at the beginning of this chapter. If the inductive design is said to represent qualitative research and the deductive, quantitative research, then there are some researchers for whom one design will be off-limits. Some branches of economics, sociology and psychology would not consider qualitative research, because their theories rely on statistics. The opposite is the case in other branches of these disciplines, in social psychology, anthropology, and political and cultural sciences, where variation in meaning and relationships is of most importance. Here, researchers in various specialisations will question whether or not they can be slotted so easily into the traditional deductive research design process. Some will say that they use both designs, incorporating them to their own needs. For them the dichotomy between induction and deduction is false—research involves either at various points of the research process. We would agree with this, but at some stage the research will favour one type of design over the other. This will be discussed later in the chapter.

Hypothesis and deduction

In a deductive design, a major concern is for the researcher to take an objective position to what is to be studied. Hence steps are taken to ensure that the methods used will be both reliable and valid and can be replicated by researchers in other situations. With reliability, the question to be continually posed is one of, 'would someone else obtain similar results to mine if they used the same procedure as I have used?'. This is one aspect of the design problem. A method can be reliable—similar responses, behaviours follow from its use—but it may not be picking up the information that it should. A research instrument designed to locate reasons why a new policy is not being adopted can be reliable—those responding provide reasons that can be grouped and analysed to show some causes. It may not be valid for other reasons; perhaps it only went to middle management or those answering did not reveal the actual reasons for fear of recrimination. Given such possibilities, a deductive design and the methods used within it have to be trialed and re-trialed. More importantly, care has to be taken in locating the population that will be drawn to test the research hypothesis. Making sure that the design is objective, reliable and valid is critical in a deductive research because:

- the study has to be able to be replicated;
- methods have to be as reliable and valid as possible before research begins;
- findings have to be generalised across a population.

Inductive research involves the researcher in the task of finding as much as possible about a topic and what the existing theories are about that topic. With this information about existing studies and theory in mind, the researcher then proposes an hypothesis. The hypothesis is set up to test—to prove or disprove—some part of the theory or literature. A research design is then made up to test the hypothesis through a process of deduction. That is, the research is designed to construct a research instrument that will measure the amount of evidence needed to prove or falsify an hypothesis. It is because of the reasons just discussed that quantitative methods such as survey questionnaires, experiment, content analysis and testing scales are most used for a deductive design. One of the key strengths of a deductive design is that it can be applied to a specific population—all graduates in a certain course from 1990 to the present. The intention might be to find out employment rates within various parts of an industry. The data collected can be analysed statistically. The study can be replicated in other colleges and courses and the study can be done each year to build up a longitudinal record of trends in student occupational destinations. This design, then, is best suited when generalisations are required. Examples of generalisations that can be tested through a hypothesis and deduction design are as follows.

Examples of questions to be tested as generalisations

Does learning of skills transfer to new situations?

Is learning more effective when done in the workplace than in formal settings?

Are flatter management structures more efficient than hierarchal structures?

Does a change to self-managed work groups increase teacher stress?

How is 'expert' knowledge gained and used to solve work-related problems?

Does teacher in-service that is culture specific cause changes in the academic performance of overseas students?

Is literacy a cause of under achievement in competency-based learning modules?

Each of these questions contains a generalisation that could direct a study, though the questions given in these examples are not yet hypotheses. To begin to make a hypothesis, you would need to read to find out what was meant by 'skills transfer', 'workplace learning', 'expert knowledge', so that the key terms could be operationalised and measured. The hypothesis must show what part of the generalisation is being tested and which part remains constant. The research design has to follow logical steps and consider only that information that links cause ('culture-specific in-service') to effect ('academic performance of overseas students'). The variable that is said to do the causing is called the *independent variable*. The variable that is acted on, or brought into being by the causal variable, is called the *dependent variable*.

In one of the examples above, 'change to self-managed teams' would be the independent variable, while 'increase in teacher stress' would be the dependent variable. Some work would still need to be done, however, for us to be able to design an instrument—survey, questionnaire, observation, experiment—to measure the variables and examine the relations between the independent and the dependent variables. There may be factors in between the independent and the dependent variables that have to be brought to the surface. Through reading, consulting with others and brainstorming, you might find that the most likely factors are:

- time taken to prepare staff before change;
- type of organisation—new or 'greenfield site' vs older;
- size of team;
- administration support to teams;
- commitment to change by middle management;
- previous occupations of teachers;

- whether previous senior staff are now members of teams as teachers;
- increase or decrease in teaching load.

These variables could each be elaborated into a questionnaire that was sent to teaching institutions to test our assumptions. As can be seen this far, the location of variables between the independent and the dependent variables is a key part of the process of bringing our design into operation. We will return to this in the final section of this chapter.

Strengths and weaknesses

Deductive designs are used when we need to generalise our results across a research population. This is the strength of such an approach. Hypotheses can be supported by data collected across a population. The results can thus be generalised in that they can show what is occurring: when, where and how. The generalisations stand and fall as a result of challenges that can be made from similar research which replicates what we have done (our results come under question should another study, with a comparable population, show results different to ours). Researchers can gather data quickly and in a form that allows statistical analysis. Instruments can be designed to reach large numbers of people—a survey can reach all vocational educational institutions in a nation within a short period of time. This can be a limitation, as it is the research instrument and not the researcher that goes into the particular situation. The conditions in which the hypothesis is formed might not be able to deal with these factors. The researchers might finish the research unaware that elements of the causal chain are left unexamined. Researchers who use deductive designs are aware of such limits. That is why they spend a lot of time and effort testing and retesting their research instruments. This checking of validity of research often involves having 'insiders'—people from within the population grouping—check such things as the wording of questions and the types of language used. The researchers themselves may take time to gain experience in the area to be researched. They could move down an inductive track to the point where they revise their theory and consider intervening variables of which they might not initially have been aware. As such, a research design is never fully deductive. If a hypothesis is to be tested, then the research design will ultimately follow a version of the deductive design shown on the left hand side of the figure 4.1 shown earlier. Inductive research does not provide broad generalisations and this is the basic reason some people steer away from it. We will now consider what it is that inductive research can provide in contrast to the approach just discussed.

Fieldwork and induction

Anthropologists and sociologists use terms such as 'going into the field' or 'fieldwork' to describe that part of their research that is devoted to collecting information. The term *fieldwork* dates back to the late nineteenth and early twentieth centuries when anthropologists, in particular, travelled to conduct research in other lands or fields. Often they did not speak the language well, or at all and had little knowledge of customs, rituals, eating habits of the people with whom they might spend one or more years. The methods were necessarily *inductive*. Like a stranger alone in a foreign country, the researcher, using an inductive design, relies by necessity on people in the research situation for information about what happens; where, why, how and when. Research in this approach can be likened to that of the young person entering their first job. They have some ideas about what the job might be like and what will have to be done. However, they only learn about the wider dimensions of what it is to be a worker through participating, watching, asking questions, being chastised, praised, allowed into some groups and excluded from others and seeking to establish a position of some worth within that workplace. That there are 'senior' hairdressers and clerk-typists, foremen, leading hands, chief accountants, head chefs, riggers, crane drivers, managers and chief executives is learnt as one is inducted into particular occupations. It is difficult knowledge to get without on-the-spot experience and observation. This is why some form of participation and observation is central to field research.

Unlike the person new to a job, researchers using this approach would try to gain knowledge as complete as possible about the perspectives of people at all levels within the company or organisation. They would also read widely about the area and what various theories had to say about it. Their task is not so much to prove others wrong, but to generate a theory that is faithful to the everyday realities of what happens at as many levels as possible. Let's look at this in terms of the implementation of CBT.

CBT as an example

The research design for fieldwork done on CBT might begin with a general question of: 'why is CBT having the range of effects that are reported to be occurring in TAFE colleges and institutions and how are they being experienced?'. Let's suppose that we come up with a supposition, an anticipatory theory: 'It appears that there are views that CBT either will work, can't work or, that it might work in some areas and not in others'. Other views state that: 'we'll just wait and see' and, 'we don't really care one way or the other'. The research design, however, would not be about defining a testable hypothesis and searching for variables. What we are seeking are as many reasons as possible in a range of contexts and we want to be able to observe and enquire about the problems in these contexts. The various ways

in which different groups perceive and use CBT would be further explored in reading and comparing what is written in newspapers, government literature, training magazines, the *Australian TAFE Teacher*, implementation reports done in-house and by consultants and in some articles and books from within Australia and other countries. Some exploratory conversations would also be held with different groups of people to gain a better feel for the topic. This reading and discussion would make us sensitive to the main issues and could lead to a general question: 'why are these views being held in what parts of an organisation are they held and not held and for what reasons?'. Given our previous life experiences, we probably come down on the side of some views over others and this must be kept in mind as often as possible.

The initial stages of our information gathering would form two strategies. First, we would decide what to take on entering and in which particular research situations—colleges and institutes. If possible, some people would have to be found who could tell us which colleges appear to be more in favour of CBT than others. We would need to know something about different schools, sections and departments if we were dealing with only one college. Here again we would have to take great care not to take these descriptions on face value. Very often after being in a college, a section, or talking with a person, we find that they are different from how others have described them. Taking a suitable role means understanding what the implications might be of having another person hanging around, asking questions of people at all levels. As researchers, we have to avoid either being seen as favouring one group above another, or as getting information that can be used against those involved. In research we have done in colleges, for example, teaching staff might be guarded if they think that information will be given to management, while management might fear that central office could get the wrong impression of what is happening. Therefore, initial interviews need to be held to explain the project. A small warning should be given here, because it is necessary to take on a role even when doing research in your own situation. Students doing research in our degree courses have found, to their surprise, that their colleagues and work friends treat them differently as 'researchers'. Some people treat them formally in an interview and give only a small amount of information where, in contrast, the same person had been talking openly and freely in a lunch room conversation a little earlier. At times what will be said 'off the record' is not the same as what will be said to be recorded. This is especially true when circulating a questionnaire in your own work environment.

Returning to our example, with entrance to the field ensured, work can be done to find the concepts and terms best suited to explaining CBT within the college or colleges. Our intention at this stage is to participate, observe and record as much information as possible to check our concepts and be the basis of our description of the events taking place. In contrast to deductive research, the main aim is not to prove or disprove an hypothesis but to build up a case by gathering new information so as to deepen the interpretations that can be made about the original question. This leads to the significant difference

between deductive and inductive research designs. In deductive designs, the intention is to test the extent to which the hypothesis and a number of variables hold across an entire population—e.g. all associate diploma students in an institute. In inductive designs, much more descriptive information is sought about a particular group as a case—e.g. one group of hospitality students.

The information we gather can be statistical—numbers of courses and subjects using CBT mode, students enrolled and graduated over a number of years, frequency of testing within a module, numbers of outcomes listed within courses and subjects. Analysis can be made of syllabus documents, internal and external memos, minutes of meetings. Staff, section and other meetings can be attended and interviews can be conducted. As well, we could document the history of the college in relation to the system and to CBT—it could be that newer institutions with new staff tend to respond to new curriculum initiatives in different ways than ones that are older. This needs to be considered rather than just accepting what is assumed. As this phase gains momentum, people will be selected for interview, on the basis of what they can tell us about the concepts we are tentatively developing. We should also look for counter explanations to question what we are discovering. Gradually, some patterns fall into focus as we code the information we are gathering and develop some concepts to explain what is happening (see chapter 10 for advice on coding). We could begin with the codes we brought into the research in our design—that CBT 'will work'; 'can't work'; 'might work in some areas and not in others'; 'we'll just wait and see'; and, 'we don't really care one way or the other'. Using these terms for our initial coding, it might be that some groups are for CBT because it makes life easier, tight. Learning outcomes mean that assessment is just as tight and 'we don't have to teach as much as we used to'. We will locate instances where new codes have to be developed—where sections have no real knowledge of CBT, about differences in occupational areas. College staffing and geographical area may mean that a lone part-time teacher is dealing with CBT in one way in a non-metropolitan college, whereas elsewhere a full-time staff of fifteen is dealing with the same modules with the help of senior staff and a back-up of CD-ROM materials. We would get to this point through triangulation—by looking at what we are finding from different perspectives. Use of CBT could be viewed from different sections of a college. People who have to handle and keep up with the increase may have no view at all on CBT but resent the amount of photocopying and printing time that reproduction, delivery and storage of modules takes. In turn, the place of CBT in different college/institute situations could be compared in terms of geographic location, size and type of organisation; or, comparisons could be made across programs within a college or across colleges and institutes. At this point we would end up at the description and discussion point at the right-hand side of figure 4.1, but our discussion will be different from that had we taken the deductive design. The report will be a description which tries to hold up a mirror to what is occurring in the use of CBT in the contexts in which

the research took place. This discussion will attempt to show how different conditions, such as those mentioned above, either allow CBT to be implemented as expected or hinder it in some way. Examples can be shown of different types of practice and of ways in which alternatives to CBT may be better alternatives. The steps in inductive design can now be detailed. Neuman (1993, p.342), in his excellent text *Social research methods*, provides an overview of the stages in field research design. These are adapted into the points that have been made this far and they are shown below.

Stages of research	**Research processes**
Preparations for entry to the field	Familiarisation—what is written and said about the topic (anticipatory theory). Locate site and negotiate entry.
Conduct initial exploratory fieldwork	Experience life in the field setting. Seek out a role. Establish rapport, 'learn the ropes'. Observe ordinary events and activities.
Collect information, alter methods to suit events and people	Seek out information needed at different points in time and place. Draw on various techniques and social skills as the setting demands. Maintain analytic distance as an outsider.
Conduct in-depth interviews with those with most relevant knowledge	Counter these with views of others. Check how the same theme is played out in different contexts. Take extensive notes, construct diagrams, or pictures to provide detailed descriptions. Observe and participate without upsetting those involved and imposing your own point of view.
Triangulate concepts/emerging theories against different cases that are observed	Clarify differences between your concepts and those held by insiders. Be capable of coping with personal stress, ambiguity, uncertainty and some ethical dilemmas.
Leave field to analyse and write report	Record what is tacit—less spoken about and often not recognised by those in the field.
Report back to those involved in research *Submit research/publish*	Seek criticism, both negative and positive.

Strengths and weaknesses

Fieldwork is based on answers gained from the experiences and understandings of participants involved and filtered through the perspectives of a researcher. Field research allows for fine-grained descriptions of people, events and situations over time. Done well it can show the contextual variations and the different conditions into which change is occurring. Its main strength is that through fieldwork, the uneven impact of change in a college or a system can be highlighted to an extent not often possible through deductive research. Having said this, this type of design is time consuming and deceptively difficult to write up in a form that will convince others of its validity. Field research is inexpensive and requires only access to the research situation and the basic tools for recording information—pencil and paper, tape recorder, one person to observe and record. Its weaknesses are that researcher bias can intrude at any stage of the research. It can enter in the forming of the research question, the design of the research project, the analysis and in the format and content of the report. The validity and reliability of what is being found needs to be checked with those in the research situation and through the seeking of feedback on drafts of what is written, including those who might disagree with what is found. In many cases, inductive field research is more valid than research done through survey questionnaires, experiments and content analysis. Conversely, the results may not be as reliable and any steps to making generalisations should be tentative and cautious. What is true in one context may not be assumed to be true in another.

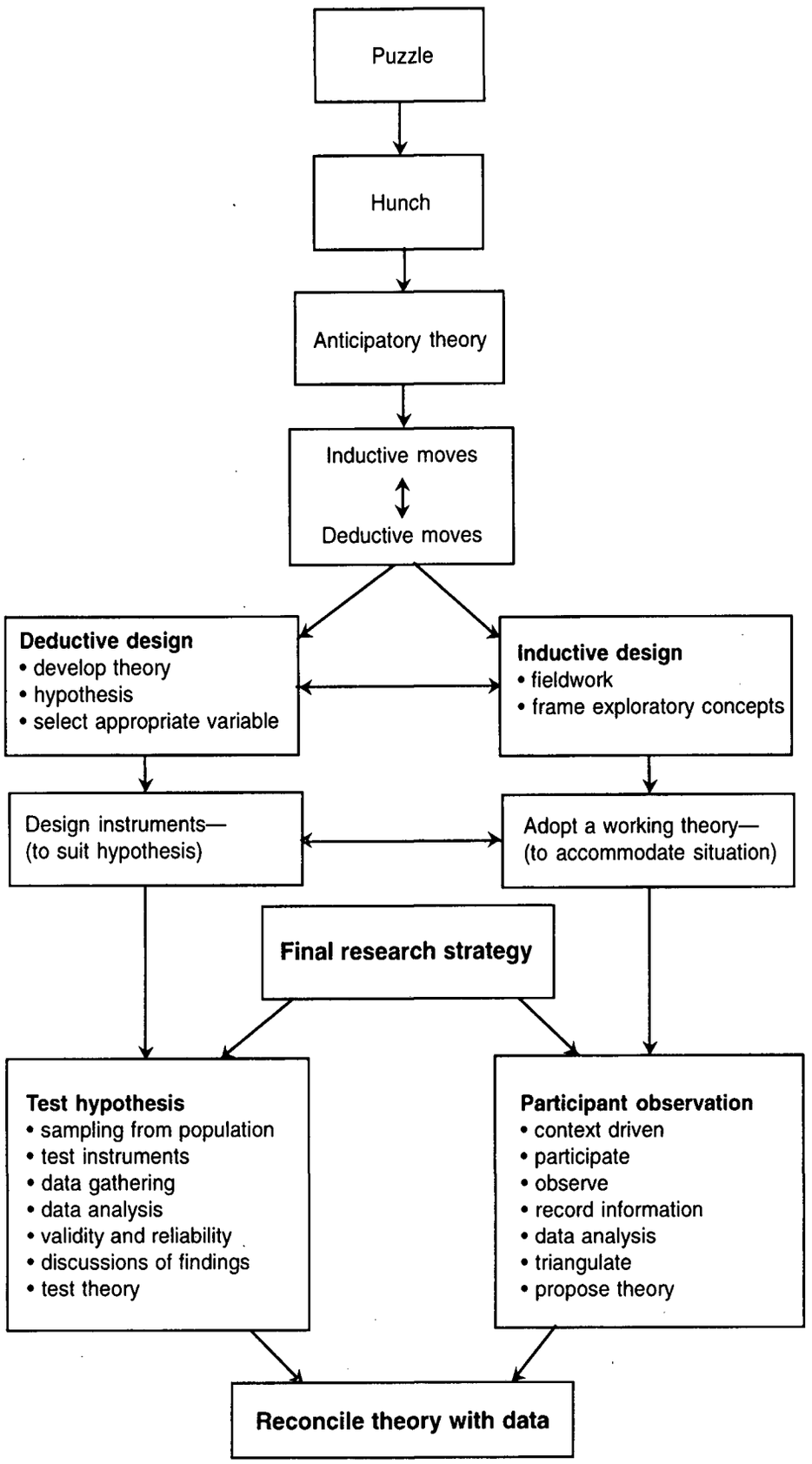
Reassessing the classic designs

To this point we have considered inductive and deductive research designs separately. However, we have seen that in reality research goes through a number of inductive and deductive turns before taking a final form that favours one design over the other as the means for answering our research question. See figure 4.2 for an illustration of how this can happen.

We can now compare the design in figure 4.2 with that shown earlier in figure 4.1. As we do we begin to see that the so-called 'fork in the road' mentioned at the beginning of this chapter can, in many instances, be met later in the research process than would be expected. Inductive and deductive moves are often made right up to the point where data gathering begins. This is because there is always confusion and uncertainty as we sift and sort through any sources we can find to make our final direction clearer. Once we define a population, design research instruments and begin to measure variables however, our design becomes deductible. This is necessary in that we wish to show the extent to which our variables can be generalised across a population. However, the research design

becomes inductive when it sets out to locate further information, which has to be found through participation and observation.

Figure 4.2 Selecting a research design



Research into teachers' world views as an example

A good example of how a study moves through stages of induction and deduction and then to a final one of measurement by deduction has been shown by John Stevenson and Irene Brown (1994). This is outlined in what follows. An example of how these stages pan out for inductive research can be found in chapter 12 which is concerned with the analysis of qualitative research. Stevenson and Brown propose that 'Australian TAFE assessment practices confuse relevance and responsiveness'. The implications for them are that TAFE is unlikely to be able to put important aspects of the Finn report into practice. From their own experiences, research (Stevenson 1990) and reading they propose the following argument:

- In improving its rate of responsiveness to changing demands (from government reports) TAFE may unduly emphasise narrow specific skills of little relevance to a changing and increasingly technological workplace.
- Increase in responsiveness leads to an ignoring of the development of general attributes transferable across workplace demands.
- If it is the case that responsiveness causes a lowering of relevance, then the 'general vocational' attributes that the Finn Report (Finn 1991) argues for throughout post-compulsory education and training will be difficult to achieve.

The theory that they wish to test is that relevance is tied to one 'world view' on teaching which values underlying cognitive structures and interpersonal attributes. A second world view—which values observable measurable performance to pre-specified standards—is brought into play as teachers respond to government agendas. These views, termed World View 1 and World View 2, become the independent variables which are to be measured to determine the extent to which they have causal effects on teaching for the general vocational attributes recommended in the Finn report. The world views must, however, be filtered through processes in teaching and learning. In their view, assessment is a major intervening variable because what is valued in teaching will be reflected in the manner in which it is assessed. They ask the question: can we look at assessment practices as instances of the putting of world views into practice? In justification of this they state that:

> *Assessment is a good indicator of educational values for, as Rowntree (1977, p.31) states,* '[The teacher's] *attitudes to assessment will largely depend on his [sic] ideas as to what teaching and learning and knowledge and education are all about. That is, on his professional world-view . . . or pedagogic paradigm.*'

In their research, Stevenson and Brown put their hypothesis into operation by separating the independent variable from the dependent variable in a cause-and-effect sequence. The hypothesis is that the two world views that lead to either responsiveness or to relevance can be

found in the types of assessment used by teachers. The world views become the *independent* variable and aspects of assessment, the *dependent* variable. These variables are shown in figure 4.3.

Independent	Intervening	Dependent
World view of teachers *World view 1* Valuing underlying cognitive structures and interpersonal attributes *World view 2* Valuing observable measurable performance to pre-specified standards	• purposes of assessment • origins and types of instruments used • purposes and uses of formative assessment • criteria for student competence • focus of assessment on particular kinds of attribute	*Aspects of assessment*

A survey was designed in order to measure the intervening variables. If you look at the table above you should consider the centre column—intervening variables. Most of these variables formed the sections of the survey they designed. The intervening variables they chose were:

- purposes of assessment;
- origins and types of instruments used;
- purposes and uses of formative assessment;
- criteria for student competence;
- focus of assessment on particular kinds of attributes.

These variables were measured through closed questions (see the diagram at the top of the next page and chapter 5). As an example, one question in the section on the variable on purpose of assessment is shown opposite.

These and other questions were developed to gain information about the five intervening variables shown above. Thus the research design is made operational by developing an instrument (in this case a survey, though it could be another) which provides as much data as possible about the intervening variables. Variables relating to the proposed two world views of teachers would not so easily be found through open, or broad, questions because of time factors. Good will would have been exhausted by adding more time-consuming, open-ended questions. These factors have to be taken into account—especially when a survey is sent into organisations where filling them out is nearly always going to be an imposition. Analysis of the two world views was done through examining what the focus on teaching and assessment was in the given replies and then cross checking these answers with each intervening variable. The two world views became

1 In your college, what are the purposes for which student assessment is used? **(Please circle the appropriate responses)**

	Stream				
	None	1000	2000	3000	4000
Provide advice to students on their competence	0	1	2	3	4
Provide student competence advice to employers	0	1	2	3	4
Provide student competence advice to others (Please specify)	0	1	2	3	4
_____					
Improve curricular content	0	1	2	3	4
Improve instructional methods	0	1	2	3	4
Improve instructional material	0	1	2	3	4
Motivate students	0	1	2	3	4
_____					
Other (Please specify)					
_____	0	1	2	3	4
_____	0	1	2	3	4
_____	0	1	2	3	4

more apparent by analysing responses already gained. The table below shows examples of the two world views taken by examining the origins of the testing instruments used and preferred by teachers. They relate to the intervening variable—origin of assessment instrument.

Variable	**World view 1**	**World view 2**
Origin of instruments	Teacher/students devising complex tasks related to real work situations, involving novel application of understanding and processing	Bodies external to the teaching situation, responsible for attesting to the maintenance of standards, setting nationally consistent tasks

This table contains generalisations which contrast and compare differences of quality of teaching and learning when assessment procedures either seek relevance or seek to respond to external standards. Other researchers and teachers then have the opportunity to question these findings or to use them to inform their practices.

To conclude, the main factors in the process of putting an hypothesis in to operation lie in the formulation of intervening variables and the designing of an instrument—survey, questionnaire, observation, experiment—that can grab the data needed for testing. If you look back at the tables shown earlier, you can see that all forms of research design involve as much induction as deduction, in that formulating variables, questions, observations and so on are creative exercises.

Research in each phase leading up to the design of the research instrument involves inductive moves—brainstorming, trying things out to see how they might work, dropping some things while retaining others. At the same time, grids are developed for analysis of the data according to the selected variables. The design takes on a purely deductive form, once a grid has been set to analyse the data. In quantitative research (discussed in chapters 5, 6, 10 and 11), grids for analysis are set up before the data is collected. In qualitative or field research (discussed in chapters 7, 8 and 12), grids for analysis are formed as the research progresses and only take a final shape towards the end of the study. Chapter 5 deals with issues of the range of questions that can be posed in questionnaires and how grids for analysis can be developed. When results will probably have to be analysed statistically, the analysis will have to be set up to be entered into a computer, and for the data to be validated by the use of different mathematical procedures (see chapters 10 and 11). Please refer to chapter 14 for more detail on the presentation of results in diagrammatic form.

Setting up a deductive research design means the hypothesis has to be formulated so that independent, intervening and the dependent variables can lead into the design of a research instrument and the grid through it will be analysed. The example from Stevenson and Brown shows that this type of design involves securing information inductively to assure that the research instrument will be relevant to respondents. When well constructed, such research can be used to challenge generalisations about education and training. If it is the case, as is shown in the example given, that responsiveness is mistaken for relevance, then aspects of TAFE's assessment practices should be questioned. As strong as this type of research is, we often need a different design to illustrate how different world views, types of responsiveness, and so on are played out in different parts of a teaching institution; andwhich agendas are being responded to where, when and why. Here, more inductive types of research have to be considered.

Conclusions

Throughout this chapter we have considered two traditionally held approaches to research design. A deductive design is most used where hypotheses are to be tested, where measurement of variables and generalisations across a given population are sought. Inductive designs are generally employed when doing field research, where a case is described in detail by drawing on the various realities held by those who participate in the research context itself. In deductive designs, researchers usually construct a research instrument—questionnaire, experiment, test—prior to beginning research and administer it in conditions that should be similar for all those who respond to it. In deductive designs, the researcher goes into the research situation and alters the parts of research in response to information found there. Finally, inductive and deductive phases of research are not exclusive or lock-step. There are moves between the

two at various stages of any research design. The chapters which follow offer suggestions on how both of these types of research designs can be used in actual research projects.

Selected readings

Bell, J 1993, *Doing your research project: A guide for first-time researchers in education and social science*, Open University Press, Buckingham.

Ford, J 1976, *Paradigms and fairy tales: An introduction to the science of meaning*, volume 2, Routledge and Kegan Paul, London.

Kellehear, A 1993 *The unobtrusive researcher: A guide to methods*, Allen and Unwin, Sydney.

Neuman, L 1993, *Social research methods: Qualitative and quantitative approaches*, Allyn and Bacon, Sydney.

Pelto, P 1970, *Anthropological research: The structure of inquiry*, Harper and Row, New York.

Stevenson, J & Brown, I 1994, 'Australian TAFE assessment practices: Confusing relevance and responsiveness', *Australian Journal of Education*, 38:2, pp.118–38.

5 Sampling and survey research

Bob Funnell

The survey questionnaire and its purpose in social research

One of the many, and perhaps the best known, methods used by social researchers to investigate human activity is the survey questionnaire. This section of this chapter sets out to explain the planning, design and implementation of the survey questionnaire as a step-by-step process. Each step is examined and the issues involved are discussed. The sequence of the steps in the process of using a questionnaire design was covered to some degree in chapter 4 in the discussion of research by Stevenson and Brown. This chapter looks more closely at ways in which the design is put into operation. Putting a survey questionnaire together is not a difficult task, even though it requires a fair amount of thought. The task may be simplified and made more manageable by drawing up some sample questions of your own as you read the examples we provide.

A survey consists of a number of questions to which a selected group of people are asked to respond. Sometimes the purpose of the survey is to describe a social environment, but more often it is used to provide explanation of social activity. The collection of data, achieved through the survey questionnaire, relates directly to the researcher's preconceived notions of what causes a particular kind of social behaviour as they are linked to theory and to existing research. As has been mentioned in other chapters, this preconceived guesswork is referred to as the hypothesis. Therefore, if researchers assume that activity in a social setting is caused by particular factors, then they are outlining the hypothesis. The use of a survey questionnaire, to see if those assumptions are correct or incorrect, is one method whereby social investigators test their hypotheses. Survey questionnaires may target one or more of the following areas of social research: for example, the social characteristics of a particular group of people, the environments in which they spend their time, work, study or leisure, the social activities they take part in, and the opinions and attitudes that they hold.

When researchers decide to conduct a survey, they usually begin by defining the details of their hypothesis. This may relate to a particular problem or a question in the social world that they wish to investigate or explain. Often researchers approach the task of formulating the hypothesis by examining cause and effect; that is, they try to identify

factors which may cause the effect of a certain kind of behaviour. For example, a researcher may make a connection between high levels of unemployment and increasing house burglary. The hypothesis may be set out as the following statement: 'High levels of unemployment cause increased incidence of house burglaries'. As we can see, again from figure 4.2 in chapter 4, the next steps would be:

- select appropriate variables
- design instruments
- sampling from population
- test instrument
- data gathering.

They will be addressed in turn as we look at the construction of a questionnaire survey.

Selecting appropriate variables

In our earlier example, the cause is high levels of unemployment and the said effect is increasing incidence of burglary. The factors which determine social behaviour are known as variables and these have to be developed from the hypothesis. There are two types of variables which are linked in a relationship; that is, the independent and dependent. The independent variable relates to the characteristic or condition of a social environment, which manipulates circumstances, thereby causing an effect. The dependent variable relates to the behavioural effect that is the result of the measured impact of the independent variable. From here, again as we saw in chapter 4, there are intervening variables. They have to be considered in our design. It is by measuring these variables that our research question can be tested. If we return to our previous example, the high level of unemployment is the independent variable which is said to cause the behavioural effect of increased burglary, which is the dependent variable in the hypothesis. We know, for example here, that there has been a recorded increase in house burglaries at the same time that unemployment has increased. This does not mean that there is a necessary causal relationship between the two. Perhaps there is a lucrative black market operating in the sale of old jewellery or video recorders, CD players and CD recordings and it is these items that are being stolen. It is only through raising intervening variables that we can uncover the actual trend or a relationship between burglary and unemployment, as opposed to other factors. We will return to this question. To briefly review our discussion, it is perhaps beneficial to think of the independent, dependent and intervening variables as essential elements of cause and effect, in the formulation of the hypothesis. The relationships between these variables can be summed up as the independent variable representing the causal agent and the dependent its counterpart in terms of effect with the intervening variables representing the complexity of factors that may exist between and among them.

This can be made clearer by working through an example of an issue in vocational education and training: 'to what extent are graduates from training courses finding relevant employment?'. A destination study, based on a questionnaire, could be a form of research suited to this task. Some intervening variables would be found through brainstorming with others about the factors that would most likely have to be considered. Others would have to be found through some other forms of research, such as interviewing students, teachers, employers, student councillors, local schools, and so on, and through an analysis of existing statistics such as student enrolments. Some intervening variables that might be used in such a destination study are shown below.

Independent	Intervening	Dependent
	Achievement What did you want to achieve? Did you achieve it? What are you doing now?	
What the college/ institute offers is of a high quality and meets the needs of its clients.	**College services** • library • counselling • canteen **Course** • subjects • teaching • materials • relevance **Personal difficulties and strengths** • finances • family • friends • work • travel	*Our graduates find employment relevant to their training, go on to further study, or are satisfied with the skills learnt and knowledge gained.*

We have included a questionnaire that could be modified for use in a destination study as an appendix to this section of this chapter. *The questionnaire is only at a stage where it would be ready for a first trial.* What we have tried to do with this example is to provide samples of how the types of questions discussed in the next section can be put to practical use.

Designing the research instrument and types of questions

The majority of all research is done by asking questions. When some form of generalisation is being sought, it is important that each person in the sample answers the same sets of questions. The types of questions asked will vary depending upon the information being sought, the population being asked to answer the questions and the ingenuity and creativity of those composing the questionnaire. Generally, responses are sought from a large number of people to validate any generalisation you wish to make. The types of questions asked then, usually require people to answer in limited ways so that analysis is easier. The questions used in surveys can be categorised according to the response required. Some illustrations of the types of questions that can be adapted when drawing up a questionnaire are outlined in what follows. They should not be seen as being the *only* ways available.

Open and closed responses

There are two broad types of survey questions, open and closed. With open questions, respondents can respond with individual answers, which are noted word-for-word by an interviewer or written onto the survey form by the persons themselves. Alternatively, with closed questions, respondents select one of a number of fixed responses. Sometimes surveys may offer a mixture of these two approaches—e.g. a limited range of responses but an opportunity for 'other' or 'please explain' opportunities for clarification. If the survey allows respondents to answer in an unstructured way, a diverse range of data can be gathered. However, the use of the closed response format has two important advantages. It makes it easy for the respondent to complete the questionnaire and it is easier for the researcher to analyse the response. Closed type survey responses may be as straightforward as 'Yes/No' or they may offer a greater choice and provide sets of alternative fixed responses known as 'scales'. They vary in terms of the choice and type of response that is made available to respondents. For example, the Likert scale allows respondents to choose from a range of responses: 'strongly agree, agree, neutral position, disagree and strongly disagree'. Closed response formats lend themselves well to statistical analysis, because each response can be given a number value, so the results of a survey can be quantified easily. Let's look at some examples.

Simple closed questions

These questions close the number of options available to the respondent. These closures can be very tight—'Yes' or 'No', 'Agree' or 'Disagree'. The most common use of tightly closed questions is

when very specific information is required, usually across a large population and in a quick space of time—e.g. in polling surveys and in market analysis. The format is easily recognisable in a two or a three-choice format.

Have you attended an in-service course in the last year?
(Please tick the response of your choice)

Yes ☐
No ☐

A three-option format on a different topic would be as follows.

Work experience should be a central part of every vocational course. (Please tick the response of your choice)

Yes ☐
No ☐
Don't know ☐

The views of percentages of a population can be quickly found as an outcome of this type of closed question—e.g. 65 per cent said yes, 20 per cent said no and 15 per cent didn't know. A disadvantage of conducting surveys using such closed questioning is that opinions can change within short periods of time. In the above example, teachers who agree today that work experience is a good idea might find that when they try to locate industry placements, some employers are not receptive. On the basis of the difficulty in placing students, within two weeks teachers who were agreeable may change their opinion. Others may have never explored the possibilities that work experience could provide and after having initially nominated 'don't know' as their response, might see an opportunity for their students and later take the concept on board; and so on. As such, the data might not be of use in the long term. The format in which a question is presented is an important factor in the survey's design, as is the need to provide instructions on how to indicate responses. These points of format and clarity of instruction have to be considered along with the wording of questions, especially where the questions involve the more complex use of scales and where multiple options are offered.

Demographic questions

A particular range of closed questions seek out demographic information from respondents. These types of questions are crucial, in that they serve the task of showing how the different groups within the selected population line up with the questions for which we are seeking answers. Usually closed questions are used because there is a limited range of possible responses. We could gather very good data but not be able to make generalisations without demographics—information about size, nature and distribution within a group. We

may through a survey, for example, locate a number of community views on how college facilities could be accessed on a fee-for-service basis. To generalise from this information, we require data on the people who would use the college's facilities—type of community bodies, individuals, when is a most appropriate time, amount prepared to pay for service, and so on. From this we may find that an art group may wish to hire painting facilities during the Christmas break, individual photographers would use a darkroom on weekends to develop black and white photos and a local university wants space to offer return to study and computing skills for adult and overseas students. More mundanely, demographic questions are about looking at distribution in a population according to measures such as: age, sex, education level, marital status, income, occupation, time lived in an area, time since last in full or part-time study, and so on. While these questions are often located at the beginning of the questionnaire as an easy-to-do introduction, some people place them at the end as they may be a distraction when asked too early in the process.

Questions using scales

Scaling is employed in order to measure the extent to which attitudes towards a variable are held. The most commonly used is the Likert scale developed by Rensis Likert in the 1930s. In developing a scale, a researcher selects a variable and then considers the range of opinion and attitude that respondents could have towards it. These could be from 'agree strongly' to 'disagree strongly'. Alternatively, opinion or attitude could be marked as a number as a ratio between 1 and 5 or 1 and 7. Likert scales are important when attempting to probe for strength of opinion.

Below is an example of a scale on a line on which respondents would place a tick to show their attitude towards, in this case, work experience.

> **On a scale from 1 to 7 how would you rate the importance of work experience in your program?** Please tick your preference (1 is extremely useful, 4 is satisfactory and 7 is very poor.)
>
> 1 2 3 4 5 6 7

Alternatively, a scale could be set out to try to gauge attitudes, as is shown following. Here, the intention is to try to obtain more focussed opinions. As you can see, provision has been made for those people who can see some things to both agree and disagree about the subject of the question. That respondents might not have an opinion or might not even know about the question we are asking is a crucial point that needs to be kept in view when constructing any question or scale. Faced with a question of which they have no knowledge, people will often provide an answer. This is a particularly easy option when one

an option is one way of isolating those responses which can lead to us having misleading trends in our results.

> **Do you agree that communication within colleges will improve with the use of E-mail?** Please indicate by ticking the appropriate box whether you agree strongly, agree, disagree, strongly disagree and don't know if you are not able to make a choice.
>
> Strongly agree ☐
> Agree ☐
> Mixed feelings ☐
> Disagree ☐
> Strongly disagree ☐
> Don't know ☐

The two sets of questions in the sample question below combine the use of a line scale with a series of questions that can be asked to gain a fair amount of information at one point in a questionnaire:

> **How much interaction do you have with your associate director?** Please indicate to what level interaction occurs in both face-to-face and indirect contact by circling the most appropriate number.

Face-to-face interaction

	Frequent		At intervals		Spasmodic	
General staff meetings	6	5	4	3	2	1
Teams meetings	6	5	4	3	2	1
Special purpose meetings	6	5	4	3	2	1
Scheduled meetings with individuals	6	5	4	3	2	1
Impromptu meetings with individuals	6	5	4	3	2	1
Informal interaction	6	5	4	3	2	1
Other (please specify)	6	5	4	3	2	1

Indirect interaction

	Frequent		At intervals		Spasmodic	
Memos	6	5	4	3	2	1
Phone calls	6	5	4	3	2	1
Circulars	6	5	4	3	2	1
In-tray data (passed on)	6	5	4	3	2	1
Other (please specify)	6	5	4	3	2	1

Ranking questions, importance ratings, checklists and statements

There are four types of closed questions, variations of the types already outlined, that need now to be described. They are discussed together here because they are often used in opinion surveys, but all four types are of suspect value. Reasons why this is the case will be explained after describing how these types of questions are presented.

Ranking questions

Sometimes in a survey we may want to know more about people's views or preferences about different aspects of one of the services offered, so that action can be taken based on these preferences. This may apply to services such as those offered in the library, through tutorials, the canteen's meals and opening hours, the types of courses offered or computing and other facilities that are available or might be introduced if a demand warrants them.

One way of dealing with this issue is by devising questions that will ask respondents to rank various options according to their needs, wants, opinions, etc.

Please number these staff development options from 1-10 according to your current needs. (1 is most important, 10 is least important)

- ☐ RPL
- ☐ CBT
- ☐ Flexible delivery
- ☐ Teleconferencing
- ☐ Writing submissions and tenders
- ☐ Coping with stress
- ☐ Developing learning packages
- ☐ Module writing
- ☐ Understanding the national training reform agenda
- ☐ Preparing yourself for promotion
- ☐ Other (please indicate)_____

Importance ratings

Another variation to this is the 'importance rating' where respondents are asked to select a level of importance of a number of variables.

Listed below are some services offered by the college library. Please circle the number that you think shows the importance of the library services to you.

1 Very important
2 Important

3 Not very important
4 Very unimportant

		Please circle a number			
a)	Range of journals/ books available	1	2	3	4
b)	Hours open	1	2	3	4
c)	Video collection	1	2	3	4
d)	CD–ROM data bases	1	2	3	4
e)	Inter-library loans	1	2	3	4
f)	Computers available for personal use	1	2	3	4
g)	Magazines and newspapers	1	2	3	4
h)	Reference librarian	1	2	3	4
i)	Quiet study areas	1	2	3	4

Adjective check lists

Alternatively, respondents may be asked to show how they feel about a service by checking their preference from a list of adjectives that 'best describes' the service for them.

Circle three words in the following list which best describe the canteen services/products:

Fresh	Average
Good quality	Fairly priced
Wide range/variety	Predictable
Good value	Appetising
Over priced	Disgusting
Convenient	Quick service

Statements

Finally, while some questions will be phrased as questions in a survey, others can simply provide a statement to which the person is asked to respond. The example below, as you will see, is the same type of closed question as shown earlier, except the type of wording in the introduction provides a statement rather than a question.

Enterprise bargaining will benefit all parties.
(Please circle your response)

1 Strongly agree
2 Agree
3 Unsure
4 Disagree
5 Strongly disagree
6 Don't know

Limitations

You will often see questionnaires containing ranking questions, importance ratings and checklists such as those just described. They should only be used sparingly, as their value is suspect. These types of questions expose perhaps the greatest weakness of the questionnaire: the attempt to tap public opinion—and then to make generalisations and suggest policy from it. The first limitation is that the information they provide is often very short term. Opinion may have changed, sometimes a great deal, by the time that the results are analysed. This is the case with election polls, which are updated on a weekly basis and sometimes even daily at times of political change. The second limitation is that the people providing the opinion may not be aware of the alternatives. Some people, for example, may not be aware of the services offered by the library and only use it to look up sporting results on a Monday morning. Depending on the sample chosen, this means that the opinion of those with a limited understanding and sometimes no knowledge are counted as being of the same weighting as those with a sound and thorough understanding of library services. If you look again at the questions outlined above, you will see that these limitations apply in all cases. At best, such questions should be trusted to gather short-term information from a known population for a purpose that can be acted on in the short-term.

Contingency, or 'go to' questions

There are times when we ask questions that will be relevant to some members of our population but not to others. We may require information about students who are from non-English-speaking backgrounds. People who are from English-speaking backgrounds will not need to reply. Therefore we need to have a contingency plan to cater for this situation—this can be referred to as the 'skip' or the 'go to' option. An example could be as follows.

Question 4
Have you had any experience in flexible delivery of training courses?

Yes ☐
No ☐

If you answered 'YES', please move to question 5.
If you answered 'NO' please go to question 10.

If you used this form of a contingency question, then there would be a series of questions leading to question 10 that probed for the information you want to know about experience with flexible delivery. If not a lot of information is required, then the contingency problem can be solved within the question itself. This can be shown with a different question.

Have you ever had to leave a course because of a job transfer?
(Please tick)

Yes ☐
No ☐

If your answer is 'YES', how many times?

Number of times ☐

At times, contingency or 'filter' questions have to be asked. However, they are possibly best avoided only as people can become impatient with, or distracted by them. If you do have to include contingency questions that require a number of follow-up responses, do so once in the questionnaire. Try to deal with the contingency within the question wherever possible.

Open questions

The use of open questions was mentioned earlier and will be further explained now. You will remember that questions to which a respondent can answer as they see fit are most often termed as being 'open'. An example of an open question would be:

In your opinion, what have been the positive characteristics of the use of self-paced learning in the courses that you offer?

_____

_____

Open questions are placed in a questionnaire to collect data about which the researcher might not be aware, but which has implications for people in the research context. Some space has to be left for the respondent to write in their opinions. Sometimes lines are provided; other times a blank space is left. Open questions are employed most effectively when the questionnaire is administered by a researcher or a research assistant. In these cases, the researcher writes down what respondents say, as they say it. Open questions are not always successful when questionnaires are to be filled in by respondents and returned at a later date. People often find writing a response either a hindrance, frustrating, or as a risk in which they might show their ignorance or perceived lack of writing ability. While most of us can say what we think, it is a different proposition when we have to write these same thoughts on paper. Open questions can, however, supply reasons we have not considered, or comments that show undercurrents that are causing some tension that the respondent wishes the researcher to know about. These responses have to be coded, perhaps by listing in terms of frequency noted. If some comments appear with enough regularity they can be added as data in our analysis and, in effect, treated like closed questions as a result of responses that suggest a trend of some kind. It is best to limit the

number of open questions, unless you are sure that people will be sufficiently motivated about the topic to take the time to answer them. Finally, consider the group to whom the questionnaire is directed—will they be overjoyed at filling in open questions that require a lot of writing?

Population and sampling

When we survey, we generally target a 'population'—not the population—but a group who share at least one characteristic crucial to the study, e.g. certificate students, trade teachers, local employers, etc. If we are seeking feedback on our own classes, we can survey all of this population. It may also be possible to survey all of the employers in a certain occupational group in the community—if the number is manageable. In these examples, the entire population is accessible and numerically small. This situation changes when information is needed about groups that are large, have complex mixes of types and origins of members and are geographically difficult to access. Some examples of populations are:

- All students who graduated from child care certificate courses between 1992 and 1995.
- All newspaper advertisements for VET courses in metropolitan newspapers between November 1995 and February 1996.
- All people seeking RPL in an institution as of November 1995.
- All providers presently accredited to offer business and management courses in Australian States and Territories.
- All tourism and travel agencies in a metropolitan area.
- Women who have completed apprenticeships in metals and building trades.
- Graduates from all classes a particular teacher has taught between 1990 and the present.
- Groups of people in the community who might be interested in using the facilities of a college section during weekends and vacations.

Sometimes the populations selected are too large to survey every member, or all members may not be accessible. When this is the case, we will need to select a smaller group to survey. This group is known as the sample and they are selected on the basis that they are representative of the population which we wish to target for our survey.

The survey populations mentioned above are themselves sub-groups of larger populations. For example, people seeking RPL in one institution are a sub-section of all people in vocational education and training (itself a sub-group of the entire population) asking for recognition of their prior learning, and so on. This should be kept in

mind in judging whether our sample reflects the target population as we often want to generalise to it. We will have to make our selection via what is called a sampling frame—a list of the group of people, companies, newspapers etc., from which the research sample will be chosen. If there have been 400 RPL applications then these can be recorded, for example, in an alphabetic list. This could be used as your sampling frame. Once this frame is established, then there are a number of approaches to sampling that can be followed. Some of these are now discussed.

Random sampling

In this method the task is to ensure, firstly, that respondents are selected without bias and, secondly, that all members of the population have an equal chance of being selected. The right size of a sample can be determined by the amount of time available, the nature of the problem studied and whether or not statistics will be used to analyse the data. **Please consult someone knowledgeable about statistics before trialling and sampling if statistics are to be used**. A set of random numbers can be used to select a population (these can be found as an appendix in most research textbooks). Alternatively, we may decide to send surveys to 100 of our population of 400 people. In this case, we may select every fourth, fifth, sixth person on the list and keep going through the list until we have the required sample.

Stratified sampling

As the name suggests, this form of sampling separates the population into strata, layers or levels. This is done to get at some of the complexity that can be missed when random sampling is employed. In the situation of RPL above, there may be a range of cases to deal with. For example, there may be tradespeople seeking to multi-skill and add another trade to their package. Others may be applying for a reclassification of trade's assistant positions. Some applications may be from large companies in different industries; others from small businesses and from individuals. There could also be gender and age factors to consider. In this case, the population is divided into layers according to these variables and a random sample done on each layer. However, in determining the sample, significant weighting has to be given to the number of people in each strata.

Stage sampling

Stage sampling could apply in the previous example, which stated that the population was, 'all providers presently accredited to offer business and management courses in Australian States and

Territories'. The geographic spread of these providers would make random sampling troublesome, as would the different nature and size of these institutions. Here, a stratified sample could be used, for example, to sort the providers into public, private and enterprise providers and these could be cross-matched according to size and nature of offerings. Sampling would then go through a number of stages. Institutions of the type sought could be randomly selected within each State and Territory on a regional basis. Once this is done, institutions can be selected randomly, according to programs requiring study or other factors. Alternatively, institutions can be selected for their being typical or atypical—niche market institutions as opposed to large institutes and enterprises; newly formed institutions as opposed to older ones. This type of research and the sampling that accompanies it would only be used in a large study with a group of researchers.

Snowball sampling

This approach is often the basis for sampling in field research, but has its place in quantitative research. It is done when entry to the population is difficult and the research question is open-ended—for example, which groups of people in the community might be interested in using the facilities of a section of a college during weekends and vacations. Here, the snowball technique might be the most appropriate method for sampling. The sample is built up by asking one respondent for an interview and then asking if they know of anyone else who might have a use for the facilities. The sample grows as the process does and, hopefully, gains size and momentum like a snowball rolling down a hill. The benefits of snowball sampling are that it allows the researcher to uncover networks and to locate people who are not normally found through other approaches.

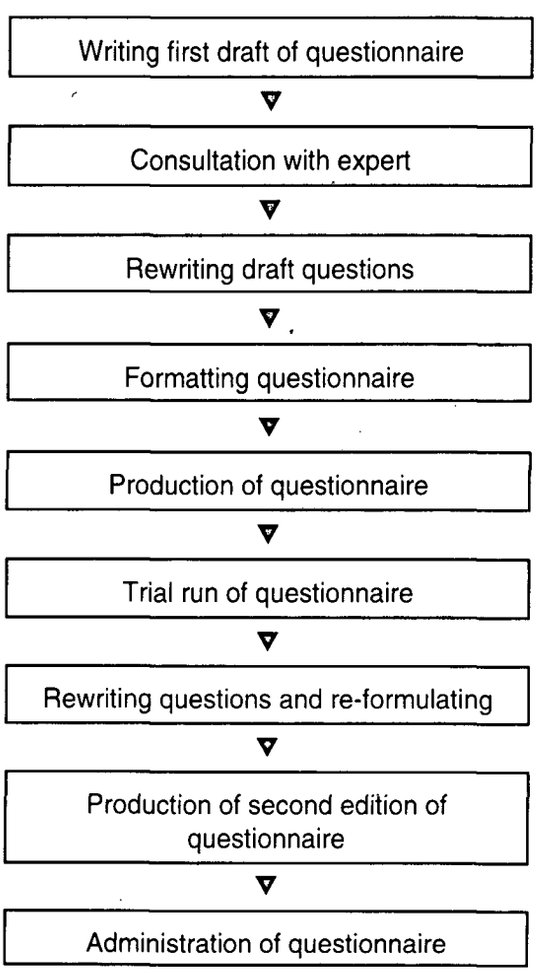
Various approaches to sampling have been outlined in this section. It is important that you take some care in the selection of the sample of the population on which the hypothesis will be tested. In ensuring that the right sample is taken, you are bettering the chances to which your findings can be generalised. The next step is that of ensuring that the research instrument is understood by the members of the selected population. If there is a mismatch between the instrument and the population, then it will not secure the data most suited to this task.

Testing the research instrument

It would be nice to think that we could design the questionnaire, select the population, administer it and then wait for the information to roll on back to us. We can, of course, design, select and administer as early as we want to, but it is unlikely that our respondents will come to the party for us in any numbers. They might not understand

some of our questions, find others ambiguous, be turned off by the format and presentation or any number of other factors. It is easy to overlook such things as we pour our energies into the construction of the survey and so we will need to fine tune our questions for readability and understanding. This requires us to regard the survey document we write as a first draft and one that will have to be altered through consultation with others. Helen West (1991, p.10) has produced a diagram of the process underlying questionnaire research. Part of it is shown here as an example of the steps in the testing of a questionnaire to make it understandable and presentable.

Once a first draft is written, the consultation with an expert often means taking the questionnaire to some of the people targeted to gauge their reactions to it. It is in this process this that ambiguities can be discovered and better ways of wording a question found. Other 'experts' could be people with experience in survey design who might suggest other ways of wording and advise on layout and format. Once again, you should consult a statistician if the results are to be quantified. A trial run is done when you are satisfied that the survey is in good shape. A trial run will ensure that small faults in design can be found before the document is distributed to the total sample—if a fault is not detected here, then whole questions could be rendered useless when filled in by all respondents in the sample population. Your questionnaire will have a better chance of success if these steps in testing are followed. Factors that you should consider in more depth are dealt with in the sections which follow.



Motivations—what's in it for me?

How many times have you answered the phone at home when someone says: 'I'm calling from Company X and I'd like to ask a few questions'? They may then enquire, 'Are there any smokers in the house?'. Personally, I am not very motivated to carry on the conversation and I often feign ignorance to avoid doing so or pass the phone on to others in the house who rather enjoy phone surveys. I find such approaches intrusive and have little motivation in helping tobacco companies improve their products or marketing campaigns. No doubt the response rates in this form of surveying are lower than desired by those undertaking this type of research.

We can devise very good questionnaires and find that our response rates are very low. We have had university students who distribute questionnaires widely throughout colleges, in other workplaces, to residents of streets in a suburb and in public places such as shopping malls. Some get amazing return rates, many do not. Often the people who do not get a good response have not considered the what's-in-it-for-them factor, as a friend of mine reminds me. In her view, the central focus in survey research should be one of motivation. She looks at the topic, format and presentation of the questionnaire from the perspective of those who we want to respond to it and asks 'what's-in-it-for-me?'. People are busy and will either place a questionnaire aside to be done at a later date, or decide that it is not relevant and not worth the time to complete. The question for them is one of 'why should I do this (answer the survey) instead of doing something else?'. I have colleagues who have rung me and said I can interview them in person but they didn't have the time to find the information I wanted from a questionnaire. Others have 'been meaning to send it back' for the last year and a half. When I look back on the survey, I now realise that the information I wanted was not as easy to gather as I first thought and that there was not enough motivation for many to do so— there wasn't enough in the task for them. I have now had to take another tack and gain the information in another way. Response rates are tied to motivations to complete the survey form. As such, consideration should be given to the respondent and why they would want to answer your questions. Write a clear introduction outlining any benefits in participating, even if it is just that their responses/opinions will be valued by you. You could, if the situation is appropriate, sell your research along altruistic lines—that the world may become a better place with valuable contributions in this (important) research. Try to keep the length of the survey to the minimum possible number of pages/questions so that the prospect of participating is less daunting.

Perhaps the best response rates are those where the person administers the questionnaire in a face-to-face interview format. Here, in my opinion, the respondent knows that the process will be over in a short period of time, not a lot of work is required of them and the interaction is more personal. Administration of a questionnaire by

interview is most successful because it provides more immediate motivation than do other forms of delivery. The process is, however, very time consuming and not feasible when a large population is involved and the study is short term and not sufficiently funded.

Things to avoid

When researchers construct the questions which are included in the survey, they attempt to focus each question on a particular issue or aspect of their hypothesis. It is advisable to write questions which measure the variables that have been identified during the process of outlining the hypothesis. The questions are brought together to form an integrated enquiry which represents a relevant whole. Writing questions for surveys is one of the most important tasks performed by researchers. If questions are not clear and do not focus accurately on the issue under investigation, they do not produce data which is useful to the research. Therefore, questions must not cause confusion and they must also be suitable for the particular group that is targeted by the investigation. There are a number of problems that arise in the wording of survey questions and these are discussed below.

Avoid terms that may not be understood by people taking part in the survey

In our everyday VET language, there are many expressions which become part of our conversations and written communication; yet these terms may not be familiar to all people. There is a danger that the inclusion of these expressions in the wording of survey questions may cause people to not understand a question and just as important, may not be understood. Such expressions can be found in slang, jargon that may be specific to a particular occupation or activity and abbreviations (or acronyms) of the titles of organisations and the positions within them. If we include the expression CEO instead of chief executive officer, DEET as opposed to Department of Employment, Education and Training, education intervention instead of program or course, or 'slack effort' rather than poor performance, we need to be confident that our sample population will be familiar with all these terms. As a researcher, you should write your questions simply and clearly. If you are in doubt about the familiarity of a particular word for the group of people under research, then do not use it.

Avoid vagueness and confusion

The aim of each question in a survey is to produce specific information. Even though researchers may assume that their questions will prompt a particular response, it is easy to leave out important details which help to get at the desired information. If you ask the question, 'Do you exercise regularly?', there is immediate confusion. The word 'regularly' has different meanings for different people. There may be those who think that regular exercise means twice a day, whilst others may think that it refers to a once-a-week activity. A question may be clearly written and yet still be vague and confusing. One simple way to overcome this difficulty is to 'trial' the

survey on those who are representative of the group under investigation. Any confusion or vagueness should become apparent when you ask these people to explain and respond to the questions. Going through this exercise prior to the actual survey enables the researcher to pinpoint any difficulty in the wording of the questions.

Avoid emotional language and leading questions

Some words convey a degree of emotional impact and therefore prompt a particular response. If you were to describe a person or event in negative terms, such as 'callous, insensitive or inhuman, etc.', you set up your survey to record responses which react to the emotion of the language rather than the content of the questions. The language used in questions can also convey to the respondent a personal bias on the part of the researcher and therefore may produce a response which is in sympathy with the perceived position of the researcher. These kinds of questions lead the respondent to answer questions in a certain way. To avoid this difficulty, it is essential to make sure that you word questions in the most neutral way possible.

Try to avoid questions which prompt more than one response

When questions are prepared to provide access to specific information, it is important to make sure that each question asks for one answer only. Sometimes, in preparing questions, it becomes apparent that a question is actually asking a number of things. In this case it is best to break this question down into a number of simpler questions. For example, a question which asks: 'Does your house insurance cover theft, fire and storm damage?', is clearly seeking a number of different pieces of information. To ensure that you get the specific response that was planned, make each question prompt one response only. For example:

Which of the following types of insurance do you have?
(Please tick)

Theft ☐
Fire ☐
Storm ☐

Design of a questionnaire

It is essential to make sure that the layout of the survey is not difficult to follow or confusing. It may be that you expect respondents to fill out the questionnaire on their own. In that case, a layout that is confusing or makes the task harder than it should be, hampers the success of the survey. As mentioned earlier, if you trial the questionnaire prior to the investigation, you should pick up on any areas of difficulty and make the necessary modifications to the layout.

If you decide to use the closed response style format, make sure that your questionnaire includes clear instructions to show how the survey is to be completed. For example, respondents may be requested to tick a box, or circle a selected response. Whatever the

case, respondents should be in little doubt as to the correct way of completing the survey.

It is important to consider the sequence of questions when designing the survey. Questionnaires are usually designed in accordance with an introduction, middle and conclusion. In the introduction, instructions are set out which explain the survey and the correct way to complete it. The middle section includes the actual questions which generate the data for analysis. The questions should be grouped together in relation to the subject area of their focus. This makes it easier for the respondent to concentrate on subject format as they work their way through the survey. The conclusion can include those questions which provide details of the respondents' social demographics, for example, details of age, gender, income etc. If you need to ask a particularly sensitive question (perhaps one that is crucial to your study), it is a good idea to place it last. By the time the respondent encounters this question, s/he has already put a degree of time and effort into completing the questionnaire and may answer so that the time already spent is not wasted. Even if the questionnaire is abandoned at this point, a good deal of data may already have been collected.

Conducting the survey

There are three main ways of conducting a survey: by mail, telephone or face-to-face interviews. The mail survey can extend to large numbers of people scattered over varying geographical locations and maintain the anonymity of respondents. All surveys are said to be 'mailed' when they are delivered in any manner. However, the difficulty arises because of the low response rates that have been noted in mail surveys. Here, you must rely on the respondents returning the questionnaire. Even when reply-paid (or stamped, pre-addressed) envelopes are enclosed with the survey, it seems the effort to complete the questionnaire and return it—or remember to do so —is too much. Response rates of twenty to thirty per cent are not uncommon with mail surveys.

The telephone survey usually achieves a much higher response rate and can also get to large numbers of respondents over great geographical distances. The cost for local-call surveys is less than that for mail surveys, but it is not always possible to catch the target sample at home. Success rates appear to improve when the survey is carried out at peak at-home times, say between 6pm to 8pm. Some surveys can be skewed because the target population may have low rates of telephone subscription, particularly those with low incomes.

The face-to-face interview probably has the highest response and also allows the possibility of conducting a longer interview. This is particularly useful if you decide to include open responses in your questionnaire. The role of the interviewer needs to be examined to appreciate its impact on the research process. An interview is usually

a social encounter in which the interviewer and the respondent come together as strangers to produce data for research. It is important, therefore, for the interviewer to build a co-operative relationship with respondents which is also neutral and non-judgemental. Respondents have to feel comfortable and confident to express their views. In each face-to-face interview, the interviewer reads out the survey questions exactly as they were originally written. If open response questions are included in the survey, the interviewer's role is more demanding. The responses must be taped or taken down exactly as they were given, in order to avoid distortion of respondents' answers. During the course of an open response interview, it is sometimes essential for an interviewer to use a 'probe'. This refers to the request that interviewers make in order to clarify or pursue a particular issue or answer. Skilful use of a probe allows the interviewer to obtain more comprehensive data.

To review, the simple six-step process shown below summarises the process of undertaking questionnaire research.

1 Outline hypothesis
2 Write up the survey questions as variables
3 Decide on open or closed responses
4 Design and layout the questionnaire
5 Trial and redraft the questionnaire
6 Conduct the survey:
  - mail?
  - telephone?
  - face-to-face?

Conclusions

A survey questionnaire is an attempt to construct an interview on paper in a format that will be similar from one respondent to another. The answers that people give to survey questions are usually quantified; that is, they are expressed in terms of numbers. This enables the data collected through surveys to be analysed and presented by statistics. Essentially, survey questionnaires allow researchers the means to interpret data as a form of numerical measurement.

Note on sample questionnaire

A sample questionnaire is provided as the final section to this chapter. It is designed to track the destination of students no longer enrolled in a course at the college/institute, whether they have successfully completed their course or not. This questionnaire is nowhere near a perfect example. It has been provided to offer you some guidelines on question construction, design and layout. Please remember this questionnaire can only be considered as being at a stage where trialling would take place. It should not be used in its

current form. The construction of a questionnaire of this type requires a consideration of local factors that cannot be addressed by us here.

Some points should be noted. You will see that some questions are set up to gather certain pieces of data while excluding others. This raises questions about the nature of destination studies and why they are done. Destination studies are often a form of market research, in that they will unveil some information while veiling other information that it is best thought to keep hidden. Hence, such a destination study will often 'find' positive outcomes for past students and these can offer a means for raising the profile of the college. Favourable results reinforce that what the college/institute is doing is right and justifies maintaining current practices. Given this scenario, some responses yielded by the survey may be used internally by the institution (only seen and operated on by college staff)—negative responses may be kept in-house. Positive responses and results will be made public, as they can be used to attract clients and funding.

Questions in surveys can be constructed to lead towards certain answers and away from others. Question 6 in the sample survey is an example. It asks students to circle the adjective that best describes various aspects of their course. Please note the first part of this question which asks for descriptors of teachers. You will see that the descriptors provided are all positive. Upon analysis, you could conclude that students identified teachers, for example, as 'helpful, organised, readily available, knew their material' etc. This is because of the simple fact that the available responses were limited to this range.

It is for reasons such as these that you should view the results of such surveys with some suspicion, until you know something of the manner in which the questionnaire has been constructed and analysed. There is more to research than the 'findings'.

Mountain View Institute

Letter of Introduction

Date.....

We are currently asking all students who have been enrolled in a course of study at our college to take the time to complete a survey for us.

Whether you completed the course or not, we want to find out what you are doing now and how you found the college and your course.

The survey is designed to find out how successful we have been in helping students to find employment, improve their confidence and, where desired, to get places in other courses in our college or in other educational institutions. Did the course help you to attain your goals? We also need to find out if you had difficulty in completing the course we offered. What problems did you encounter along the way?

With the information that you and other students give us we may, in future, address your needs and those of other students who do these courses after you.

Your responses will be collated with those of other students. Any comments you make will be used in conjunction with those of others and you will not be identified by name.

When you have completed the questionnaire as best you can, please place it in the envelope provided and mail it to us as soon as possible. Alternatively, you could drop it in the box outside the Enrolments Section in the main office at the college.

Thank you for your participation.

.....

Associate Director

Mountain View Institute Of TAFE

Destination study

Survey of past students

Please take the time to complete this survey. We wish to monitor the institute's success and to find out if you had any difficulties in completing your course.

With the information that you and other students give us we may, in future, address your needs and those of other students who do these courses after you.

Your responses will be collated with those of other students. Any comments you make will be used in conjunction with those of others and you will not be identified by name.

Your participation in this project is greatly appreciated.

Background details

Name: _____

Enrolled course: _____

Age: _____

Sex: _____

Educational level previously completed or partially completed
(Please circle one of these options):

Primary	Year 10	Year 12	Certificate
Associate diploma	Diploma	Degree	

Part A: Reasons for doing the course

Question 1

What did you want to achieve when you enrolled in this course?
(Please tick one or more options)

Improve my chances of getting a job ☐
Improve my general confidence

Get a place in another course at this college ☐

Get a place in course at another college or university ☐

Other (please specify) ☐

_____

Question 2

What have you been doing since you left the college?
(Please tick the boxes or write information that shows what you have done.)

a) **Taken up employment**

No ☐ Yes ☐

If yes, Full-time ☐

Part-time ☐

Position: _____

b) **If you have taken up employment, how long did it take to gain employment?**

While doing the course	☐
Less than 1 month	☐
1 to 3 months	☐
4 to 6 months	☐
7 to 9 months	☐
10 to 12 months	☐
Longer (please specify)	☐

_____

c) **After leaving the college did you . . .?**

Take up home duties ☐

Look for work in the area you studied ☐

Look for other types of work ☐

Enrol in another course ☐

If so, which course? _____

Which institution? _____

Do something other than things listed ☐

(Please specify) _____

Part B: The college

Question 3

Did you complete the course?
(Please tick the correct response.)

Yes ☐ No ☐

Question 4

a) What problems did you encounter with the college?

In the space below, please indicate on a scale of 1 to 7 how much each of the problems listed impacted upon you. If you found the problem listed particularly difficult, rate the problem 7, if the problem did not affect you, it would rate 1. (Circle the appropriate number.)

	Great difficulty			Some difficulty			No problem	
Transport	7	6	5	4	3	2	2	1
Sickness	7	6	5	4	3	2	2	1
Not enough support	7	6	5	4	3	2	2	1
Financial difficulties	7	6	5	4	3	2	2	1
Family commitments	7	6	5	4	3	2	2	1
Child care	7	6	5	4	3	2	2	1
Work commitments	7	6	5	4	3	2	2	1
Didn't get on with other students	7	6	5	4	3	2	2	1
Didn't get on with staff	7	6	5	4	3	2	2	1
Other (please specify)	7	6	5	4	3	2	2	1

b) If you did not complete the course

Did you encounter any of the following problems? Please indicate on the scale from 7 (problem provided great difficulty) to 1 (no problem) if any of the things affected your participation in the course. (Circle the appropriate number.)

	Great difficulty			Some difficulty			No problem	
Moved to another area to live	7	6	5	4	3	2	2	1
Course was too difficult	7	6	5	4	3	2	2	1
Course was not as I imagined	7	6	5	4	3	2	2	1
Found employment	7	6	5	4	3	2	2	1

Question 5

What did you think of the services the college offers? What did you think about certain services and which ones did you use?

In the space below please circle a number which shows how you would rate the usefulness of the services listed.

1 Extremely useful
2 Very useful
3 Useful
4 Not useful
5 Did not use
D/K Didn't know about it

Open Learning Centre	1	2	3	4	5	D/K
Computer facilities	1	2	3	4	5	D/K
Library services	1	2	3	4	5	D/K
Personal counselling	1	2	3	4	5	D/K
Careers counselling	1	2	3	4	5	D/K
Recreational facilities	1	2	3	4	5	D/K
Child-care facilities	1	2	3	4	5	D/K
Canteen	1	2	3	4	5	D/K
Enrolments	1	2	3	4	5	D/K
Student council	1	2	3	4	5	D/K
Security	1	2	3	4	5	D/K

Part C: Your course

Question 6

How do you feel about various aspects of your course?

Please tick the boxes for the options which best describe your opinion of the aspects of your course that are listed below. (Tick more than one if you wish.)

Teachers	☐ Helpful ☐ Knew their material ☐ Organised ☐ Readily available ☐ Up with new technology
Difficulty of content	☐ Challenging ☐ Appropriate standard ☐ Too easy ☐ Too difficult
Relevance of skills	☐ Exactly what I wanted ☐ Relevant ☐ Some parts relevant ☐ Not relevant
Usefulness for future employment	☐ Very useful ☐ Useful ☐ Partially useful ☐ Not useful
Equipment	☐ High industry standard ☐ Good ☐ Outmoded ☐ Easily accessible
Further study	☐ Very relevant ☐ Relevant ☐ Partially useful ☐ Not relevant
Personal benefit	☐ Gained a lot ☐ Rewarding ☐ Not what expected ☐ Disappointing
Length of course	☐ Far too long ☐ Right length ☐ Too short ☐ Not sure

Any other comments:

Thank you for your participation.

Selected Readings

Bourdieu, P 1993, 'Public opinion does not exist' in *Sociology in question*, P Bourdie, Sage, London.

Burns, R 1994, *Introduction to research methods*, Longman Cheshire, Melbourne.

Gardner, G 1976, *Social surveys for social planners*, Holt Rhinehart and Winston, Artarmon, NSW.

Monette, D, Sullivan, T & DeJong, C 1994, *Applied social research: Tool for the human services*, Harcourt Brace, Chicago.

Moser, C & Kalton, G 1971, *Survey methods in social investigation*, Gower, Aldershot, Hants.

Neuman, L 1994, *Social research methods*, Allyn and Bacon, Boston.

Wadsworth, Y 1984, *Do it yourself social research*, Victorian Council of Social Service.

West, H 1991, 'Just a few questions...', *Good Practice in Adult Literacy*, 1:13, pp.10-11.

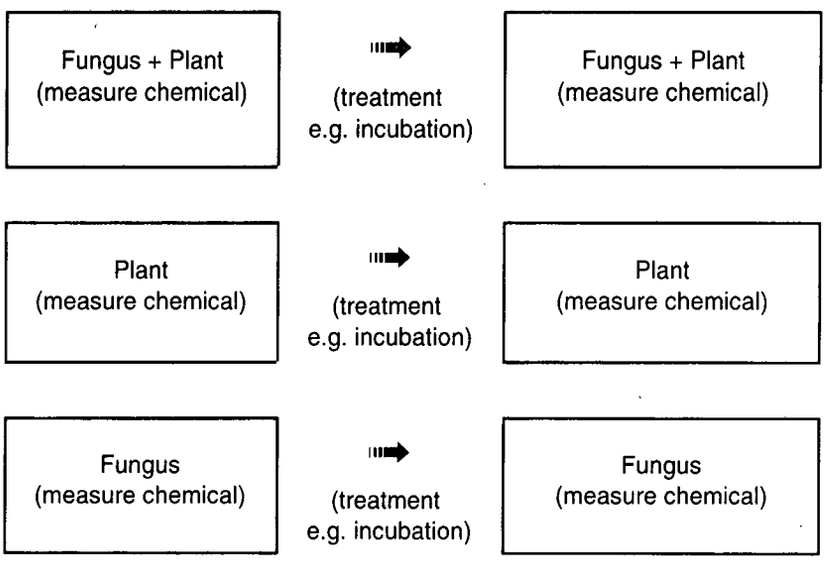
6 Experiments

John Stevenson

The experiment

Experiments have their origins in scientific research. They are usually undertaken to test one or more hypotheses. For instance, a scientist may have speculated that the cause of chemical found on a plant was fungal growth. This speculation may have arisen from research about fungi, the chemicals that certain species produce and the origins of related kinds of chemicals. To test this hypothesis the scientist would attempt to design an experiment that showed unequivocally that the fungus (and not some other causative agent) was responsible for the presence of the chemical. For example, the scientist may isolate and grow cultures of the fungus, then apply the fungus to sterile samples of the plant, and then measure the increase in presence of the chemical. To eliminate the possibility that other factors caused the increase in the chemical, the scientist may compare this increase with that of plants left for the same period of time in the same environment, but without the presence of the fungus; and with fungus in the absence of the plant. Once the hypothesis is confirmed that the presence of the fungus on the plant material is essential for production of the chemical, this research has contributed new knowledge which can assist in further theory building and research.

Thus the scientist may have set up an experiment such as follows:



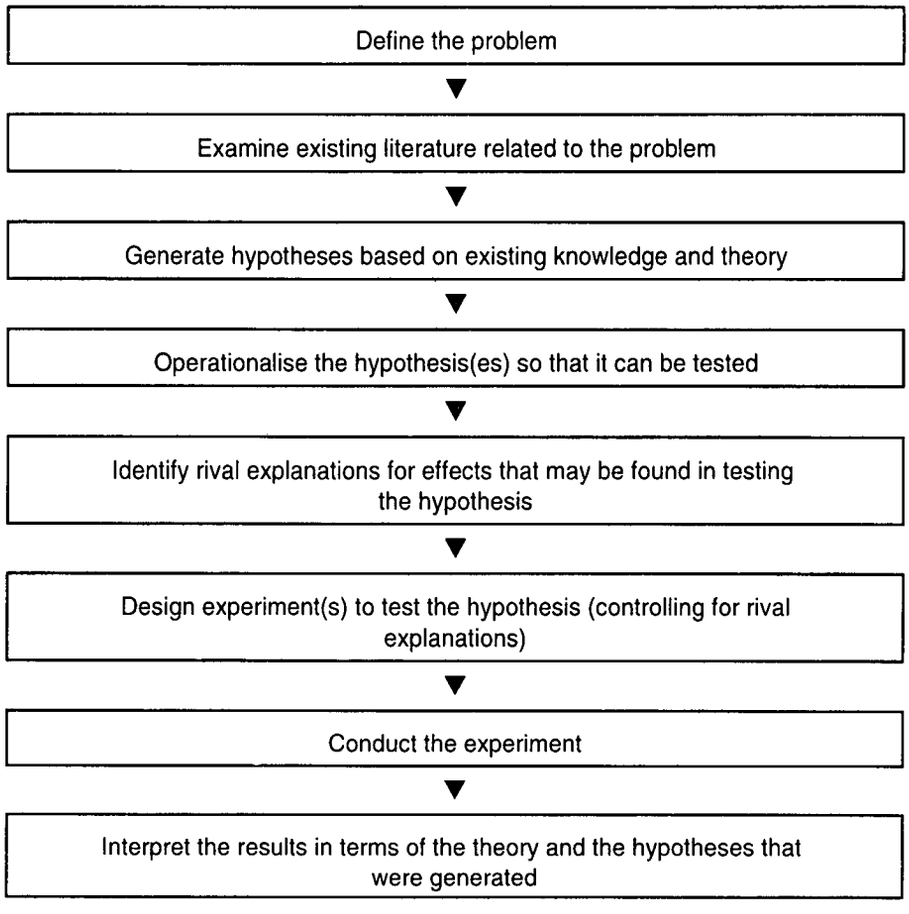
The increase in chemical available in the first situation would be compared with any increase in the second and third case and conclusions drawn about the extent to which the fungus and plant mixture led to increased quantities of the chemical.

In educational research, design of experiments to test hypotheses is not simple. Complexity of learning environments makes it hard to isolate what causes the effects in different educational experiences. It may be speculated, from the literature, that developing conceptual understanding in a vocational field will help learners be more adaptable. An instructional approach may be designed to develop conceptual understanding and measures devised to assess the adaptability of learners. However, it is not easy to set up an experimental design which clearly shows that any improvement in adaptability is due solely to the instructional treatment.

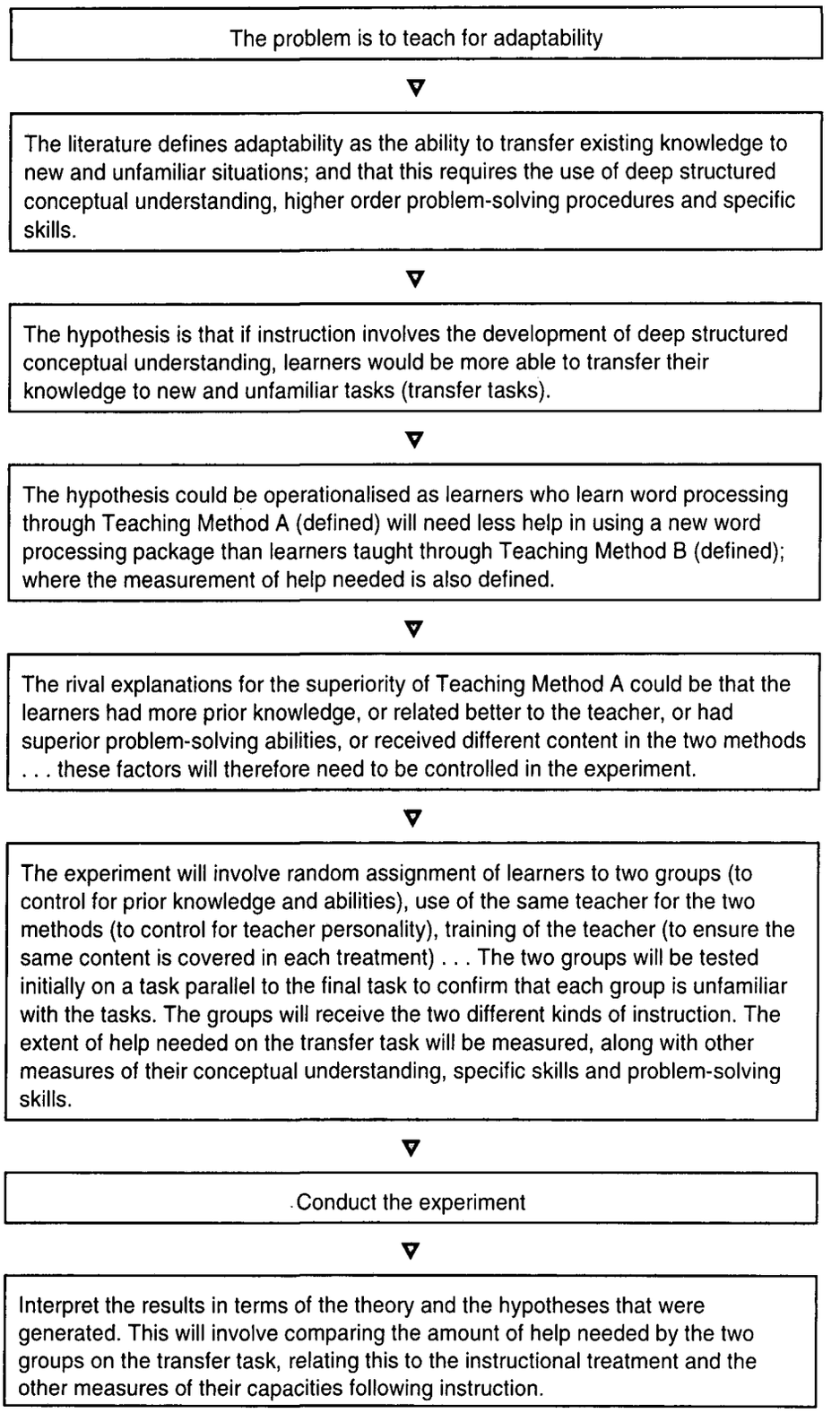
Generating and testing hypotheses

It is important to ensure that the best possible hypotheses are generated. This is usually by searching all the reported research in the area under investigation. This enables the researcher to generate hypotheses based on existing knowledge and to identify the rival factors operating in any experiment that is designed. So to test whether conceptual understanding leads to greater adaptability, the literature suggests that the researcher should *control* for differences in the specific skills of learners and their abilities to use problem-solving procedures, because previous research shows that both of these abilities assist in adaptability.

Experimental research, then, involves the following steps:



For example, in designing an experiment to test the effects of developing conceptual understanding on the development of adaptability, steps such as the following may be involved.

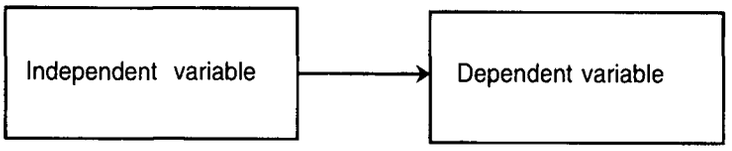


Variables

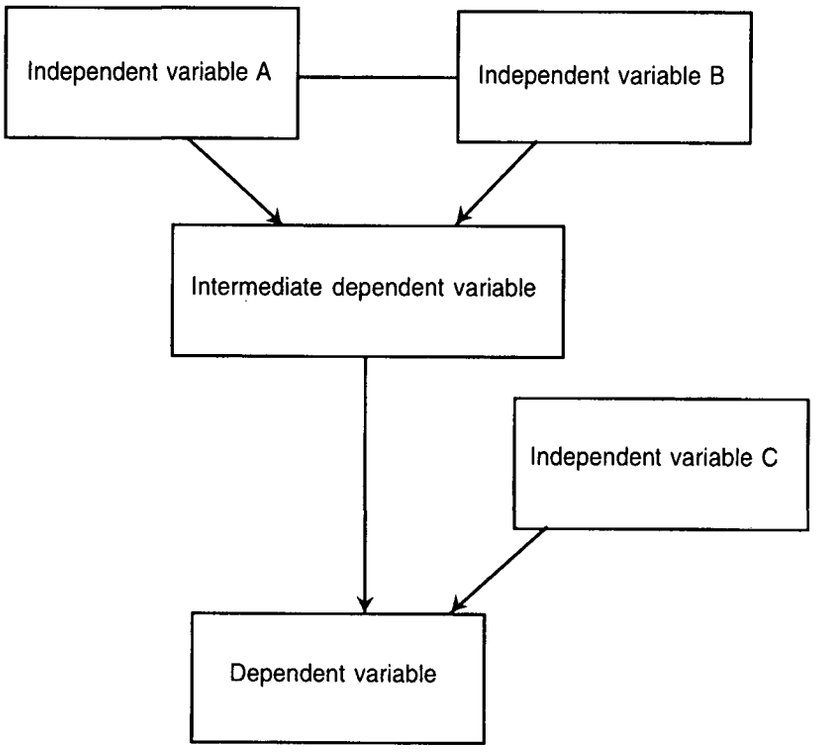
In designing experiments, it is necessary to identify the kinds of variables that are involved. The *independent variable* is the treatment or the factor(s) that are thought to contribute to the effects that are

measured. The *dependent variable* is the effect that is measured, which is thought to be dependent on the operation of the independent variables. In the case above, the main independent variable is the teaching method, and it may be that characteristics of the teaching method could be measured, e.g. the extent to which the teaching pressed students into engaging into higher-order thinking. The dependent variable is the amount of help needed on the transfer task. There may also be intermediate dependent variables, e.g. the conceptual knowledge that resulted from instruction, and this could also be measured, as indicated above.

The simplest representation of an hypothesis, then, is:

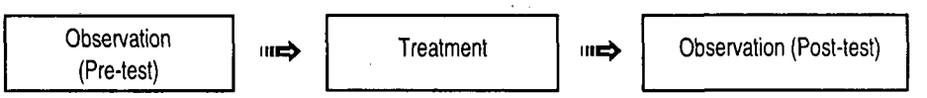


But, of course, they can be more complex than this, such as the following:



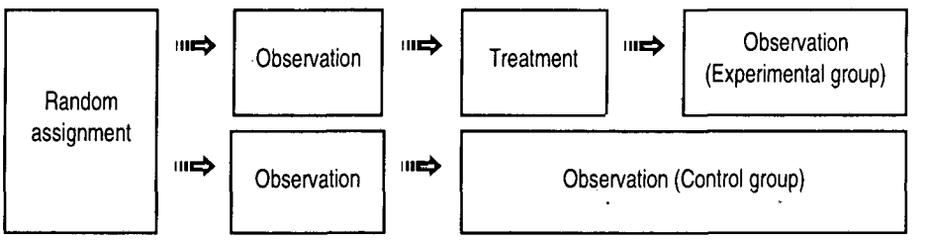
Kinds of experiments

Several kinds of experiments are usually differentiated: pre-experimental design; true experimental design and quasi-experimental design (e.g. see Cohen & Manion, 1989). A *pre-experimental design* involves the treatment of a single group with a pre-test and a post-test. It is represented as follows:



The problem with such a design is that observed change, as measured on the post-test, may not be due to the treatment. There may be many other factors that could have caused the effect. For instance, if learners are involved in a new instructional approach and end up more adaptable, how do we know that they would not have become more adaptable irrespective of the instructional approach, or that other factors in the learning setting caused the effect, rather than the special features of the instructional approach?

To overcome such problems, *true experimental designs* are used. These involve pre-tests and post-tests, but also include a control group. This design can be represented as follows:



The use of random assignment to the experimental and control groups is to even out any variations among the two groups. It is probable that, on average, the groups will be equivalent in such matters as prior knowledge and abilities. Because the two groups will differ in the treatment only in terms of the independent variable, then the possibility that other factors in the setting produced observed effects is also minimised. So, if this design is used to examine if a particular teaching approach was more successful in developing adaptability, it is more likely that the observed effects are due to the teaching method.

This design is successful in evening out initial differences between groups only if the group size is substantial. The actual size that is necessary depends on the variation which exists in the population on the variable that is being measured. Educational researchers aim for minimal groups, sized of the order of 20. Because it is not always possible to assign groups randomly to experimental or control conditions of an experiment, many experimenters use a *quasi-experimental design*. In this case, pre-tests and post-tests are used, but group membership is determined by such factors as location, accessibility, availability and so on. To overcome the fact that strengths of random assignment are not obtained in such designs, the experimenter usually measures characteristics of the members of the two groups. The aspects that are measured are those thought to be important in any rival explanations that could be made of the experimental results. Thus, it is common to measure the prior knowledge of learners, in the hope that it will be equivalent across the two groups. The challenge for the researcher is to ensure, as far as possible, that the groups are equivalent, even though random

assignment was not possible, and these measures are used to confirm this equivalence. Thus a quasi-experiment is often called a *compromise design.*

Statistical methods

One of the simplest statistical techniques used in experimental research is the t-test. This test examines the mean of some measure (e.g. scores on a test) and the variation of individual scores from that mean. It compares the mean of the control group and the experimental group and assigns a probability that the differences in the two means could have occurred by chance. It is usual to accept that, if there is only a 5 per cent probability that a difference of the given magnitude could have occurred by chance, then the difference is significant and the two groups are different following the treatment.

Another simple statistical test is the Chi-Square. This procedure calculates the expected frequency of group membership, as if there were no differences between groups and compares this with the observed frequency. It then assigns a probability that any differences between observed and expected frequencies of a phenomenon occurred by chance.

In more complex experimental designs, other statistical tests are conducted. These include analyses of variance (ANOVA) and analyses of covariance (ANCOVA). An analysis of variance examines the differences in scores of individuals within different groups with the differences across groups. Again, a probability is assigned to the chance that the differences across groups occurred by chance. Analyses of variance can also be undertaken for more than one independent variable (MANOVA). An analysis of covariance is used in quasi-experimental designs to compare differences within groups with differences across groups, but it uses the pre-test mean scores as covariates to control for initial differences across groups.

Validity

The aim of experimental research is to control conditions so that valid deductions can be made from the data that are gathered. There are two aspects of validity that are usually differentiated: *internal validity* and *external validity*. Internal validity refers to the extent to which effects can be unequivocally attributed to the experimental treatment and external validity refers to the extent to which the experimental findings can be generalised to other populations or settings. There is a good treatment of threats to internal and external validity in Cohen & Manion (1989) and Campbell & Stanley (1963). The following discussion is based on these references.

Threats to internal validity include the following:

History:	Are the effects due to the other events that occurred between pre-test and post-test observations?
Maturation:	Are the effects due to changes that have occurred in the participants between pre-test and post-test observations?
Statistical regression:	Are the effects due to the fact that participants scoring high on a pre-test are likely to score lower on a post-test and vice versa?
Testing:	Have the pre-tests sensitised participants to the post-test or have they interacted with other variables in producing the observed outcomes?
Instrumentation:	Have the instruments measured what they were intended to measure? Have the human observers committed any errors through unreliability of the instruments, reduced levels of concentration or other factors?
Selection:	Has there been any bias in the selection of participants, and could this interact with any of the other threats to validity?
Experimental mortality:	Has the dropout of participants affected the equivalence of groups?

Threats to external validity include:

- inexplicit description of the independent variables;
- lack of representativeness of target population;
- Hawthorne Effect (mere participation can lead to improved; outcomes);
- inadequate operationalisation of dependent variables;
- sensitisation to experimental conditions;
- interaction of extraneous factors and experimental treatments.

Selected readings

Campbell, D & Stanley, J 1963, *Experimental and quasi-experimental design for research*, Rand and McNally, Chicago.

Cohen, L & Manion, L 1989, *Research methods in education*, Third edition, Routledge, London.

7 Field research

Bob Funnell

Field research

Field research is a cover term for the phase of a study when a researcher is working, 'in the field', or collecting data. A field might once have been a village in another country. It is now accepted that a field can encompass any social setting in which a researcher can observe, participate, record, and describe something of the way of life of those in the situation with some certainty and accuracy. A classroom could be a field for research as could a family, a factory, an office, a community, a section of a college, and so on. Fieldwork is an underpinning for all methods of qualitative enquiry. The types of study done in field research are ethnography, case study, historical research and life history. While ethnography is a major aspect of field research, we will not deal with it in depth in this chapter because this type of study requires longer periods of time in the field than are possible for people undertaking initial research. The form of field research of this type that we recommend is that of a case study or a 'mini-ethnography'. These are studies that use the same methods but can be done in a shorter period of time and can be focussed on a particular topic of interest.

Multiple perspectives

The process by which people determine the reality of social circumstances is shaped by their previous experiences, attitudes, beliefs and values. It is not surprising then, that people who are actors in particular social events may present quite diverse views of those events. Researchers who are attempting to make sense of a social setting and its activities need to collect the views of as many participants as possible. A collation of views of participants allows the researcher to piece together a comprehensive picture of a social environment. Let's use a familiar example to explain this further. Imagine you have joined a group of friends for a social outing at the cinema. Following the film, the group begins the inevitable discussion of the events and motivations of the characters depicted in the film. It soon becomes apparent that within your group of friends there are a number of differing views which provide explanations for certain events and actions of the characters in the film. The experiences, beliefs, attitudes and values that each person has forms a filter through which events and details of social circumstances are interpreted. Therefore, each person's unique view of the world may provide a similar or quite different interpretation of events depicted

in a film from those of other people. Your group of friends offers multiple interpretations of different aspects of the film you have seen together. The processes at work here parallel those generating the interpretations common to our everyday lives.

When people interpret events, they are actually constructing a version of social reality. This means, of course, that there are multiple constructions of social reality in accordance with the diversity of participants in any particular social setting. As was illustrated in our example of the multiple interpretations of a film, it becomes apparent that what is 'real', in a social sense, is largely a matter for each individual person, group and culture to build or construct. When an understanding of the different, and often hidden, knowledge is the task of research, then it is difficult to form and test an hypothesis and to build a theory based on a process of deduction. The differences between a research design aimed at generalisations across a population and one dealing with explanation of particular cases was dealt with in chapter 4. What we wish to establish here is that social phenomena and their interpretation in cultural settings is very much a process of multiple perspectives. A research process which sets out to locate and record those differing perspectives does not require a preconceived explanation of the social setting in the form of hypothesis.

An alternative approach to the construction of theory, based on the multiple views of participants, is an inductive process 'grounded' in the research setting itself. This is most often called *field research*. Put simply, the researcher enters the field, collects data and then begins the process of developing theory before, during and after the research process so as to build explanations that include the multiple realities of those in the research context. This, so called *grounded theory*, is developed inductively through the actual experience of the research process itself. Within this approach to research there are a number of implications for the role of researcher. First, to obtain data the researcher must be able to enter the research setting and gain the trust of the actors in the environment under investigation. Second, researchers must record their own observations of the events that take place during the investigation. Third, researchers need to be able to collect data in the form of interviews with the participants in the setting as direct recordings of their perceptions. Thus, the data that is collected in social research represents both the perceptions of the researcher and of the researched. The underlying factor affecting the role of researcher is the degree of involvement with the protagonists in the field under enquiry. It is possible to imagine a continuum which indicates various positions between full participation and detached observation. Most roles adopted by researchers combine these two elements in varying degrees. However, in contrast to the scientific researcher, who attempts to stand apart from the research setting, the social researcher becomes a part of the social environment under investigation. There is no alternative if the researcher wishes to collect data relating to the impressions and perceptions of social actors. Among the various methods that social researchers employ are participant observation, the case study, the historical study and the

life history. We will examine each of these research methods individually in the remainder of this section of the chapter.

Participant observation

The practice of a researcher participating, and at the same time observing in the research situation, originated in the discipline of anthropology. Field researchers investigated the communities and social environments noting the development of cultures, languages, rituals and lifestyles of so called 'native' communities. The intention was done, to a great degree, to compare Western and non-Western cultures and societies. Nowadays, participant observation is used widely to report descriptive evidence so as to allow readers insights into the characteristics of life in any form of social setting. It is usual for the researcher to either live in the social environment during the period of investigation, or alternatively, to spend considerable time in the setting on a regular basis. The researcher therefore interacts with the social actors as a participant in the research setting. As opposed to making observations of a culture from the outside, participant observers develop their observations from the inside. The result is usually a combination of descriptions of actors, settings, events and behaviours, in addition to some explanation for the workings of the culture.

The distance between researcher and researched is an essential issue to explore in this kind of research. When researchers come to a setting as strangers, they can only gain access if they are accepted by the social actors. Of course, there are instances where the researchers are full participants in the social environment. When researchers forge relationships in order to gain access and collect data, they naturally develop attitudes and sympathies for people in the setting. A significant part of the relationship between researchers and the researched is based on mutual trust and at first researchers must be open and honest in explaining the aims and purpose of the intended study. As the researchers settle into the research environment, they are able to identify key informants who can extend the depth of the study. A 'key informant' is usually a person who knows the setting well, is interested in the research project and who can deepen the researcher's understanding of what is happening. The term 'informant' is not meant to equate with that of 'informer'—someone who tells about others for their own gain and to undermine the positions of others, as in the case of those who inform on others in criminal investigations. If researchers wish to record the usual behavioural patterns and events within a community of people, it is essential that they are accepted and allowed access to as much activity as possible. A key informant can guide a researcher to greater understanding and access in a research setting. Once the researcher has access to a large number of actors, it is possible to compare the different impressions and perceptions of events in accordance with the varying viewpoints of informants. This process of checking and comparing different accounts of the same event is known as

triangulation. The study that captures the sense of multiple viewpoints allows a comprehensive portrayal of a social environment. In reference to our original example of a group of friends revealing different interpretations of events depicted in a film, it is possible to see the process of research at work. Perhaps a researcher wished to record the impressions that a group of people had of a particular film. This would be a task of recording the multiple views of those who saw the film, in order to piece together a larger picture of the impression of the group of people as a whole. Although the example is a simple one, it does give some indication of the researcher's role in recording, presenting and drawing interpretations from the multiple perspectives of actors in any social environment.

Relevance of studies

As the outcome in some fields of research is a portrayal of life in a particular setting, it is common for researchers who have an interest, sympathy or are actual actors in the setting to conduct the investigation. When we think of research in anthropology, we may imagine a researcher living with people in faraway countries in exotic, isolated localities. However, our society encompasses a broad diversity of cultural difference and this often represents the focus of many studies. For example, a researcher may investigate the lives and cultures of street kids, people in and out of work, of organisational change, so as to describe the experience so that others will learn from it and see these situations from a new angle. This research also aims to question and get behind the stereotypes that are an end result of accepted opinion, government funding for special programs and the taking up of these terms in academic research. There was for many years, for example, a view that children from working-class suburbs and those from broken homes were culturally deprived. Long-term fieldwork in schools by researchers such as Connell et al. (1982) with parents and children and Walker (1988) in a Sydney high school showed that many more factors have to be ascertained about life in schools to understand the interactions between families, school and work. Accepting stereotypes on face value only reinforces and confuses the existing situation. In both examples, the researchers wished to reflect back to the larger community an impression of a particular social situation. They hoped to alter the theory that those who do not do well in schooling are culturally deprived, in order to widen the lens through which teachers and students view each other and also to attempt to influence government policy. Not all fieldwork is of this type. It has to be done over a long time span—Walker spent five years as a participant observer in a Sydney high school—and would often need to be funded or would have to be a part of a postgraduate study in which the researcher was a participant in the educational setting. Many areas have examples of major ethnographic studies, which depict organisational life as it is experienced by those who are members of the institution where most of the business of end-of-service deliveries takes place—e.g. schools, hospitals, companies, families, workplaces, street corners, gymnasiums, police stations. Such studies, done on a large scale, are rare in vocational

education and training. Gleeson and Mardle (1980) studied life in a further education college in Britain as did Anne Stafford (1991), who has published a book on her experience as a participant observer in a youth program in Scotland. Paul Gleeson and Robert Mealyea from the Hawthorne Institute in Melbourne have done doctoral theses on the experiences of becoming a technical teacher. Colin Ducker from the University of Canberra has also completed a thesis on the knowledge and world views of trade teachers. It is not certain that these will be published in full, but ethnographic studies are very much needed in vocational education and training if more understanding is to be made of day-to-day life in colleges and institutes in this sector in Australia. In the meantime, much descriptive information about vocational education and training can be documented through case studies, which are shorter studies that use participation and observation as their main method.

The participant observer

Broadly speaking, when doing participant observation, the researcher is either an 'outsider', a person new to the situation; or an 'insider', someone who is already a part of the social setting in which the study is to be done. A person doing research in a workplace setting with which they are not familiar is an outsider and will assume a role of observer and interviewer more than that of participant. A teacher studying some facet of curriculum implementation would be a participant observer with inside information and would rely at first on observation and taking notes of what happens and what is said, rather than interviewing. Taking on an identity as participant observer too early in a location where we are well known can have its disadvantages, in that people need time to take us seriously as a researcher. In this situation, questions that would be given thoughtful consideration when asked by an outsider who is trusted will often receive the 'you should know that!' treatment when asked by an insider. A lot of thought and care needs to be taken in assuming an identity as a researcher in situations where we already have an established persona. This problem of over familiarity is less likely to occur if a person from one section or area in a college, for example, wants to know something about what happens in another area or section. People in computing can ask naive questions of fitters and turners and receive honest answers, as can a teacher wanting to enquire into the new role of institute director in TAFE colleges, and so on.

As participant observers, we strive to gain a position where other participants feel as much at ease with us as they can; where there is a form of mutual trust and where interviews become more like conversations than formal question-and-answer situations. This is not always possible and when it occurs it is often a result of circumstances beyond our control. Thus there are times when all we can do is to observe, listen and record at a later time, whereas at other times we can write notes or use tape recorders in open discussions.

As a person alone in a situation, the researcher has to establish a 'feel' for the strategies and tactics required. For these reasons, many participant observers face forms of anxiety produced in what is often called the 'culture of shock' of the first days in the field (Geer 1964). The ethnography by Anne Stafford mentioned earlier called *Getting work* shows this process of participant observation in great detail, as she recounts her experiences in a youth training scheme in Scotland. It is worth reading her study for the way in which the information is recorded and then reflected back upon by the author. To conclude this far, a participant observer faces the task early in research of establishing an identity that allows for as free a flow of information as possible and a climate of mutual trust and respect. This is not always possible and researchers will alter the degrees of participation, observation, in-depth interviewing and listening and recording to gather as complete a picture as possible of the research situation.

In the field

In the research setting, information should be recorded about a range of factors. Initially, these include the setting and people in it. Over time, activities are observed to determine some underlying structure and to uncover relationships between this structure and the people in the setting. This is not as complex as it sounds. We do something like this every time we begin taking a new group of students. Our students are from different backgrounds and have various reasons for doing the course. Over time, we observe that many people always sit in the same place, some people arrive early and chat, others smoke and drink coffee—this group invariably walks in five minutes after the class has started, and so on. This a familiar pattern that you recognise as a structure—a re-enacted ordering that brings meaning to a situation. Through further interactions with and observations of the class, you find that some sub-groups are identifiable. One group may favour a type of hairstyle and jewellery, another group may play sport together and another group might have common interests derived from work or family similarities. There are also people who are not a part of any group. There might be some sort of tension between different groups and individuals. Again, this is familiar territory for teachers—and I suspect also for those who observe teachers and compare notes about teachers after classes and when courses are over. The point being made is that participant observation in any setting follows a similar pattern of piecing information together. One difference is that you will be recording the information for research purposes. Another difference is that discussions will have more purpose and will take the form of semi-structured interviews.

Field interviews

For most researchers, field interviews comprise a series of friendly conversations in which the interviewer introduces new elements. As Spradley (1980, pp.58–59) contends, the major part of interviewing is not asking questions, although this is important. In interviews, a

researcher has to keep giving explanations to the person being interviewed and directing them in subtle ways. Essentially, the researcher wants the informant to become their teacher, someone who will help them learn about the setting and the people in that setting. Interviews conducted during fieldwork are two-way teaching and learning encounters. The informant learns what research is about and something of the researcher's interviewing style—how notes are taken, about tape recording of interviews and the language most appropriate to the interview situation. These points may seem strange, but they are important in field research. They are important because we are seeking to explain phenomena by drawing on the knowledge of those we are interviewing—the manner in which people speak in normal activities is a key part of that knowledge. If people read the interview situation as one in which normal speech might be considered improper, and give us an altered version, then something of the nature of the culture and the operating knowledge of those within it is lost. People have to be given reassurance that it is OK to speak openly and frankly, without risk of what they say being seen as inappropriate. Only so much of this can be communicated verbally, and then only a little. Most trust is conveyed in the interactions of the interview situation. The success of the teacher/learner aspects of interviewing can be felt through clues—for me I become aware that the person being interviewed does things such as looks at what I am writing when I am taking notes, pauses and restates so that I can catch up to what they are saying, or makes sure that I have got something right that they see as important. Sometimes a person takes the interview over. In other cases it feels obvious that I am being told an official version and that there is more that I won't be told—supplying versions of 'trust me I'm a researcher' at this point won't help at all.

The end result of field interviews is that those we interview feel that they have an expertise in describing their culture that we do not possess and they take pains to fill in the gaps in our knowledge. Two examples might make this point clearer. In chapter 11 a research project on TAFE restructuring is described. In this study, I had been interviewing teaching staff for a month or so and my interview notes were brief because I thought I knew the situation well. I had been writing mostly words and phrases as people spoke and elaborating on them later, but using a mixture of my words, those from people interviewed and some that crept in from theory I am familiar with. In a particular interview, a teacher watched my note taking, answered easily enough but then became more rigorous when we spoke of changes to the teaching culture. The excerpt from my notes at that time is shown below.

> *. . . TAFE is a great organisation with plenty of potential. I am concerned to see it being stuffed around by people with no concept of what it is like to operate in a teaching environment. They are not at all concerned about ascertaining the culture of their organisation so as to develop*

a culture that will support the things they want to bring about . . .

The teacher went over this statement with me a number of times so that I got it exactly right. In my shorthand at this point, the statement could have been abbreviated or put more in my words than his. This quote had a high degree of credence with teachers, but was seen in other quarters as a naive response to the realities of changes that were inevitable. Interviews will bring out different forms of expertise and knowledge bases where one will often contradict the other. The task in interviews is always to keep these avenues open. This can be seen in what follows. Some months later I interviewed a college director. He was not enthusiastic about being interviewed and would have terminated the meeting early, had he not wanted to set me straight about how budgeting of colleges had changed inalterably and what this meant for the TAFE system. The interviewer's job in these situations is not to argue a point of view but to let the person instruct us. In the next forty five minutes he outlined the differences in detail and provided me with a lot of published examples. It is here that the field interview can be contrasted with the questionnaire and the survey where researchers test their own insights by considering responses to predetermined (usually closed) questions. The field interview works to a different agenda—to set a scene in which people can inform and teach the researcher about a knowledge of the culture with which they are most familiar. One of the best strategies to ensure this is to establish a rapport so that the person being interviewed informs you about things you ought to know, rather than respond to a set of questions to which you want specific answers. This is why the person who fills in a questionnaire is referred to as a respondent and someone who participates in a field interview is seen as an informant—one responds, the other informs.

The case study

The case study differs from an ethnography, in that it does not attempt to describe the total way of life of a group of people. Instead, as the term implies, the focus is on a particular case. Cases can range from an individual, a student who has succeeded against the odds; to a group, retrenched workers undertaking retraining; to an event, the implementation of a new computerised accounting package. Case study is a form of social research that may be located in various settings; for example, in the study of policy and administration in adult, vocational and community education, health and urban planning. It is also prevalent in the study of organisations, management behaviour and industrial relations. The case study may range from general to quite specific subjects. In certain psychological research a case study may represent the record of response to treatment or therapy for one patient or client. This aspect of case study is not pursued in this section. We will deal only with case studies as they might be done primarily with field research methods—participant observation, interviewing, unobtrusive measures. These methods can be, and often are, supplemented with

others such as questionnaires and content analysis. Case studies often provide not only description and analysis of behaviour and events, but also explanation. The design and the way in which a case study is conducted is largely dependent on the nature of the researcher's enquiry. In other words, the question that the researcher is asking of the proposed study. For example, a researcher may wish to know how a suburban community successfully opposed the construction of a freeway through their suburb. In this instance, the design of the study, the type of data collected and its analysis is dependent on the nature of the question, 'how?'. The study may describe the situation, the community actors and government bureaucracy and the history of events in order to reach a conclusion which explains the community's success. Even though the formulation of a research question is a form of preconception, it is not a fixed hypothesis which is tested in the research process. The data gathered during the investigation period of a case study allows the setting to present its own story. Case studies often generate diverse types of data. Three examples are briefly outlined in what follows.

Case 1

Consider an example of a group of workers undertaking retraining, who are retrenched when a car manufacturing company closes. They are provided with one year of retraining. Your job is to evaluate a course in landscaping that fifteen workers have chosen to do for the last three months of their retraining year. This course becomes the case. You know nothing about it at all, but you are given a half-time teaching load to do the evaluation. As a stranger to this field, you will have to negotiate entry, establish an identity and get a feel for what is happening. You decide to play the role you have been assigned as researcher and to be on-site for two days of each week when the group is in a series of 'live work' projects—providing landscaping of primary school lunch and play areas. During this time you 'hang around', get to know people and let them see you as someone who is useful by handing people tools when they need them. In discussions, observations and semi-structured interviews, you try to put some aspects of the case into perspective. The data generated will include details of the students, the course they are undertaking, the staff involved, and so on. Questions will be about things such as how is the area for retraining related to the previous occupation? What positions did each of these workers hold in their previous employment? You will find out what their ages are and how long they were employed with the company before they were retrenched. You will gain insights into why have they decided on landscaping as an area for future employment. Through talking to staff you learn something of the student's performance during the study. Once you are accepted, you can then conduct semi-formal interviews and focus on the course and the retraining year. By being on-site you are able to be there when some form of cultural conflict arises.

Car manufacturing workers, for example, often work from a principle of quality control—if something is wrong with a car it is sent back to the point of production where it must be fixed. Doing something over

again until it is up to a standard is a culturally accepted value. If landscapers followed this principle, they would struggle to make money and would be out of business. Unevenness is a consequence of soil and rock which shift and give and are not predictable. A sleeper wall, for example, cannot be taken down and redone for minor errors, just as a long run of paving could not profitably be pulled up and redone if the line was out a little. Rather than starting again, as car manufacturers would, landscapers will do something that distracts the eye away from the fault—place a hanging plant over a wall, strategically position a table or large pot plant. They work at making things look right 'to the eye'—if it doesn't look right, seek for ways of making it look as though it does. Conflict over which way of working is right may provide some understanding of the unseen difficulties of retraining workers from one sector of employment to another sector. Finally, a brief questionnaire might be used at the conclusion of the course to help explain some difficulties uncovered about the subjects in the course and offer suggestions from students and staff about how such a program could be better offered in the future. A brief follow up of the workers a year later could show the occupational sectors where these people were working. As can be seen from this example, case studies begin very broadly and narrow gradually, through participation, interviewing, observation and other methods. A case study, such as the one just described, could be conducted across a number of sites where people were doing a number of retraining courses. This would be more time consuming and probably need more than one researcher. The strength would be that of being able to generalise more about this wider case of retraining of all the workers from this company in retraining courses.

Case 2

The example quoted earlier of the study of the community in opposition to the freeway provides a wider range of resources for use in analysis. We may be presented with newspaper articles, sections of government reports, policy statements, descriptions of events and interviews with the major participants. In both examples, the mixture of data has to come together to allow the researcher to paint as comprehensive a picture as possible of what has taken place in a particular setting over a specified period of time. This case is very broad and can be attacked in a number of ways. It could be seen as a case of strained relations between a government body seeking to serve a wider community and specific groups within that community—those living in areas and suburbs where quality of life and value of property will be reduced. In another case, we could be looking at a breakdown of tradition—the freeway might put historical buildings, parklands or wildlife species under threat. Finally, there could be issues of pollution and noise that might be the prime issues that inform the case. Again, in starting broadly we have to establish what the case actually is in all of this information, before more focussed research can continue. In contrast with our first case, the role as participant and observer varies, in that the researcher will not be turning up to work at the same site each day. The relationships with the people will not be the same and key informants would have to be sought out who could provide some finer detail about the perspectives of those involved. More time would be spent in

analysing written documents and interviews would be a little more structured. Meetings would have to be attended at night and interviews might have to be conducted then, as some community members would not be available for interview during work hours. Employing a survey might not be sensible, because there would be little time to develop and trial it. The population would be difficult to define and it might not bring much more significant detail to the surface than was publicly available. As you can see, the methods used will vary case by case, especially when the issue is being debated widely and over a short space of time. As Burns (1994, p.318) says, case studies require a process of ongoing internal sampling:

> *. . . You must often step back and ask, 'If I do it this way what am I missing, what am I gaining?' The more you are aware of these ramifications of the choices the more likely you will choose wisely . . .*

Case 3

A third type of case study should be mentioned, that which draws on the situation of one person. For example, a number of years ago I was asked to find some answers as to why TAFE teachers were not using expensive computer software packages that were making their way into the system at the time. The study began with surveys being sent to a number of colleges. Analysis showed that few teachers knew of the existence of most of the packages. They were most often used in areas where they related to a specific course and an occupation such as business studies and accounting—word processing, data bases, spreadsheets etc. Teachers who had begun to learn a package had often not gone on with the exercise. Through talking with a specific teacher, it was found that time to learn the package, workload and access to a home computer came to be seen as important factors. This teacher was a resource teacher, doing studies in computing teaching and she had to buy an up-to-date computer as a part of the course requirements. At this time, not many people owned personal computers. Those who wanted to learn a new package had to access computers in college hours and outside teaching time. The resource teacher had tried to remedy the situation by offering courses and providing tutorials, but with little success. It was only by asking her to keep a record of the number of hours that she had spent learning to use new software packages, that the reasons for minimal use of these and other packages became apparent. *This teacher came to be the case* of someone who had mastered computer packages against which cases of teachers who had not mastered them could be compared. This comparison of cases showed that it was unrealistic to expect that teachers could utilise software packages given the manner in which were being introduced—simply by making them available.

Although case studies are represented in a variety of settings, generated by research questions from a variety of disciplines, there are certain commonalities which are worth discussing. Most case studies are conducted during a period when decisions have been

made which affect a particular social environment, experiences are recorded and the effects of the implementation of specific policies are noted. Case studies may pinpoint one person, groups of people, organisations and communities. In all cases, the researcher sets out to record the impressions and perceptions of people as to the events that are taking place. The portrayal of a setting during a specific set of circumstances calls for the collection of data from a variety of sources. Therefore, the researcher requires the skill to identify those diverse sources of information and employ appropriate methods to gather the data.

Historical studies

The purpose of historical studies in social research is to increase our understanding of the social world by merging what has occurred in the past with what is happening in the present. The historical analyst often attempts to locate explanations which outline the causes for the development of particular social events. In many instances, comparisons are made between particular time periods and over varying cultural and national histories. For example, an analyst may wish to research the apparent rise of Neo-Nazism since the re-unification of Germany. Such a study may seek to explore the connections between high levels of unemployment and support for the Neo-Nazi movements in varying areas of Germany. It may also look back to the rise of Nazism during the 1920s and try to identify similarities in social trends and conditions. The study could also trace the development of contemporary neo-fascism in other European countries to see if there are any major differences or perhaps similarities. Therefore, the main aim of historical analysis in social research is to provide causal explanations for social phenomena. Quite often these studies include comparative or related research and because of this feature the approach is often referred to as historical comparative.

There are a number of approaches to historical analysis. Some studies set out to provide a description of the past by reconstructing a record of significant events that have taken place leading up to a certain period in time. Other studies attempt to apply a general theory of explanation to past history. These explanations may address the occurrence of a particular set of social circumstances, events or behaviours. In these instances, the analyst uses an inductive method of theory development comparable to the one described earlier in the chapter. The analysis of vocational education and training as a field in chapter 1 followed this format, where the history of the sector was briefly traced from the system of technical colleges, to the TAFE system to VET. In many such studies, the analysis attempts to explain the present by exploring specific events in the past. For example, the kinds of values, beliefs and attitudes that people hold in our present society may be explained by researching their development through previous history. Much historical analysis, like case studies and participant observation, is based on the notion that people construct social reality. Therefore, the researcher approaches the study of

history with the intention of comprehending events within the frames of reference of those who participated in or were affected by them. Although most of the data gathered by the historical analyst is documentary evidence, located in libraries and archives, there are also data which relate to eyewitness accounts of events. The data collected in interviews with those who actually witnessed, participated in or were affected by events are known as primary sources. Data collected from the study of related research, historical records and archive material are known as secondary sources. A researcher may wish to examine the development of education and training in respect to a specific trade. The types of data may include archive material, government records, related historical studies, employer and union records as secondary sources. The study may also include interviews with informants, of varying age groups, who served their apprenticeships in different time periods as primary sources. It may also be useful to research similar studies done in other trade areas in order to allow comparison. The combination of data types enables the researcher to present a comprehensive record of both the history of instruction in the trade and also the contemporary situation regarding the role of education and training in the area.

Life history

The life history is a form of social research in which an account is presented of an individual's life. The object of the research, unlike other forms of social investigation which examine social collectives of people, is an individual. These studies are often built up over considerable periods of time and usually draw on diverse sources of data. Essentially, extended interviews with the subject produce the major source of data. In addition, the researcher may include interviews with others who offer significant information concerning some aspect of the person's life. The subject of the study may provide an array of data in the form of letters, diaries, photographs and other valued items from their past. Therefore, the result of life history research is a comprehensive and in-depth portrayal of that individual's life. In many cases, life histories have targeted individuals who come from particular national or racial backgrounds; for example, ethnic peoples. They may include those who are engaged in activities outside mainstream life; for example, prostitutes, delinquents, thieves or perhaps those suffering drug and alcohol dependency. In all cases, it is essential that the researcher develops a relationship with the subject, based on mutual trust and respect. The success of a life history study, in terms of its comprehensiveness, depends fundamentally on the quality of the data that can be collected during the investigation period. It is possible to view life history research as a collaborative enterprise, in which subject and researcher work together to jointly construct a picture of the subject's life.

The legacy of life histories is that they allow the possibility of comparison with studies of other lives, the histories of particular places in specific times and the related studies of groups of people

with whom the subject may be associated in some way. In addition, the life history of an individual offers social research an alternative to the types of investigation which survey large populations. The life history is almost the complete opposite to the survey approach to research. Where the survey samples large populations, the life history focusses on one subject. The role of researcher in the survey is in many cases completely detached from the person researched, whereas in life history, the researcher takes on the most personal of all roles, that of confidant to an individual in the discussion of their life's experiences. Although the life history method might seem to have little relevance in the vocational and education systems, much can be learnt from its use. There are, for example, many trades men and women whose knowledge of their occupation is being lost through technological change. Their life histories will, if collected, show the transition from one period of work to another. The method is ideal in questioning stereotypes and showing how some people move into positions in a field which logically they should not have reached.

Doing the life history

A biography is the complete version of a life history. It is not often, or at all, that we would wish to attempt research of this scale unless we wished to trace something that is long-term, such as career paths through occupations. A biography takes more time than is usually available to us. Most often the life history will be researched and presented as a case—it will look at a period in a person's life and explore that in some detail. Although the workplace is presently changing as traditional occupational sectors break down and new full-time, part-time and casual jobs are emerging, little is known about how people are moving into and out of jobs. Life histories, done as cases, can add a dimension to our understanding of these processes far beyond those offered through other methods. The first step in doing a life history is locating a person who is willing to tell their story. Once this has occurred, some time is required in loosely structured interviews where the selected period in the person's life is discussed. In their best form, these interviews are done with the person leading and the researcher asking for detail at certain points while recording with a tape recorder. Tape recording is necessary. Verbatim quotes and extended dialogue are needed, as much of the written report is in the person's own words. After a few interviews, a structure of the person's life can be built up and then analysed to uncover themes. The analysis here is similar to that outlined in chapter 12, the only difference being that we are trying to understand as much as possible about a single person. As themes are found in our analysis, further interviews are used to concentrate on what happened in relation to them and other themes and events. The final analysis is usually performed in conjunction with the person and involves discussions about certain key events in their life, their importance for the person and relevance to the main themes of the life history. Relationships to wider issues, such as labour-market changes, are added in the researcher's account.

Conclusions

To this point in this chapter, we have discussed field research that involves participant observation of a certain kind—that which relies heavily on discussions between informants and researchers. In the next sections, we will focus on field research in which talking, or interviewing, is not of so much importance. Before doing so, four issues concerned with leaving the field should be discussed.

- Has enough information been found?
- Have people been thanked for their participation?
- Have those involved been informed of the findings?
- How are ties to be broken or maintained?

It is not unusual for beginning researchers to collect a mountain of data and face difficulties about what to include and what to leave out. This dilemma can be solved through analysis—a lot of information collected does not make it through to the final report. The problem of leaving fieldwork too early, when not enough data have been gathered, is more difficult to solve. Perhaps the study has been too ambitious, too much time has been spent on one aspect of the research and others have not received enough attention. Whatever the reason, there is a real danger that the data on which the final report is written will be too thin to back up the conclusions made. For this reason, it is best to leave some time in your planning to go back and collect more information after a draft of your report has been written. A number of people, especially key informants, provide us with a lot of time and our research might not have been completed without their co-operation. They should be thanked in some way and informed of the results of the research. Finally, some friendships are made as a result of a research project and, in the case of case studies and life history research, people become accustomed to regular conversations with a person to whom they have told important aspects of their lives. These ties have to be broken sensitively, or in some cases they are maintained.

Non-reactive research

One factor common to all the methods dealt with in the previous sections of this report is that the people in the research situation react to a research instrument (e.g. the questionnaire survey) or to the questions and the presence of the researcher (as in participant observation). These so called 'reactive' approaches are now the most popular in the social science fields. This section of this chapter raises the case for what has been termed non-reactive measures by Webb et al. (1966). Non-reactive research does not require the researcher to interact directly with those being researched, but to gather information through other means and from other sources in an unobtrusive manner. Unobtrusive methods were the common approaches used in much of the ground-breaking theories developed

prior to the predominance of the large-scale government and private sector funded research of today. Jean Piaget, the famous French psychologist, founded the theory that children develop through cognitive stages, by closely observing of his own children. The influential theories of economics, the bureaucracy and of suicide in industrialised societies that were formulated by Karl Marx in Britain, Max Weber in Germany and by Emile Durkheim in France, drew almost exclusively on available data and a reconsideration of existing research.

Unobtrusive methods

Sometimes the best information is found when no one but the researcher knows that any research is actually taking place and where people in the research situation itself are not interviewed, spoken to, or asked to fill in a survey form. Unobtrusive research is that which does not intrude into or interrupt the flow of events in a situation. This type of research reports on what actually happens rather than seeking reasons as to why it happens. Before we enter a class, for example, we are pretty sure where most of our class will be sitting, because most people return to the seats they took soon after the first class began at the beginning of the year or the block or the module. We know that fashions are changing when the majority of a class start to wear certain clothes, change their hairstyles, talk a lot about new shows on television and use catchy cliches from them. We can see and hear it for ourselves without asking questions. We use unobtrusive measures to read between the lines, to recognise recurring behaviours and seek out the physical signs which help us recognise that some patterns are influencing what is happening.

Some other types of non-reactive research are dealt with in chapter 7; namely content analysis and observation studies. The difference here is that less emphasis will be placed on them as quantitative or measuring devices and more emphasis placed on how they can be used to uncover themes and information that are often overlooked in other methods. Probably the best text available on unobtrusive research is the guide to such methods written by Alan Kellehear (1993). Kellehear's book contains detailed examples of how various projects can be carried out in a variety of settings. In this section, some of Kellehear's material is considered to suggest how unobtrusive research can be done in vocational and educational settings. It should be stressed that unobtrusive research is, at the beginning stages, best employed to complement other research methods. Kellehear (1993, pp.6–8) notes that the main advantage of unobtrusive research is that the researcher studies actual rather than reported behaviour. That is, the study concerns what is done rather than what people say about it—the differences between what we say and do can be substantial. Because the method is non-reactive, people are unaware that it is taking place and data can be gathered over a long period of time. This is in contrast to the survey and questionnaire where information has to be gained in a once-off manner—people have to step outside their everyday routine to react

to our instrument. The method also gives importance to data that are rarely considered, but have much to say about patterns of behaviour within institutional settings. It is finally through the analysis of what Kellehear calls 'material culture' that unanalysed but observable aspects of an institution can be brought to the surface. It might be best to begin with this aspect of the method.

Material culture

Librarians and teachers in primary schools know which books are the most popular, just as ground staff in other institutions know where most people walk, smoke cigarettes and eat their lunch. The most read books are those with pages made fat and frayed by small hands turning them over and over again. They are the ones whose records show that young people keep borrowing them and teachers keep asking for more copies to be purchased. Ground staff see where grass has been worn, cigarettes lie in great numbers and food scraps and drink containers are scattered. These are all examples of physical traces shown through wear and tear on material objects. They show us something about culture and patterns of behaviour within an institution. Some of the most different studies of material culture have involved analysis of garbage thrown out by households to establish eating and drinking habits and differences in lifestyle between different groups. The writer of unauthorised biographies, Kitty Kelly, has become infamous through the use of this method to write highly controversial and unflattering accounts of the lives and lifestyles of famous people. Another approach has been to study graveyards to find out about the social structure of a period, through measuring the size of tombstones, and content of inscriptions and epitaphs. Graffiti has been a focus for unobtrusive analysis using material culture. I am certainly not suggesting that you go through the college garbage or visit the local cemetery, but some knowledge can be gained through different analyses of material culture in TAFE and work environments.

There has been, for example, a substantial increase in the amount of paperwork that is put into staffroom pigeon holes and onto desks in the period of devolution of responsibility from central offices to regions and colleges. A teacher in a college where I was doing research used to keep all the paperwork sent to his section in a large cardboard box under his desk. Every ten weeks or so he would take it to the head of school to show what he believed to be the unreasonable amount of reading required to keep up with new, and from his perspective, irrelevant information. The paperwork circulating through an organisation is an important part of the material culture and this teacher could have used it in a manner more helpful to the college as a whole. The head of schools reaction was that only a fraction of information was sent to management, others contributed to the situation, and photocopying was the quickest means of informing everyone of an issue or a new development. There wasn't time to read, condense and summarise the information. An

unobtrusive study of a section, or a number of sections, could be done by the following examples:

- Make a list of all paper materials sent to all members of a section, team or school.
- Categorise the information in different ways. These could include:
  - source of information;
  - in-college sources—admin, stores, management. This may involve the use of a map of the college/institute and its campuses;
  - out-of-college sources—industry, ITABs, curriculum consortia, high schools, part-time job applications. This will require the development of a list of such sources;
  - frequency from sources.
- Use different type of information:
  - for information only;
  - needing a reply and time limit for reply;
  - type of reply requested—written, attendance at meeting, phone call, etc;
  - related to teaching and learning, administration.
- Analyse the size and amount and type of reading required—difficulty of access to the meaning of the document, how many pages, completely new or well-known concepts.
- Select a presentation mode—memo, official college, section, school, organisation, letterhead. These may be copied back-to-back, recycled paper, on used paper, handwritten and then copied, or typed. These are then passed on to others or to be filed or returned.

Analysis of how much of this material is thrown out and when it is discarded can be done at the same time as these and other factors are recorded. However, this is only one part, and an incomplete part, of such a study. All of the written information will not be placed in wastepaper baskets; some is filed, other materials are taken home and filed or thrown out there. What is thrown out will, however, give an indication, a valuable pattern. This can be read into the other information that can be gleaned from the analysis of type, source and nature of information in the checklist shown above.

There are other aspects of material culture that can be studied. Graffiti—on desks in classrooms, lecture theatres, in workshops, in toilets, on walls and columns of buildings is an example. As well, posters and what is written on them show something about student concerns and their reactions to their courses, the political scene, different cultural groups and so on. Other aspects of vocational education can be discovered through unobtrusive research into how space and time are used.

Time and space

Physically, teaching situations are devised mainly to suit the learning of some form of manual skills and they usually contain apparatus that is up-to-date with that which is used in an occupation. The amount of physical space, the noise that is allowed, the spread of students across the space make the interactions between learner and teacher different to those in traditional lecture and classrooms. TAFE learning contexts in general house fewer students within a physical space than do others—compare a first year university lecture of over 200 students packed into an area roughly the same as an area containing fourteen diesel fitters. Time is also sliced up differently. Sometimes it is 'blocked' into eight week's attendance per year over three years for some students, or one day a week for others. In other situations, time is organised to mirror the workplace eight hour day, with students doing three or more hourly sessions in workshops in a five day week and having breaks similar to morning and afternoon 'smokos' and lunch at mid-day. The differences can be seen in the way that words show how time and student movement is organised in high schools—'period', 'term', 'spare', 'nine-to-three', 'sport's afternoon', and 'parade' have no equivalent in TAFE contexts. The difference in contexts between TAFE and other institutions has been raised here, but this topic is nowhere near exhausted. Many associate diploma courses are organised similarly to university degrees.

Unobtrusive measures are important tools for research, as they bring to the surface for observation objects and events that we are aware of but do not 'see' as important in any real sense. People who work well with their methods have an eye for detail and the patience to keep looking, whereas others get bored and move on. Such is the case with observational studies.

Observational studies

Observing is an activity with which we all have a lifetime of experience. Devising surveys and conducting interviews has to be learnt, but observing is our one basic research tool, the one we can trust the most. This should be true, but unfortunately it isn't. Observation is one of the most difficult methods to put into practice. This is a dilemma, because observational studies are as needed as they are important. A questionnaire can show opinions and attitudes and a case study and ethnography can show the different perspectives and forms of knowledge within a group or an organisation. However, none of these methods can get a solid purchase on the differences between what people say they do and what they actually do, in the way that observation does. We are all aware of examples about others—but perhaps less aware about ourselves.

Managers can talk of having, and being in favour of, democratic decision making, leaving decisions to teams and building 'synergy' in their department or school. As teachers, we may feel that we represent a certain style to which we aspire, only to be surprised by a chance video of ourselves in operation which shows that we aren't nearly as close to our ideal as we thought. It is extremely difficult to stand back from what we continually hold in centre vision and focus clearly on what lies at the periphery. For example, think of some game shows and experiments that ask participants to watch a segment of film and then report on what they saw a minute or so earlier. It is difficult to even spot the twenty or so differences in the two cartoons that appear in the kids' sections of Sunday newspapers. It is more difficult to keep up with what material keeps moving past quicker than our senses can compute. Observation studies require practice and a structure that will help us categorise and more importantly recategorise, in order to keep adapting to new factors that emerge as the observations gain more breadth and depth. In this fashion, observational studies are much like content analysis performed in the situation later, without the help of video records or written text.

Observations can be used to look at participation within groups—classrooms, meetings; and at individual behaviours—time spent on a task, interaction patterns. As an example, a module may list a number of learning outcomes to be achieved over a certain amount of time, say forty hours. An observation could be set up to determine the amount of time spent on the outcomes, the differences in the amount of time spent on teaching as opposed to testing, practical and theoretical purposes, the whole class against group and individual interactions. In another situation, an associate diploma (now diploma) class may contain a mixture of school leavers and older adults, or a combination of local students with some from an overseas country where English is not the first language. You may wish to devise an observation through which you could discover patterns of which you are unaware that act against more effective teaching and learning. As well, you could systematically observe interactions at meetings over time to look at decision-making processes. Individual students can be observed to ascertain ways that they deal with complex unusual tasks using computers, video cameras, machinery, etc.

It is best to use a less demanding task if you do choose to perform observational research. First, as was mentioned earlier, there are some aspects of the social world to which we have become attuned and others that we have learnt to 'tune out' from. People who work on and are interested in cars will recognise and take note of different makes of cars when they are on a drive. Similarly, someone whose background is in horticulture will probably notice trees, plants, foliage and landscaping before they notice cars. Some beginning practice is needed in observing and recording, so that biases can be identified and worked on. If the observation is to be unobtrusive, then means for taking notes and recording have to be further explored.

The observational process

The section on content analysis in chapter 8 provides a sound basis upon which observational studies can be designed. One major difference to content analysis, and to other methods, is that observation requires a great deal of attention to be paid to familiarisation with the physical setting before research begins. The researcher should be familiar with the setting either through drawings or photographs and some pre-observation practice time should be spent before the research proper begins. All of this is done to develop categories—of time, of space, of meaning, that can be used to make sense of our observations. Judith Bell (1993, chapter 10) and Alan Kellehear (1993, chapter 7) offer suggestions about how observational categories can be developed. You should consult these texts for further advice. The pointers given in what follows are taken from these two sources and from the advice on content analysis provided in chapter 8.

Developing grids

Some of the simplest grids to set up are those that are tied to time and to the factors we want to uncover. Look at the box below. It shows time divided vertically into thirty-minute intervals, with the main factors sought for across the horizontal axis.

Category/ time	**I**	**II**	**III**	**IV**	**V**	**VI**	**Remarks**
8.00 – 8.30							
8.30 – 9.00							
9.00 – 9.30							
9.30 – 10.00							
10.00 – 10.30							
4.30 – 5.00							

Another way might be to list all of the people in our observation (perhaps a meeting) and to compare this with the extent to which they participated in the activities.

Categories/ participant	1	2	3	4	5	6	7	Remarks
Industry rep (1)								
Industry rep (2)								
Department rep								
College rep								
Student rep								
Union rep								
Teacher (1)								
Teacher (2)								

In terms of time, a module can be cut down into weeks and the categories such as assessment can be studied as follows:

Activity/week	Learning outcome 1	Learning outcome 2	Learning outcome 3	Learning outcome 4
1				
2				
3				
4				
5				
6				

This chart can be broken down week-by-week with an adaptation of the above chart to fit each week as follows:

Week one

Category/day	1	2	3	4	5	6	Remarks
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							

In turn, each day could be observed and cut down into observational units that direct our understanding of everyday life.

Video and tape

The construction of grids, such as the ones opposite, have to be worked at so that they can provide you with the breaks in time and activity that you wish to capture. In each of these grids, you will need to prescribe the types of behaviours you will be noting and also leave spaces where categories can be added as you become aware of them. There is also a need to invent some codes or forms of shorthand before the observation begins, so that you do not miss activity because too much time is spent in recording. Kellehear (1993, p.133) also suggests that grids and checklists should contain a remarks column in which comments relevant to certain actions can be recorded. Grids and checklists, while important, are not the only means of recording information. If you can be unobtrusive, and the observation is over a long period of time, then notes should be written as would be the case in any form of participant observation. Hence, along with fine-grained analysis using grids and checklists, there would be a set of field notes that can be analysed as well. If you were observing how learning outcomes were achieved over the length of a module, for example, recording through checklists of behaviour will be interlinked with more general observations. Here your written notes will, for example, contain records of what is said when certain types of teaching and learning takes place; what is said and done informally. Kellehear (1993, pp.132–133) advises that a camera, a video and a tape recorder are valuable assets in conducting observations. Videotaped recordings allow you the opportunity to go back over what has happened so as to recheck your notes and observations. With photographs, the scene itself can be studied away from the pressures of recording and direct observation. The tape recorder, he suggests, 'is valuable for doing for sound what the camera and video do for visuals'. They add another dimension. Given that vocational education and training can often take place in environments where noise (of machines, motors, hairdryers, cooking on stoves, hammering, sawing, etc.) is part of the learning environment, they deserve consideration.

Finally, observation is mainly an unobtrusive method of research. Cameras, tape recorders and videos have to be used selectively so as to avoid risk of what is known as the 'Hawthorne effect'. In observations of workers in Western Electric Companys Hawthorne plant at Chicago in the 1930s, a team of researchers found that these workers were responding to the researchers. The workers felt they were a specially selected group and worked harder than they normally would—even in difficult conditions—to show the researchers what they were capable of. We are not suggesting that students will work harder when being observed—all classrooms and workshops would be equipped with recording devices if this was the case. Rather, what we are trying to capture might be lost or diluted once a person or group responds in some way to the research and the recording devices being used.

Conclusions

Field research comprises a number of methods, all of which require that the researcher both participates and observes within the research contexts. The intention in field research is to uncover a multitude of perspectives contained within a research setting. These perspectives are usually reported as cases. Field research aims at showing the complexity existing within a case and the implications that this can have for existing theories and a common sense understanding of the issues being researched. It differs from most forms of quantitative and statistical research in that it does not attempt to generalise across a population statistically defined. There are any number of research problems that can be investigated within vocational education and training. Some suggestions are provided in chapter 2 and you might like to begin with one listed there. It should be mentioned again that there are sometimes problems in doing field research in a setting in which you already have a known and accepted identity. Perhaps it is best to begin research with a project in an area in which you can assume an identity that makes data gathering easier—there is a lot of field research, for instance, waiting to be done in the workplace. Whatever the site of your research, it is a good idea to do your first project with someone who will act as a supervisor of some type. Most often the craft of fieldwork is learnt by actually doing it and this applies especially to the first attempts in the field.

Selected readings

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8 Using existing documents

Patricia Funnell

Introduction

Relevant information can be gathered from going over what others have found, by locating trends and patterns from available data. Some clues about why vocational education and training gains prominence can be suggested from an analysis of existing data—studies, statistics, the 'boom and busts' of previous eras in Australia's history. At another level, the types of students accessing our courses can be found from the statistics available in enrolment forms as the chances of employment for graduates can, in part, be gleaned from the number of job advertisements in the most applicable newspapers. In less obtrusive ways, what occurs can be found by looking at the policies being pushed by governments and by applying research to what is occurring. In this chapter, three data sources are explored—library research, existing statistics and content analysis.

Undertaking library research

Whether planning essentially a qualitative or quantitative research project, often the first port of call will be the library. There are several reasons for this which are outlined below.

Reasons for library research

Background reading

You may have some general ideas but feel the need to develop further an hypothesis or clarify a situation or topic.

Locating previous research

Research that has previously been published can be a great deal of help, even if the research was undertaken on much the same topic but in a different context (e.g. young women in non-traditional work roles in the United States when you are researching assimilation of girls into the metal trades here) or where the context is much the same but the topic may be different (e.g. a previous research project undertaken within your college/institute may have surveyed student approaches to 'external' study where you will be specifically studying self-paced packages). Publications of this nature may act as a guide for procedures to follow or for applications of your research findings. Similarly, they could be used to strengthen any arguments you are developing.

Finding previously implemented research instruments

These may be particularly useful if you are having trouble developing your own research instrument. Previous questionnaires, for example, may be able to be adapted to suit your purposes—perhaps if you are attempting to design a survey on student needs in relation to library services you would be able to locate surveys previously developed on this topic (be careful of breach of copyright). In addition, it is not unusual to adopt similar research strategies in order to increase any claims you are making about the validity of your study. After all, if a previously published piece of research has been deemed to be both reliable and valid, chances are that if you emulate the approach and the type of research instrument used then you can't be too far wrong! Previously designed research instruments are also good for comparative purposes.

Locating documents for analysis

If your study is to involve the analysis of existing statistics or is to take the shape of a content analysis (both of which will be dealt with later in this chapter), you may need to use library facilities to locate the primary documents for your study.

Reinforcing/ challenging your views

You may have only fairly tentative views about the topic you are investigating and may not be sure if you are on the right track. Doing some background reading in the library can help strengthen any arguments you are developing and can be equally as useful in identifying any possible counter-arguments that might surface in response to your research report.

Finding theory

To look at how a problem is viewed through different perspectives and to widen the scope of your research. A seemingly quite narrow study may have wider implications when theory is applied.

Which libraries could you use?

As a member of the public, there are many libraries at your disposal. Included are those most commonly considered—TAFE colleges and institutes, universities and other tertiary institutions and public libraries (local council/community and State)—all of which are easy to access. Local schools could also contain some relevant information. A number of other specialised libraries may, however, be of even more help, depending on your research topic. These include government departments (including your TAFE department, justice/attorney-general, family services), trade unions (including the ACTU branch in your State), professional associations (both for teachers and for people within your industry area), business houses (a great example here are newspaper companies) and industry councils/organisations. You may need to seek permission to access these libraries, particularly if owned and controlled privately. However, you should consider whether any of these types of libraries might be able to provide you with relevant information—statistics, background studies, etc.

What resources are available in libraries?

Most libraries contain a number of collections—non-fiction, fiction, reference, periodicals, newspapers, vertical files, sometimes a separate audio-visual section.

Each of these sections has something to offer, though you could probably eliminate the fiction section fairly early on as it would have limited application for the type of research you will probably be conducting. What do each of these collections contain? The reference section is a good place to start because it holds a lot of publications that can provide you with excellent background information. Apart from dictionaries and encyclopaedias, of which most people are familiar, it also contains acts of parliament, directories, yearbooks, etc. that can help you to define a topic and give you additional resource information.

The non-fiction section is the section with which most teachers will be familiar. It contains many books and monographs that provide more in-depth information, both in terms of practical research and theory. The non-fiction section will usually be arranged according to categories of content of resources, rather than alphabetically by author or title (usually the Dewey or Library of Congress systems are used). Generally, books and monographs are `one-off' (Lane 1989, p.55) publications. You are no doubt very familiar with what books have to offer. Be aware that books can provide a great deal of useful information, but some of it may be a little dated. Because of the length of time it takes to write a book and the publication process involved, the material contained in books may have been written, or based on studies undertaken, from four or five years ago. A great deal may have taken place in that time. (Did you know about CBT or RPL five years before this publication?) Monographs are usually published by one author or a writer representing a corporate body (for example, a department of a university) and can fill the gap left by books. They are up-to-date, usually focussed on one topic and often designed to encourage dialogue/discussion. Sometimes several monographs may be published to form a series (Lane 1989, pp.55–7).

While some libraries incorporate their audio-visual holdings into this collection, others maintain them in a separate collection. Audio-visual resources most commonly include video- and audio-tapes, kits (including slides), maps, charts, etc. CD-ROM packages are also taking information technology by storm. You should probably ask your librarian if you need to know more about these packages. The vertical file can also yield some good information. Vertical files are generally arranged into a series of folders containing information arranged by content. The material contained in the vertical file is often difficult to house in the main non-fiction section, because of size or the delicate (physical) nature of the material. Resources stored here may include newspaper clippings, photographs, pamphlets, etc.

Newspapers themselves may also be stored in some libraries, but because of their bulk and delicacy, newspapers have only a limited shelf-life in most libraries. As you probably know, newspapers do not

age very well. Alternatives to storing newspapers in their entirety have been devised. Some libraries keep clippings files (often as part of their vertical files), or purchase copies of publications on microfiche. As we shall see later, it may also be possible to subscribe to a commercial database to access this information electronically.

No doubt the most helpful of all library resources to a researcher are journals, also commonly called periodicals, serials and magazines. These are of most use because of their recency, brevity, accessibility and relevance. Most journals are published in volumes (each volume usually representing one year—volume 1 being its first year of publication) and are published in regular intervals, usually monthly or quarterly. Each will therefore also be identified by issue number and/or date (variations include seasons, e.g. summer, autumn, within each year/volume). Many journals are published by organisations or interest groups; for example, by departments of universities, professional associations and industry groups. When reading periodicals, it may be useful to consider who the publishers of the journal are, as this will undoubtedly influence the types of articles selected and any editorial bias contained within each article. For example, if you were interested in journalists and copyright, the journals published by the journalists' union, those of educators and those of publishers may all contain interesting and relevant material but each will be coming from a different perspective. You should therefore be aware of how the publishers/editors of each journal will have clear editorial policies which colour the types of reports they provide. Whilst journals are full of rich, relevant and up-to-date information, some may tend to date rather quickly—what is modern today may be old hat tomorrow. As with any resource, you must be discerning when reading and utilising journal articles.

Processes for locating information

So, you are ready to begin a search of the library. Before starting, you will need to define your topic so that you can look for relevant resources. You will usually start with your library's main catalogue, providing information about the holdings. This main catalogue can allow you to search by author, title, category or type/subject and possibly the form of the item. We will not go into any great detail at this point, because your librarians will know their own system best and it is them that you should consult. Most libraries are now moving towards full computer catalogues and if your campus is part of a larger institute/organisation, it may be possible to locate relevant items on other campuses at the same time.

Many libraries now also have access to Online Public Access Catalogues (OPACs) which give details of many libraries' holdings, including perhaps your State library and those at university campuses (Queensland TAFE 1990, D1). This is a useful service, because you can find out what is available before having to go physically to another site. Main catalogues will lead you to specific books, monographs, journals and other resources. They cannot, however, help you to locate specific articles contained within journals.

You can peruse journals that you have located in the hope of finding something relevant, but this is a cumbersome and time-consuming method for finding articles. A far simpler way is to use indexes or databases.

Indexes and databases

Organisations exist who produce indexes to journal articles for hundreds of different journals. Such indexes provide the author's name, title, source, bibliographic details (so that you can locate the item), keywords to enable better searching and often an abstract of the item (a useful summary of the article). These indexes are provided in paper form—which are updated periodically and each year a compilation is produced of that year's index. They are often now available electronically either online—where the computer in your library links up over phone lines to a central database—or on CD-ROMs. They are wonderful resources, because it would take you weeks to replicate a search of a hundred journals published over, say, a ten year period. Once you have learnt to use such indexes, you will wonder how you ever used a library before without consulting them. They are a great resource to help you with teaching or locating information to help you undertake your research. Set aside some time to undertake searches of this type, particularly if you are not practised in using databases.

The first step in using indexes is to define your topic. What are you looking for? Next, determine which index is the most appropriate. There are literally hundreds of indexes to choose from, but many college libraries will only subscribe to ten or twenty. There are several general indexes, such as APAIS (Australian Public Affairs Information Service) or Guidelines. These are Australian indexes which provide information on articles of general interest, mostly covering the social sciences (communications, economics, politics, etc.) and cover a selected range of newspapers and conference papers in addition to journal articles (Lane 1989, p.85). One very useful database specifically addressing issues in this field is VOCED (Vocational Education and Training Database), which covers topics on vocational and adult education, training and related subjects. The database draws on a wide variety of material which includes both published and unpublished documents. These include research reports, evaluation studies, policy documents, curriculum materials, survey results/questionnaires, proceedings, workshops/seminars/conferences, theses, bibliographies, research projects (ongoing, current and planned), periodical/journal articles and non-print materials. As well, VOCED contains information such as projects/research in progress in vocational education, training and related areas in Australia, New Zealand and internationally, with emphasis on the Asian and pacific region (Hayman & Jones, 1994, p.1). This database is discussed in detail in appendix A.

Check with your librarian to locate the most appropriate index to your needs. You need to work out some search terms. While you can search the database by author and title, it is a more general practice to search for keywords or concepts. You may be interested in enterprise bargaining, for example, and this would be an ideal expression to search for. If you are using a hard copy of an index (rather than an electronic database), your search terms will need to be fairly specific. The index will usually be accompanied by its own thesaurus, which will provide for you a comprehensive list of search terms from which to choose. Then you will have to decide which years you wish to search. Usually you will want to start with the most recent, but if you are researching a particular event, other time periods may be more appropriate. Electronic databases are superior to the paper indexes because they allow you to search over a wider period (around ten years at a time), will provide the information from the most recently published item and work backwards and allow you more margin of error in selecting search terms. Once you have mastered electronic databases—and they are not difficult—to return to paper indexes can be very frustrating.

The index should now provide you with the details of a number of items on your selected topic. If the database identifies far too many items for you to consult, you may need to further define your search. You can conduct a further search within the group of items that the index has already identified, or you can start a whole new search. Similarly, if the index has failed to identify any (or very few) items, you may need to rethink your search. Keep in mind that many databases will not search certain words; for example, commonly used words such as 'of', 'with', 'and', etc. Clearly, searching such words would yield thousands of potentially useless articles. Also, it is possible on some systems to search more than one term at once, thus limiting your search from the outset. Many databases also allow you to use word truncations—the base or root of a word and all the terms that may include. For example, 'art?' will yield items on art, artist(s), artwork, artforms, etc.

It is also more likely with electronic databases searching for keywords that you will get 'false drops' (Lane 1989, p.106–7). This is where your search term may technically match words within the text, but the item is clearly not on the required topic. If you were searching on the topic freedom of expression of photographers, your search terms would be 'freedom', 'expression' and 'photo?' but you could end up with items about race relations in a foreign country, which may be accompanied by photographs! One search recently conducted on 'pets'—dogs, cats, budgies, fish, etc.—gave around ten items on Penthouse Pets! Clearly, the meanings and interpretations of words are not taken into consideration by a computer when it is merely matching words.

The next step is to record the bibliographic details of relevant articles, including author, title of the article, title of the publication (journal), year of publication, volume and issue number (or date of publication) and page numbers over which the article runs. Again, an advantage

of using electronic databases is that you can usually print out these details, reducing the possibility of error.

The next step then is to locate the articles. Firstly, you will need to determine whether your library includes that journal, newspaper, book or conference proceeding within its holdings. To do this, you may need to check within the library's main catalogue. (Alternatively, you may be able to access databases of the holdings of other libraries—your library may have reciprocal borrowing rights with other libraries where members of one library can borrow from another, or you may be able to order an inter-library loan. Requests for items located through VOCED should be directed to the State clearinghouse from which the material originated or directly from the source—see your librarian.)

Then, proceed to the collection to locate the item. Quickly scan the item to further determine its relevance. You can then undertake the next step of notetaking/photocopying the most appropriate data contained within the item. Ensure that you are not breaking any copyright laws if photocopying. Copyright laws can differ according to the purpose of the copying. Consult your librarian if you are unsure how much you can legally copy.

If the article you have located is useful, pay close attention to the reference list/bibliography provided by the author. Chances are, they have utilised materials that could also be of use to your research. While such resources may be a little more dated than others you could find, they will often be relevant and may help you shortcut time spent on potentially pointless searches.

You may need to return to the database again if your search was not fruitful, using any information you might have gained along the way.

In summary, you should follow these steps in undertaking a search for journal articles using an index or database:

- define the topic
- select appropriate indexes or databases
- list the search terms/concepts you intend to use
- select the year(s) you wish to access (particularly if using paper rather than electronic indexes)
- using your clearly-defined search terms, interrogate the database for relevant items
- redefine, if necessary
- record the bibliographic details of such articles
- locate the item(s) (in your library or in other libraries)
- take notes or copy the most pertinent information (check reference lists)

- return to the database if further references are required.
  [Adapted from Lane (1989, pp.44, 86) and Kirkham (1989, p.49).]

Be aware that many libraries will offer a search service but, even still, it is often best to sit with the person undertaking the search so that you may advise them on what to pursue. This allows you to determine new search terms that you had not previously thought of.

Citation indexes

As we have noted previously, when you have located one useful item, you can use its reference list to find more relevant publications. But what if you have an item and wish to find out who else has used it? This is where you use the specific type of index known as the citation index. Put simply, a citation index allows you to look up a subject or an author previously published and will lead you to items that have cited (or used as reference) that item. The most used citation index is probably the SSCI (Social Sciences Citation Index) (Lane 1989, pp.93–94). Ask at the reference desk of your library if you wish to pursue a search using a citation index.

On-line databases

While many databases and indexes are purchased by libraries in CD form, others are on-line—in other words, they are accessed via computers and modems (using telephone lines). These databases are just as quick to use as CDs, but generally there are costs involved with carrying out such searches. The general rule here is that the longer you're logged on, the higher the price (Kirkham 1989, p.49). Hence, you will need to find out what on-line searching is available through your library and what is the cost is likely to be—usually libraries who subscribe to such services charge the person who orders the search, in other words, 'user pays'. You may be charged per minute of connection time, by what information you use, or what information you download or print out. With such databases, you are probably best advised to have someone who is familiar with the system to conduct the search on your behalf.

Some useful on-line commercial databases that are available emanate from news services. These are particularly useful because they are recent and because you can retrieve the full text of the article, not just its bibliographic details. Three such databases are QNIS, Presscom and AAP. QNIS is the Queensland Newspapers Information Service, which contains all items published in Queensland's the *Courier-Mail* and *Sunday Mail*, as well as the now-defunct *Telegraph*, dating back to 1984. Stories published up to the previous day can be interrogated and you can search by words or phrases, not just topics. QNIS is reasonably expensive to access. Presscom is a similar service for articles published in Adelaide's daily *Advertiser* and weekly *Sunday Mail* (as well as *Messenger* and *News*), together with the *Herald Sun* (previously the *Herald* and the *Sun*) in Melbourne and the *Hobart Mercury*. This service is a little cheaper. Australian Associated Press (AAP) is our domestic newswire service and its database provides information on financial, political, industrial and sporting events in

Australia, as well as stock exchange information (Queensland TAFE Library Network 1990). While the service is reasonably expensive, you can limit searches to particular categories and can also subscribe to a news photograph service.

Having covered some of the ways in which the library can be used in conducting research, we will now suggest how existing statistics and documents found in libraries and databases can be accessed and analysed.

Use of existing statistics and documents

There are many cases where a study is carried out when much of the data is already available. Rather than starting from scratch all the time, we can or should draw on data already collected by someone else as a source of information for our own research. In the main, this data is in the form of existing statistics. Other times, what is called available data can be found in college, government, company and other reports. Available data can often produce information that would be beyond the reach of a single researcher and at a far lower cost. They can be used to complement data collected in a survey or in field work, or existing statistics can be the sole basis of a study.

Locally available data

On a local scale, statistical information is held in teaching institutions. All institutions hold figures concerning enrolments, numbers of courses and programs offered, costs involved per program and course, classroom and workshop usage and other details that are needed to be able to teach, manage and administer from week-to-week and from year-to-year. Other teaching and training institutions keep yearbooks and handbooks that provide statistical and other detail from which material for an historical study or one uncovering longitudinal trends can be ascertained. So too do unions, companies and local authorities, who also compile published reports from which useful information can be drawn for your research purposes. Such statistics and other information can often be the basis for research that would be a part of, for example, a feasibility study to determine if a new program should be offered and where available space can be found for fee-for-service courses. The statistics held in a college or institute could be a means of analysing retention rates across programs, to gain a profile of categories of students. There is, for example, a considerable amount of interest in the extent to which vocational and training institutions are serving the interests of their clients. You could make the extent to which this is occurring clearer, by analysing available data to look at origins and destinations of students over a year or over a number of years. The study would be best broken into two parts. The first part would deal with origins of students. It would entail gathering lists of the places of work of some students. This could help build up a profile of the companies, industries and government and other bodies that the college or

institute serves, in which courses and programs they take part, and whether in full- or part-time or fee-for-service modes. Another list could do the same thing to categorise students returning to or continuing study by course and program, etc. All of this could be done from enrolment forms—if they contain sufficient information. More information on this will be provided later in the chapter. In terms of origins of student population, on a one year or long-term basis, available data could also categorise and profile according to age, gender, length of course and equity and access and then be used to look at trends over time. Thus strengths and deficiencies could be identified without a need for generating a questionnaire or doing fieldwork—again, the material uncovered could also supplement either type of study.

Before embarking on research of this kind, two points should be highlighted. First, more often than not, the information you will find in available statistics has not been collected for research purposes, but for making decisions about management and administration and for formulating policy. Enrolment forms will probably not contain all of the information that you require. As such, some type of supplementary form might have to be devised. If a college or institute finds that it needs supplementary information, then another form may have to be devised and administered internally. Some people may become impatient with the extra paper work, whereas others may be concerned about the time required and costs involved in collecting, recording and storing of the data. Supplementary data must be believed to be useful for its collection in order to be approved. The second concerns the ethics involved in using such types of available statistics. Enrolment and other forms are designed to provide information that can be used again—that is why the forms are set out as they are and why they are changed when other information is required. No one, however, would want the information contained in them being used for purposes other than educational ones. Permission should therefore be gained and advice sought before beginning a study of this type. Some directors of institutes and colleges would welcome the types of profiles that such research would produce; others might not.

State databases

On a wider scale, TAFE authorities and training bodies collect information on a State and a national scale. All State authorities keep statistics that might be accessed for research purposes, usually after permission has been gained to do so. State education and training offices and bodies publish annual reports which contain 'facts and figures' that can be used to complement a research project. However, you should keep in mind that a fact is often only a fact from the perspective of the observer. The people collecting certain statistics define a concept for their own purposes. This can differ from the way that you define this same concept in your own study. This applies both to local data as well as that contained in local areas. Often, the latter feeds data to the former. Participation in a program is, for example, often read as an increase in equity of access and response to

clients. Figures collected may define participation as equalling enrolment. From your point of view, however, participation should include completion and this should also be related to the type of program. The 'facts' in the figures will be different, because the definitions of the concepts are at odds. One definition cannot be read into the other and if they are the value of the study is diminished. When participation is read as enrolment, then the figures can be used to show increases. When retention rates are included, the picture might change. It will change more if participation is measured as completion of courses of a certain kind. Measures of productivity as student contact hours (SCHs) and cost as dollars per SCH is another area where concepts can differ and where facts and figures can be at odds. Colleges and institutes can be compared based on these types of input/output statistical models. The figures often do not contain information through which institutions can be compared based on contextual factors. Looking at the figures, the differences between institutions cannot be seen—one may deliver mostly high-cost, resource-intensive programs, while another provides low-cost courses in which large numbers of students can be taught by fewer staff and tutorial assistants. In considering existing statistics, ask the following questions:

- How is the concept is defined?
- What data are collected?
- What is presented?
- Which factors are missing?

A range of causal relationships may be being overlooked in existing statistics, because of the way in which concepts are defined and because of factors that are not presented in the analysis of these statistics. The use of existing statistics and other forms of available data are a very positive source of information, despite limitations of this type. Analysing existing data can be a time-consuming process and one in which you should seek the advice of someone with expertise in the area, before proceeding with a research project. Although this form of research can appear to be very dry and uninteresting, there can be a real feeling of accomplishment when patterns begin to emerge and when patterns fall into order.

National databases

The National Centre for Vocational Educational Research (NCVER) compiles statistics concerning vocational and training on a yearly basis as does the ABS, the Australian Bureau of Statistics. There is also an Australian Committee on Vocational and Training Statistics (ACVETS) which sponsors the NCVERs efforts—the number of acronyms used in the VET sector continues to grow. ACVETS provides training statistics quarterly. The national authority, ANTA, produces a number of informative occasional papers on aspects of education and training that can provide useful forms of information. All of this data can be freely accessed for research purposes, although the ABS does charge for information. The ABS census and labour

market statistics regarding the composition of the labour force outlines trends and changes over ten year periods and similar information can be found about all education sectors. Beginning in 1994, the ABS has begun to collect more statistics about the training including a volume on *Commercial training provider, Australia.* The ABS has offices in the capital cities of all Australian States and staff are available to advise and assist on which of their publications would be the most appropriate for a particular area of research. The NCVER has been compiling statistics about vocational education and training for a number of years. This compilation is titled *Selected vocational education and training statistics* and is ordered according to year of publication. In the past this publication has concentrated on detailing measures of annual student contact hours and annual teaching effort both nationally and on a State and Territory basis. From 1995 the scope and the format of this publication changed to include adult and community data as well as financial information and other data that include the needs of various providers, policy analysts and researchers. This publication is a useful source of information. The NCVER data is also available on computer disk.

The intention in this section has been to suggest sources of available data and existing statistics which can be accessed to do a research project. While the limitations in these databases should be explored, existing statistics and other forms of available data should be strongly considered to supplement any type of research design.

Content analysis

What is content analysis?

Content analysis is a statistical research method used to analyse the contents of documents. Such documents can include newspapers, books, magazines, policy papers, radio broadcasts, television programs and feature films. The 'content' under review in written documents will usually focus on the written words on a page, but can include photographs, drawings and diagrams. Within the electronic media, the content may include dialogue, narration, moving pictures, types of editing etc.

The content analysis method is mostly utilised within communication studies, particularly in gauging the output of the mass media where the frequency with which certain items appear in the content of the media are counted. It is hoped that such an analysis will tell us what producers of such documents value and what their audiences are therefore exposed to. An example of a typical traditional content analysis of a daily newspaper may see the researcher categorising all the news items over a period of time, so as to determine which type of news receives the most coverage. A typical set of news categories would include politics, economics, science and medicine, human interest, education, health, the environment, police/crime/courts, education and industrial relations, amongst others. By counting how

often each of these types of stories appear in newspapers, we may be able to hypothesise about the news values of editors and about what types of news readers encounter. We may find, within this example, that a particular newspaper favours stories involving crime and human interest, while another newspaper in the same city focusses more on politics, economics and industrial relations. Further analysis may show us that the first newspaper emphasised local news, while the latter gave more coverage to either stories with a national emphasis or those originating from other countries. Content analyses have also been used in newspapers to analyse advertising, photographic content or the use of drawings and graphics.

Content analysis has been called 'the scientific study of messages'. Many of the principles of other quantitative methods also apply to content analysis. According to Berelson's (1952, pp.14–15) 'classic' definition, 'content analysis is a research technique for the *objective, systematic,* and *quantitative* description of the *manifest content* of communication' (emphasis added). The concepts of objectivity, adopting a systematic approach and using statistics to quantify a situation, apply to many other quantitative methods, including scientific observation, surveys and questionnaires. Content analysis is a method where counting the appearance of items is crucial. The central belief is that the frequency with which certain items occur in a text will tell us what is of most concern or under scrutiny at a particular point in time. It may help us gauge the intensity of the interest in a subject or the preoccupations that the producers of documents may have. In this method, we are not particularly interested in qualitative concepts—as other textual analyses may be—but rather the surface or manifest content of the documents under review. The judgments made by those undertaking content analyses are shrouded in 'objectivity'—where researchers deliberately distance themselves from the content and attempt to describe it in ways that others will agree with. The idea is to bring to the foreground what documents seem to be emphasising through frequent reporting.

Why do you want to undertake a content analysis?

Content analysis, as a form of academic study, has largely grown out of the study of mass communications. But why are such studies undertaken? According to Danielson (1963, p.193):

> *Content analysis is ordinarily employed because the analyst is interested in drawing an inference about some state in the source which originated the content, or some state in the audience or person who received it, or some more global inference about several parts or all of the communication system involved.*

Researchers within the field of vocational and educational training may find the study of the mass media to be of benefit. However, chances are that their studies are more likely to encompass other documents or artefacts than those presented in mainstream media, such as documents emanating from head office, unions, or industry. Let's look firstly at possible studies related to the mass media and

then see how content analysis might be applied to the study of other documents.

How important are vocational education and training issues to everyday people living and working outside the field? One possible way of determining this might be to find out how regularly stories related to vocational education and training are reported in daily newspapers. After all, if our media are expected to reflect the realities of our society, as so many editors claim, then to find out how regularly something is reported should be a good indicator of the relative importance of that issue. A reasonably standard content analysis could therefore be undertaken. How many education issues are reported? In particular, how many VET stories are reported? Of all the VET stories, how many originate from each State? Does one State appear to dominate the debate? Are VET stories most likely to be reported on a particular day of the week and, if so, why? How many VET stories concern TAFE colleges/institutes as opposed to private providers? Do certain industries and their training needs get reported more regularly? What issues are most likely to be reported on education/training and who is usually quoted? Content analysis is therefore an ideal method to track the current or past agendas, as reported in the media. It is ideal for determining whether the treatment of different ideas, themes or groups is equitable, or whether over-representation or under-representation takes place.

Another research project using this method might focus on advertising. What adverts are placed within mainstream newspapers? Are the kind of courses advertised pre-vocational, Commonwealth-funded, access/equity programs, or is most advertising related to short-course corporate training? What cost, if this information is provided, are such courses? Does there appear to be any gaps in the marketplace for courses you could offer?

The method can also be applied to electronic or visual media, for example, to 'examine the extent to which the mass media perpetuate the stereotypes of our society' (Danielson 1963, p.188). How are certain stereotypes portrayed in a number of media? Are women in non-traditional trades portrayed regularly in popular television? If so, what trade areas do they represent? How often are non-white, Anglo-Saxon, English-speaking groups represented in the media? How are particular migrant groups portrayed? How many television programs focus on Aboriginal and Torres Strait Islander issues in a given month? How might a training institution take up the results of such a study?

The method of content analysis also has a number of applications beyond the study of the mainstream media. It may be of particular interest to those wishing to become more familiar with policy documents and their related terminologies. What terminologies seem to be emphasised in the climate where training markets are being created? Throughout the enterprise bargaining negotiations, how are non-teaching staff discussed? What appear to be the future role/s of

administrative staff as discussed in departmental correspondence? While content analysis is not looking for the 'hidden meanings' of communications, it can provide an analysis of the frequency with which certain words, themes, concepts etc. appear as a gauge of their importance. Clearly, in times of great change, determining what seems to be important, measured by the frequency with which it is discussed and being able to use new terminologies appropriately, can provide some greater measure of comfort than may otherwise be achieved.

What is the methodology used in conducting a content analysis? This will be considered next.

The methodology

There are seven basic steps in undertaking a content analysis. These are:

1 forming an hypothesis

2 deciding on a unit of analysis

3 determining a measure of frequency

4 deciding on the sample

5 developing a classification framework

6 conducting the content analysis

7 analysing results.

Forming an hypothesis

As with most other quantitative methods, a researcher undertaking a content analysis will usually determine an hypothesis which will be tested. Such a hypothesis may be that 'newspapers in Australia rarely report news related to vocational education and training' or 'computer training courses advertised in Australian daily newspapers do not cover the use of interactive databases and Internet'. Whether based on extensive reading or gut feeling, the researcher has now generated a question or statement to be tested, to be proven or disproven.

Deciding on a unit of analysis

When the hypothesis is determined, then the unit of analysis must also be determined. Given that content analysis is a method based on counting, what is being counted? What is the purpose of the study? The unit of analysis will depend on the information required. Will you be counting the appearance of a particular word, statement, sentence, paragraph or theme? The most common approaches will involve either individual words or themes. For example, if you wish to find out how often particular words are used in policy documents, —words such as 'equal opportunity' or 'equity'—then these words/expressions may constitute your units of analysis. If, however, you are trying to locate newspaper items concerning the restructuring

of a particular industry, your research will be based on a thematic unit of analysis.

Frequency of measure

You need to determine *how* you are going to measure the appearance of such words or themes. Within newspaper studies, the two most common methods will be (a) the mere appearance of the unit of analysis, or (b) a measure of the amount of space devoted to that theme. In newspapers, the standard measure of space is column centimetres. Newspapers are measured across the page in columns, and down the page in centimetres. If a newspaper is ten columns wide and forty centimetres deep, there will obviously be 400 column centimetres per page. A newspaper study may find then that on one day three stories on vocational education and training appeared; the first measuring 24 column cms, the second a mere 6 column cms and the third measuring 40 column cms. The total representation on that day then was 70 column centimetres.

There are difficulties inherent in measuring the space devoted to particular items. The lay person can have great difficulty in measuring column centimetres when standard column widths are not used throughout the newspaper. You may also have difficulty in a comparative study where coverage across two or three newspapers will be contrasted. Newspapers do not have standard column widths. Finally, how do you go about measuring headlines, photographs, graphics, etc.? The more specific the researcher tries to be, the more problematic the task becomes. The easiest solution then is to merely count the appearance of the unit of analysis and to ignore the space devoted to it. Studies have found, anyway, that little difference in the overall findings has resulted whether space or mere appearance is measured.

Sampling the parameters of the study needs to be defined. The *sample* needs to be determined. When undertaking a survey, the researcher will decide to whom the questionnaire will be administered. Obviously the entire population cannot be surveyed, so how can the group be limited to a manageable sample? The same applies to content analysis. The hypothesis itself may help you to limit the study. For example, if you are wishing to determine what computer courses your college's commercial services centre needs to offer in Semester 2, you may wish to discover what advertising has been placed by both public and private providers in the local press throughout Semester 1. Clearly, studying advertising placed prior to this time may be of little benefit. You may wish to further limit your study, however, by focussing only on those days that are pertinent; for example, every Saturday (because of the volume of advertising in each Saturday's edition) and every Wednesday (when a special computing section is run in your paper). Studying papers from every day of the week may be of little additional benefit. Similarly, if you are interested in tracking the progress of enterprise bargaining through departmental and trade union communications, clear start and finish dates should present themselves.

In a larger or more general study, where the hypothesis does not help limit the sample, researchers may need to be selective. The selection for the sample should be based on reasonably scientific means, either random (where every edition or item has an equal chance of selection, a method which presumably eliminates bias) or purposeful/quota (where each day, month, etc. is represented equally). It should be remembered in content analysis, as in most other quantitative methods, that the larger the sample, the fewer the problems of bias. Whichever method is used, you should ensure that your sample represents the population it is intended to represent. Availability of the source material will be another factor you will need to consider. Whichever methods you employ to select the sample for review, you should be able to identify and justify the sampling method employed.

Classification framework

Since content analysis is, in essence, an approach involving counting, the best method of collecting that data needs to be determined. The category construction you use (known as the 'framework of referents' in the literature) could be adapted from those used previously by other researchers. There are obvious advantages in using someone else's system—(a) it takes less brain power, (b) you know that it can work, (c) measures of reliability and validity should already have been made, and (d) you could compare results with the previous study, thereby being able to show if there has been any change over time, or differences across States or nations. If you have to devise your own categories, keep in mind the objectives of the study (what are you hoping to find/prove?) and that the system of categories you devise has to be workable and manageable (Stempel 1981, p.123).

In the first example described in this chapter, we were interested in classifying the entire news content of the paper and a number of categories of news were discussed. We also discussed the origins of each story—local, State-based, national or international. Each of these categories needs then to be defined and to be placed on a grid so that data may be recorded. If required, further classifications and sub-classifications could be made. A sample grid is provided.

The researcher would use this grid to tally the number of articles in each of the categories and also to keep track of the total number of articles classified. Clearly, an analysis of this sort requires that the person classifying the data (known as the coder) has clear definitions about what constitutes each category, so that there can be little margin for error.

Analysis of editorial content of newspapers

Newspaper: _____ Date: _____

Category/origin	Local	State	National	I/national	TOTAL
Politics					
Economics					
Science and medicine					
Health					
Environment					
Police/crime/ courts					
Education					
Industrial relations					
Sport					
Human interest					
Welfare					
TOTAL					

Another example previously mentioned involved the content analysis of advertising for computer training courses. A possible framework for classifications is provided.

In generating such a framework, you need to consider if you are interested in gauging *how* the unit of analysis is used. For example, are you interested in whether women in non-traditional trades are discussed in a positive, neutral or negative way? Are you interested in whether the item is illustrated? Your framework needs to be able to capture all of the information you wish to include in your analysis. Revisit your hypothesis. Can your framework capture the information you will need?

Analysis of advertising content of newspapers—training

Newspaper: _____ Date: _____

Course name	Cost					Duration					Provider				
	< $100	$100 -199	$200 -299	$300 -499	> $500	< 20 hrs	21-40 hrs	41-60 hrs	61-100 hrs	> 100 hrs	Our college	Other local colleges	Other State colleges	Private colleges	Other trainer

Conducting the research

Actually conducting the analysis is the sixth step in the process. To ensure that the coding is both reliable and valid (and therefore 'objective'), a number of coders are usually used. Each coder systematically and independently works their way through the documents under review, counting the appearance of whichever characteristics are being quantified, creating a tally mark in the appropriate place on the grid. A comparison is then made to ensure that there is a high correlation (i.e. agreement) between the findings of the coders. Generally, coders aim for around 90 per cent agreement. In other words, if more than one in every ten decisions is disputed, coders need to redefine each category to eliminate the chances for such dispute. The classification then needs to start over. Sometimes, classifications are developed based on 'common sense', but differences in understandings of common sense can emerge. For example, on first glance, there would seem little problem in conducting a study utilising the first grid above. However, one would soon find that without a clear definition of what constitutes each of the categories, a low correlation between two or more coders would result. If an article reporting a teacher strike appeared, for example, it may legitimately be reported under education, industrial relations or politics. If the strike were nationwide, but the emphasis was placed on the effects locally, how would the article's origin be recorded? Sometimes a test run is conducted before the study, a sort of pre-test, to check that there will be reliability of coding. Sometimes, coders will disagree, not because of poor definition of categories, but simply because they do not share a common frame of reference—the coders' backgrounds are so different that they will never be able to agree on their analysis. If this should happen, you will need to find coders who share similar backgrounds (Stempel 1981, p.126). Basically, however, the content analysis should be effective because of the framework of referents and definitions of each—the employment or application of the method—rather than the coders themselves.

Analysis of results

The content analysis is conducted in similar ways to other statistical methods (see chapter 11). The results in content analyses are normally indicated as a percentage—as a proportion of the total number of stories, or as a proportion of space that was available. Here, you need to consider whether you are trying to draw conclusions or make inferences about the producers of the documents (for example, news editors or policy-makers), or about what content the audience has been exposed to. You should also consider whether it is possible to prove that the inferences made on the basis of the content analysis are correct.

What are the strengths and weaknesses of employing content analysis as a research tool? These will be addressed in the next section.

Strengths and weaknesses of content analysis

In the table below, the strengths and weaknesses are summarised. A brief discussion following this will outline them in more detail.

Strengths	Weaknesses
• inexpensive	• a new text is generated with its own new meanings
• easy-to-access source material	• assumes that frequency will show the importance of text objectively, devoid of meaning or context
• method can be used for current and/or past documents	• the unit of analysis may not be meaningful
• unobtrusive	• the meanings of words are not discussed
• reliable results, reproducible by others	• investigator imposes own meaning system and categories rather than 'taking' it from the content
• data can be quantified	• the link between the category and the item may not be clear

As a methodology, content analysis has a number of strengths and weaknesses, as outlined by Danielson (1963), Stempel (1981) and McQuail (1987). One of its major pluses is that it is a relatively cheap form of academic research, particularly now that many documents are available through databases at little or no cost. Newspaper databases such as QNIS (Queensland Newspapers Information Service), for example, are readily available on many university and TAFE college/institute campuses and are relatively cheap and easy to access. While there are also charges associated with accessing the Internet, the wealth of information is mind-boggling. In addition, with many government departments using (or investigating the possibility of using) E-Mail as the principal means of correspondence, undertaking analyses of these documents will become increasingly easy. Clearly, electronic data storage also means that making comparative analyses will also become easier—whether such comparisons are made over periods of time or across geographical boundaries. Content analysis is an ideal method for comparative studies.

In addition, content analysis is largely unobtrusive and this is one of its greatest strengths. Conducting such an analysis, in contrast to such qualitative methods as participant observation, is unlikely to influence the people involved in the communication process, yet it has the potential to tell you a great deal about how they operate.

Content analysis also has the potential to be an extremely reliable method of investigation, dependent upon the category constructions employed and their definitions. The results of the research should

therefore be reproducible by other researchers adopting the same methods and definitions.

Another strength of content analysis is that its results are quantified. In other words, it turns verbal or textual phenomena into numerical data. This makes it easier to determine the frequency with which certain words, sentences, themes or concepts are used in communications, whether those of the mass media or from government departments or unions. In addition, there is no denying that many people place greater importance, and attribute greater reliability, to data expressed numerically. Unfortunately, this also constitutes its principal weaknesses—that in producing a new text in the shape of a content analysis report, the meaning is inherently different from the original. Entire documents are reduced to a series of numbers devoid of context. The assumption underlying the research has been that the frequency with which something occurs will validly show the reader the meanings of the text. Clearly, language constitutes a far more complex meaning system than placing tally marks in a simple category employed by a content analyst. Can the meaning of a text be summarised so cleanly in an 'objective' way? Are the meanings in text manifest? Are the units of analyses determined by the researcher meaningful? Are the links between categories and items as clear as we would like to think? In other words, is it possible to generate a classification system of categories and effectively impose these upon the documents of others, rather than drawing them from the existing content? It is clear that constructing such categories and analysing texts accordingly has the potential to be an extremely distorting exercise.

Despite these weaknesses, content analysis offers a relatively simple and inexpensive means of analysis.

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9 Action research

Stephen Billett

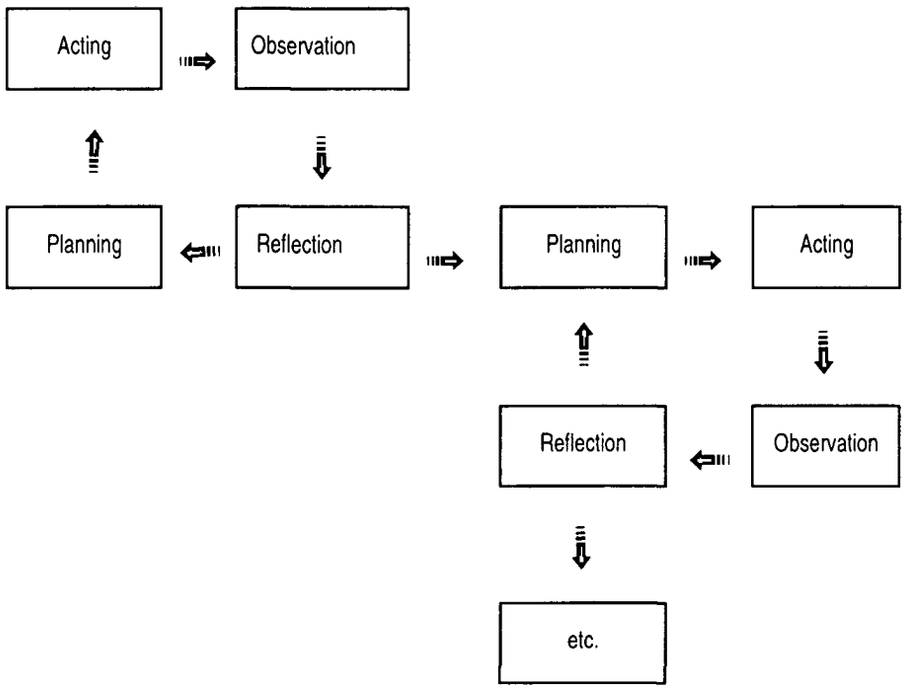
Overview

This chapter provides an overview of action research as an approach to inquiry within vocational education. The aims and characteristics of action research are discussed, as are concerns about enhancing its credibility (validity and reliability). A particular emphasis is placed on the application of action research to the practice of vocational education. This chapter is not intended as a guide to conduct action research, as the methods are those used in field research which is discussed in chapter 12. Rather, the intention is to provide an understanding of its characteristics and how it might be applied. Eichelberger (1989, pp.28–29) claims that approaches to inquiry can be classified into three types: basic, applied, and action research. Basic research is concerned with addressing fundamental aspects of human existence, with the purposes of developing new theories and testing existing theories. There may be no interest in the application of this type of inquiry. Applied research is concerned with the application of theory to a particular situation for the purposes of understanding and therefore improving the effectiveness of, in this case, vocational education. Often this research is directed at improving either the teaching or the learning process in TAFE colleges, Skillshare or workplaces. Action research is concerned with collecting, analysing and interpreting data to improve decision making (Eichelberger 1989). Much of its focus is on evaluating existing educational programs and provisions. While the basic and applied research claims about generalising findings from action research are restricted, the approach can be used effectively in vocational education. In seeking improvement to programs, action research involves a collaboration with and the participation of all involved in the research project, which is distinct from the approaches canvassed elsewhere in this book. In addition, action research adopts a critical perspective which seeks to identify contradiction in practice. It also takes as its assumption that those engaged in the research are those most likely to be informed by the process and take action as a result of the inquiry.

The chapter is divided into four sections, which commence with defining this approach to the inquiry and its aims. Next, the key characteristics of the inquiry are delineated. This is followed by a consideration of issues associated with the credibility of findings from action research and then a basis for conducting action research is advanced. Finally, some applications of action research to vocational education are discussed.

Burns (1990) describes action research as a collaborative and co-operative form of inquiry involving researchers, practitioners and outsiders. However, in seeking to refine this definition, it is useful to make comparisons between action research and action learning. Action learning is the engagement by groups of individuals with problems which they have the responsibility of resolving in real conditions (Revans 1984). These problems are usually investigated in workplaces (e.g. industry settings, TAFE colleges or training centres), with the participants working collaboratively with other individuals who may or may not have particular expertise in resolving particular problems. Therefore, action learning is a form of inquiry-based learning which is collaborative and engages the participant in the identification of the problem and the means to secure that problem. Action research is also a collaborative and participative approach to inquiry originally proposed by Lewin (1952) and consists of a spiral of cycles with the phases of *planning, acting, observing and reflection* (figure 9.1). The cyclical nature of the phases indicates that action research is not linear; instead, it builds upon the new problems that have been identified during the preceding cycle(s), which leads to further and ongoing inquiry.

Figure 9.1: Action research cycles (Lewin 1952)



The commonality between action learning and action research includes participation and collaboration—the idea that people learn with and from each other—and that the intention is related to direct improvement of practice in particular circumstances. However, the two approaches have different goals. Action learning adopts an interpretative view of knowledge. In action learning, reflection is personal, seeking to resolve an impasse to a particular problem situation. Reflection within action research is socially critical; that is, it is concerned with identifying contradictions in the existing situation and highlighting issues related to inequity, access and fairness (Carr & Kemmis 1986). The action researcher is asked to adopt a critical

stance in order to seek those contradictions in practice which are a product of accepting the status quo, without an intense questioning of values. The action researcher adopts an emancipatory stance in reflecting on their practice using critical theory as a metre, whereas inquiry through action learning has a more pragmatic focus.

For example, consider inquiry into Recognition of Prior Learning (RPL), the process that is used to provide formal recognition for individuals' skills and knowledge acquired informally. Some action-learning questions might be:

- How can the RPL process be improved to maximise the recognition to applicants?
- How can syllabus documents be adapted to ease the identification of areas for RPL?

These questions are focussed on improving the process to make it more effective. The participants would address these important questions and seek to solve them collaboratively and participatively, to assist learners in having their informally acquired skills recognised.

Conversely, action research questions might be:

- Whose interests are served by the RPL process?
- Why are there no benchmarks for RPL in many occupational areas that are mostly inhabited by women and non-English-speaking-background workers?

These questions focus on the purpose and process of RPL, to determine if it is able to secure the equity goals that are used to advance its implementation. The first question addresses the interests of sponsors, to determine whether this RPL is concerned with providing formal recognition for those who do not possess that recognition; or whether it is about reducing the demand on the vocational education and training system by granting credit based on demonstration of attaining the pre-specified outcomes. Given that RPL is usually a document-based process, what happens to those individuals who have difficulty with obtaining or presenting such documentation? The second question addresses the equity claims of RPL, by suggesting that if there are benchmarks for the prior knowledge to be assessed against, how can those workers obtain formal recognition? As can be seen this far, the goals of the two sets of questions are quite different. Although there is a particular specific problem focus, as well as a collaborative and participative approach adopted, in both approaches there are quite different goals for inquiry. It is commonly accepted that action learning focusses on the practical personal applications, whereas action research has an emancipatory application. Action research is defined by Kemmis and McTaggart (1988) as a critical and emancipatory methodology. It is, they propose:

> *. . . a form of collective self-reflective inquiry undertaken by participants in social situations to improve the rationality and justice of their practices as well as their understanding of these practices and the situations in which these practices are carried out . . .*

The critical orientation adopted in action research is central to emancipating participants through their own understanding and actions (Kemmis 1991, p.61); that is, those directly involved with the research are themselves transformed by the process.

In summary, action research is an approach to research which is collaborative, participative, critical, self-evaluating and situated. As discussed below, there are likely to be as many variations of approaches to action research as there are action-research programs. They are likely to vary amongst those programs in which the team of researchers are themselves the object of the inquiry, to programs in which the team may investigate others. However, the aims and characteristics of action research offer principles which distinguish this form of inquiry. Having discussed definitions of action research, it is appropriate to briefly examine what are the aims of an action-research program.

Aims of action research

The aims of action research are to improve educational decision making in areas such as curriculum development, professional development and institutional improvement. In keeping with what Eichelberger (1989) advances, the aim of action research is to improve the provisions of particular programs and institutions through evaluative inquiry. However, as stated above, the aims are associated with critical inquiry to understand the factors which underpin the particular circumstances and then transform those circumstances. This transformation includes changes to the participants through a reflective engagement in the research. These aims are seen as being more worthwhile goals than seeking generalisations from research. The specific focus means that this methodology seeks depth in inquiry rather than breadth. Consequently, the techniques adopted for investigation are likely to be those adopted in ethnographic research such as interviews, observations and questionnaires. However, they might also be extended to include an examination of policy documents and other sources of data which identify factors associated with the particular circumstances. In addition, as the action-research process includes the development of participants, they may also be encouraged to use entries in logs or diaries as a means of reflection.

Characteristics of an action-research program

The characteristics of the action-research methodology are an interdependence between its:

- collaborative
- participative
- self-evaluative
- critical, and
- situational nature.

These characteristics are briefly elaborated below.

Collaborative

Action research usually involves a team of researchers and practitioners working together collaboratively. A quality of the collaborative participation is that unlike other research activities where the researchers conduct research on subjects, here the subjects are a key part of the research process. Collaboration literally means 'working together' and emphasises that there needs to be a commitment to working together as equals. Genuine collaborative relationships are likely to be important for the research process in order, for example, to prevent the researchers dominating the practitioners within the team of researchers. In addition, collaborative arrangements are required to gain the trust of all participants. Hence, as suggested below, it may be necessary for the researcher(s) to adopt a leadership role, but that role should be one which involves light steering, rather than firm control.

Participative

The traditional role for the researcher is to be responsible for the design, planning, preparation and evaluation of research activity (Burns 1990). However, in action research all participants should play a role in all these phases of the inquiry. This involvement includes participation in the aims, design, implementation and evaluation of the research, which extends to participants often being the object of the research. However, as McTaggart (1991) argues, the participative role is rarely free of power status and influence; therefore participation needs to be considered problematic.

Self-evaluative

Modification within action research is continuous and is not necessarily constrained by the completion of each cycle (McTaggart 1991). However, within the cycles reflection is seen to be an outcome of the cyclical process, which leads to new questions and a further cycle of inquiry. Therefore, central to the self-evaluation which occurs within practice is reflection on action. Reflection is a deliberate and careful analysis of the phenomena being investigated. In action research it may well be the participants' practice that will be the focus of that reflective evaluation. To be reflective, practitioners need

to understand the nature of their practice and appreciate the learning they can derive from their own practice. A view of learning that has practitioner knowledge as its basis is well supported. Schon (1983, 1987), for instance, advances the notion of the practitioners' intuition or 'knowing in action'. He observed the effectiveness of what practitioners do by intuition and places great value on the accumulation of personal knowledge which supports that intuition. Schon states that many problems require solutions that are outside the existing theory and technique. Practitioners cannot rely on instrumental solutions provided by research-based theory, because the practitioner's problems are 'frequently messy indeterminate situations', not tidy research problems (1987, p.3). The practitioner must deal with those indeterminate situations by the application of professional knowledge. Improvisation of that knowledge is required to generate and test strategies developed for those situations. Common (1988) concurs with this view. She argues that, in their classrooms, teachers are the producers of knowledge; the central source of knowledge for their students, the creators of norms and the arbitrators of justice. In this capacity they are daily reminded of the effects of their actions (Common 1983, p.205). Therefore, reflection on experiences within an action-research project as a participant or subject-participants is a legitimate and critical basis for inquiry. As Carr and Kemmis state:

> *the only genuine source of educational theories and knowledge is the practical experience out of which these problems are generated.*
> (Carr & Kemmis 1986, p.124)

Reflection is also associated with personal growth through 'critical inquiry and analysis, and self-directed evaluation' to be contrasted with behavioural skills which emphasised the acquisition of pre-determined practices (Calderhead 1989, p.43). The capacity to be reflective can be constrained by organisational and psychological factors, not the least of these being the failure of practitioners to realise what they do in their practice is substantive and theory formulating (Usher & Bryant 1987, p.208). Critical reflection, therefore, provides a basis for knowing and in participating in action research it offers a basis for accessing critical insights, thereby avoiding instrumental problem solving which ignores development. So, in sum, action research is self-evaluative in two ways; firstly, through the cyclical process and the reflection which is a part of action research.

Critical

As stated above, the focus of inquiry within action research is socially critical. It assumes that inquiry which is not socially critical would lose the important ingredient of transforming the participants. Kemmis and Stake (1988) state that to assist a critical process of reflection, certain conditions need to be addressed. These include the participants' freedom to:

- *consider, reflect on and express their understanding and values;*

- *articulate, share and collaboratively scrutinise the intentions and judgements;*
- *make and implement decisions in the light of collective judgement, and to monitor and review the consequences of decisions in action.*

(Kemmis & Stake 1988, p.12)

The opportunity to enjoy these freedoms will be dependent on the nature of the collaboration and participation provided by the team of researchers. In this way, these characteristics are interdependent.

Situated

As action research focusses on particular circumstances and investigates these circumstances in depth through cycles of inquiry using participants from the social setting, it can be characterised as being highly situational. In favouring depth of inquiry over breadth, it is concerned more with improving the particular circumstances than identifying findings which can then be transferred to other settings. Diagnosing a problem in a specific circumstance and attempting to solve it in that context is the focus of action research.

Credibility of research (validity and reliability)

Credibility in action research is based on the validity of the research and its findings, although the nature of credibility is shaped by action research's orientation. Researchers using this approach still have to demonstrate the degree of rigour for the findings to be accepted as valid. *Internal validity* is concerned with whether the claims made from the data can be substantiated. Is the study reporting what it claims to be reporting? It is necessary for the research report to demonstrate rigour in the research design and hence its validity. *External validity* is concerned with the generalisation of the findings from one study to other populations or settings (Le Compte & Groetz 1982). As replication of the circumstances of action research is not often possible, triangulation of data is usually seen as being a means to secure greater validity in ethnographic-type research. Triangulation is the gathering and verifying of data by independent and different means (Hamil, Langer & Shanahan 1985), such as using a number of approaches to gather data for analysis and interpretation. Typically, in qualitative inquiry the extension of findings from one situation to another is based on case-by-case comparisons; with the reader, rather than the researcher, determining in what ways the findings are generalisable to other circumstances. Firestone (1993) suggests going beyond this case-by-case approach and seeking external validity through a case-to-theory process of generalisation. In the case of action research, this might well be associated through supporting and extending critical theory, or theories which underpin the area of development such as curriculum development, professional development or organisational change.

How action research might proceed

As stated earlier, Lewin (1952) provides a cyclical spiral of phases (planning, acting, observation and reflection) for action learning. These phases offer a means by which an action research project might progress. Kemmis and McTaggart (1988) suggest a modification to Lewin's ideas by advocating cycles of reconnaissance, planning action, enacting and observing the planned action, reflecting on the implementation of the plan, and from there moving onto the next cycle. However, the likelihood is that 'the process begins with some general idea that some kind of improvement or change is desirable' (McTaggart 1991, p.170). This idea is then transformed through deliberation with the participants until some sets of goals have been established. Having established this common basis for inquiry the action research moves through a spiralling set of cycles, as shown earlier. Within those cycles, however, flexibility is probably required as changes and unexpected impasses appear. There are likely to be as many variants of moving through the action-research cycles as there are action-research projects. In the next section, some roles for the researcher are advanced to assist with maintaining the integrity of the action-research process with such inherent flexibility.

Roles for the researcher

Although an action researcher is participative and collaborative, it is likely that there will be a principal researcher who will initiate and guide the process. Although not expected to take a dominant role, in practice there are likely to be roles that a particular individual—the principal researcher—may have to undertake. Burns (1990) suggests three roles for the researcher which reflect experiences with conducting participative inquiry. The roles for the researcher are:

- initiator of research
- resource person, and
- developing the research skills of the participants.

These roles can be captured by there being an initiating and guiding role of the principal researcher—that is a researcher from the 'academy' or the situation who may initiate the project.

Initiating and guiding the action-research process

It is unlikely that the initiative for an action-research project would occur spontaneously with a group of practitioners. Rather, a researcher is likely to initiate the project and may have to guide the project in a way that is facilitative rather than being directive. Action research is intended to operate as a self-managed and supportive process; however, it may be necessary for the researcher to adopt a facilitative role initially to assist in establishing the inquiry. My experience has been that assumptions about groups' ability to initially manage their own process are not always borne out in practice. The intent is to establish a participative and collaborative process in which critical appraisal is encouraged and undertaken in a responsive and supportive way. The intention is for the group to question, discuss,

reflect and collaboratively resolve issues related to the inquiry. However, my experience has been that regardless of their understanding of the principles of group process and formation, vocational teachers and administrators do not always take account of these principles when they are engaged in group activities. Lewin stated that there are two conditions crucial to the success of processes like action research: group decisions and commitment to improvement. Such decisions and the commitment to them will only arise from effective collaborative action (Lewin 1952). For example, premature decisions at the commencement of the research may ignore the complexity of the situation and the need for professional problems and issues to be considered practically and critically (Kemmis & McTaggart 1988, p.7). Stake (1975, p.202) also stated that 'it is important not to confuse with simplicity but to examine the complexity of situations'. Domination by individuals, underdeveloped listening skills and basic resolution of housekeeping issues are group-process problems that frequently occur, even with experienced vocational educators and administrators. Therefore, rather than assuming that collaboration and participation will necessarily flow, some 'light steering' may be required by the researcher to establish the norms under which this collaborative form of inquiry will take place.

This guidance might be achieved through modelling the desired norms by ensuring that the timing of meetings and their content are negotiated and the basis for deliberation, critical appraisal and reflection are established. Specific problem areas need to be clearly stated and the group should seek to clarify the issues associated with that problem. A personally reflective approach to inquiry can be encouraged in individuals by asking them to embark upon the completion of a log or diary in which they write their personal progress with the innovation. Such a reflective process may be the key to substantial personal and professional development, particularly if practitioners begins to question their own practice (e.g. what they do well, how do they know they do it well; what do they need to improve upon and how). The reflective process can make explicit what has been tacit, thus allowing the practitioner to value their practice, see it as a source of direction for what they do and use it as the basis for evaluating changes in their practice.

The comment by Burns (1990) about the researcher as a trainer of participant researchers can be exemplified by my own experience. During a recent research project conducted in which the participants acted as researchers in their own organisations, the outcomes may well have been improved if the research design had included a training program to assist participant-researchers in undertaking their tasks. The circumstances under which action research is likely to prosper are dependent on a range of personal and situational factors. Personal factors which are important include the individual's willingness to participate and their openness to reflection and appraisal. In addition, there needs to be degrees of trust between the participants. Situational factors might include sponsorship and

support for the inquiry from the setting in which the inquiry is being conducted.

Applications for adult and vocational education

As stated earlier, action research has applications in areas such as curriculum development and professional development, institutional improvement in vocational education. It is accepted that there is likely to be overlap amongst these three areas. The development, implementation and evaluation of curriculum within vocational education provides a rich basis for the use of action research. Action research could be used to address research questions about the very premise of how vocational education is conducted. For example, the question asked by Stevenson over ten years ago about whether vocational education should be seen as focussing on the development of skills for the workplace, or as a form of education with a vocational bias (Stevenson 1985). Such a question might be framed quite differently across courses in TAFE and Skillshare, given the particular students. Equally, action research could be used as a collaborative tool to answer questions on teachers' or students' difficulties with competency-based training, by examining its assumptions against its goals.

In practice, this participatory and collaborative approach to investigation has a range of applications with questions which are not socially critical, or not initially intended to be critical. Many practitioners would argue that they are constrained by current provisions and that guidelines are unable to adopt a critical stance. For example, a group of TAFE practitioners might be working together to improve the provisions of vocational education using collaborative and participative approaches which include cycles of planning, observation, action and reflection. Although not being socially critical, an examination of an approach to CBT, for instance, which seeks to maximise the freedom provided by a system which only prescribes outcomes, leaves areas for development in terms of innovative, alternate and novel approaches to the teaching of vocational knowledge. It could be proposed that the very process of engaging in reflection on practice makes the process critical. So in adopting a non-socially-critical approach (action learning), important questions about vocational education can be addressed using participative and collaborative approaches to inquiry. Action research also has applications for professional development as participation in action research should be inherently developmental. The process of participation and, in particular, the reflection on practice opens a host of avenues of development which are self-evaluative. As with other models of professional development for teachers such as clinical supervision (Smyth 1984), the strength of the outcomes are most likely to be associated with the quality of the collaborative and participatory arrangements which can be developed between the participant researchers. Institutional change and improvement should also flow from collaborative and participative approaches to research which focusses on improving programs. With the removal of a

middle tier of management in many TAFE colleges and the evolution of self-managed teams, action research may provide a means by which these collaborative arrangements can be extended into forms of inquiry aimed at improvement for the institution and in so doing address professional and curriculum development.

Conclusion

As a mode of inquiry, action research offers to vocational education an approach which can be used to question assumptions about contemporary practice at a time when there is an intolerance to views other than those proposed by key stakeholders such as government and industry. The participative and collaborative nature of action research offers to practitioners in the vocational sector an approach to inquiry which is inherently developmental through the application of cycles of reflection on action. Even when the socially-critical perspective is put aside, the collaborative cyclical approach to inquiry can be used to secure other important pragmatic goals associated with improving the provision of vocational education.

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Further reading

For detailed accounts of how action research can be implemented, the following texts should be consulted.

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10 Validity, reliability and triangulated strategies

Charlie McKavanagh

This chapter is about data, the forms it can take and about maintaining integrity of data. The focus is on how to collect and treat data in ways that ensure that the situation being investigated is faithfully portrayed. While the central issues are ones of reliability and validity, the related issue of triangulation is also addressed.

In devising data-gathering procedures, it cannot be too strongly emphasised that it is important to seek advise about how data should be collected and treated at the design stage. This is particularly true for numeric data, because what statistical measures are appropriate for the research question and for the data will depend upon sampling and the form of the data being collected. Seek specialist statistical advice early and certainly before any data is collected. There are also many references available to help, including those such as SAS Institute (1989) that are specifically written for particular statistical software packages. There are also those that cover a specific range of statistical procedures such as Siegel and Castellan (1988), as well as more general texts on research methods with sections on data collection and analysis.

What are data?

The data are the information collected about the situation under study. Interpretations and judgements are based on data. In the course of the study, data are collected and transformed to results to portray aspects of the situation. There are many ways to portray a situation and some of these ways will be more faithful than others or will suit some purposes better than others. Consider the example of a disruptive classroom. A photograph or video of the classroom might show chaos and a tape recording might portray the room as noisy. A diagram mapping the activity of students over time might show a great deal of movement about the room. A researcher might count the number of conflicting verbal statements or write them down verbatim and an audiometer might measure the sound level in decibels. These pictures, words, diagrams and numbers are different ways of portraying the classroom.

While ways of gathering and treating quantitative data (involving numbers) are often different from those involving qualitative data (non-numeric), many concepts about the integrity of data are shared

between quantitative and qualitative methods. The data collected are always only a sample of what could be gathered, so the question of representativeness arises. Do the collected data fairly represent the situation being investigated? Are the data biased due to the collection method or the frame of reference of the investigator? Do the data provide sufficient information on which to base interpretations and judgements? Does the data-gathering process itself distort the situation being portrayed? Should the form of the portrayal be determined by the research question? We will return to these and related questions, but there are key concepts about data and their interpretation which need clarification first.

Units of analysis

Any large system has many levels and a study could focus on any of its levels (or the relationships among levels). For example, a study of vocational education might focus on apprentices, teachers, classrooms or curricula. A study on a larger scale might focus on colleges or industries or State and federal government policies. The key level (or levels) of the study becomes the focus of data-gathering activity and the unit of data analysis. If the study is of trainers, then, the data collection would be centred on trainers, although data sources would not normally be restricted to this level. Trainees would no doubt be able to offer insight into what trainers do. So, to pursue this example, data gathering could well seek information from trainees, but the information sought would be about their trainers and data would be classified and ordered according to those trainers. Trainers would form the unit of analysis and analyses would group, compare and contrast different trainers.

Variables

Variables are the factors which may be different across the units of analysis in an investigation. So, in our study of trainers example, variables of interest might include the form of pre-service training, the length of training experience, the amount of industry experience and student perceptions of the relevance of their training. Usually, data is gathered about each variable and the study explores relationships among these variables. In our example, each trainer might be asked how much industry experience they had, to provide data on an 'industry experience' variable. Trainees of each trainer might be asked how relevant they found their training, to provide data on a 'training relevance' variable. During the analysis, connections between industry experience of trainers and perceived relevance of training might be developed and reasons for any relationships (or lack of them) examined.

Reliability

Reliability refers to the consistency in data gathering. For example, is the approach we use to make judgements about students' work consistent? If another similar group of students undertook the same assessment would they achieve the same sort of results? If your group of students were assessed by somebody else would the same

students get the same results? Would two students who just passed a test today also pass it in a week's time?

Three common types of reliability are defined and exemplified in the table which follows, along with an overall definition of reliability.

Definitions of reliability and some subtypes with examples

Term	Definition	Example
RELIABILITY	Dependable, stable, consistent, predictable, accurate.	A person who is consistently late is reliable in his/her arrival times.
Stability over time	Stable, dependable, predictable.	The score obtained is a stable indication of performance.
Accuracy	Accurate, true, stable.	The score obtained is an accurate indication of his/her 'true' ability.
Error free	Without random or systematic errors. Tested statistically by test-retest, alternate forms, split-half or internal consistency methods.	Arrows shot from an expertly aimed bow will all hit the same small area, providing the bow is in good order and is clamped firmly in position.

How do we know that our data gathering is reliable? There is a much-used analogy of weighing scales. If you measured yourself on a lot of scales and got different results, could you say that any one was correct? Would you be more confident in one measurement than another? If one measurement came out more often than others, would you choose the most frequent one as the best measurement? What would it take for you to be confident that one measurement was right? If all the scales indicated the same weight, would you be quite confident about the measurement? Usually, the answers to questions about what is the right measurement are a matter of confidence and judgement. The more consistent our measurements are, the more confident we become that the measurements are correct, even though we may never be sure that we know the absolute truth in the matter. A highly reliable measuring instrument will give the same results every time it is used. We have more confidence in a reliable instrument than in an unreliable one.

A number of factors can affect reliability. These include changes which may occur during data gathering which effect consistency. Examples include: varying approaches or questions when interviewing; changes in direction, timing, and rapport between interviewer and different respondents as interviews proceed; inaccuracies in scoring responses; and of course the health, motivation, degree of fatigue of the respondent which might influence the amount of guessing or forgetting. Because of factors such as these affecting performance, we would not expect to achieve perfect reliability. Some variation in results is expected if the same questions were administered several times, for example. However, a set of unreliable questions is very suspect.

For quantitative data, reliability can be estimated by calculating statistics such as the standard error of measurement or reliability coefficient. The statistical concept of reliability is related to sampling. If enough measurements (samples) are taken, then the average of these is the 'real' score. Variations about this 'real' score are 'errors' of measurement. The amount of variation is the reliability of the measure. Measures with large variations have low reliability. Hagan (1993) provides a useful summary of statistical concepts of reliability in the context of social research.

Reliability can be increased by:

- focussing questions by providing background and context;
- being more specific about what is required of respondents;
- increasing direct observation and decreasing inferences, as discussed in a later section in this chapter.

Unfortunately, increasing reliability often decreases the emphasis on creativity, problem solving and other higher-order thinking skills, because the structuring required to increase consistency can be contrary to providing new and challenging encounters needed to examine non-routine undertakings. We often need to compromise between achieving a high level of reliability and gathering data on what is of prime interest or importance to us. Nevertheless, we should strive to achieve the highest reliability possible and should demonstrate that this has been done in writing the report of the study.

Validity

Obviously, a report of an investigation cannot present the entire situation, but must present its essential ingredients, taking into account the focus of the research. While preparation of a report must involve summarisation and condensation as well as description, it is critical that the summary does not lose the essence and substance of what is being portrayed. The issue is one of validity and the question which needs to be asked is: 'Does the study faithfully report the reality of the situation being investigated?'. In other words: 'Does the study do what it claims to do?'. In designing, implementing and reporting a study, explicit attention should be given to issues of validity. Burns (1990) and many other texts on educational measurement and research provide further information.

An investigation which claims to study teaching is suspect if it looks only at student results or at enrolment and dropout rates, and a study of workplace competence is suspect if it considers only data from classroom settings. The emergency service that asked officers to name the parts of a piece of safety equipment would not be able to infer from that exercise that the officers could use the equipment safely in times of emergency. Equally, the health sector that only used written examinations to assess practitioners' skills would be seen as using an invalid process. The recent interest in adult and vocational education for assessment to be conducted at work could be seen as an attempt

to ensure valid statements are being made about trainee performance on the job.

There are different types of validity such as content validity, criteria-related validity and construct validity, all of which play a key role in assisting with the quality of data gathering for educational research. Each of these types is defined and illustrated in the table which follows.

Definitions of validity and some subtypes with examples

Term	Definition	Example
VALIDITY	The data-gathering procedure does what it is designed to do, as does the whole study.	A tape measure which has been stretched will give invalid readings. (However, if it is uniformly stretched and does not continue to stretch, it will measure reliably.)
Content validity	The data gathering faithfully captures the breadth and emphasis of what it is supposed to.	The substance of the test is representative of the content of the course as judged by an expert.
Predictive validity	Future performance is accurately predicted from results collected for the study. A validity co-efficient is the agreement between the predicted and the actual (later) performance.	Students with higher tertiary entrance scores will be more successful in university studies than those with lower tertiary entrance scores.
Concurrent validity	Actual current performance is accurately predicted from results collected for the study.	Students with a high reading score, do in fact read well at the present time.
Construct validity	The degree to which the intended hypothetical constructs are measured.	Students with a high IQ work faster and achieve more than those with lower IQ's.
Face validity	Each test or questionnaire item, and the set of items as a whole, appear to measure what one wishes to measure.	The questions on a test of critical thinking actually require critical thinking on the part of the respondent, and not, for example, remembering someone else's answers.

Of these types of validity, content validity has received most attention, particularly in relation to sets of items on a test or questionnaire. Content validity is most often achieved by asking experts in the field to make judgements about the items as to whether each item is indicative of what is being measured and whether the balance of items is appropriate. For an example, see Stevenson, McKavanagh & Evans (1994) for a report on the development and validation of a classroom questionnaire for measuring the press for higher-order thinking, or McKavanagh and Stevenson (1994) on the development of the training environment questionnaire. What is true of validity for a study as a whole, is also applicable to each data-gathering exercise within the study. So that, for example, a variable which claims to be about a student's prior knowledge needs to assess the entire range of knowledge that is applicable to the study.

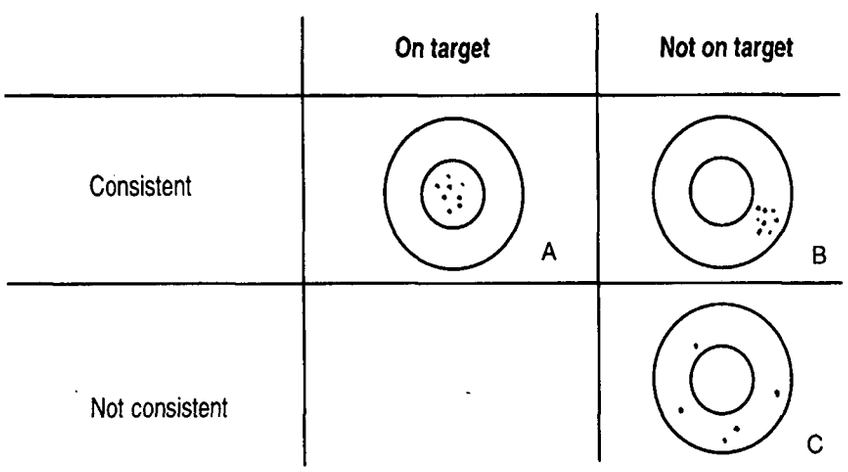
Observation and inference

Data may be gathered by direct or by less direct means. Observation includes not only using the eyes, but also other senses and instruments as well. All these data-gathering techniques are regarded as direct, in that the data is collected for the variables of interest without having to make deductions. A record of who does what when is a record of observations. Direct observations of this kind are regarded as the best data, because, without the need to infer, there is less chance of errors of judgment. However, in educational research many variables are not available for direct observation, as in the case of ideas, attitudes and understanding. In these cases, indirect means of data collection must be used. For example, attitudes of employees to work may be inferred from their arrival and departure times, but care needs to be taken that errors are minimised and that the inferences made are justified. Especially where inferences are involved, it is advisable to use several different ways of gathering data about the same variable and to compare the data from each method.

Reliability and validity?

The following diagram highlights some of the differences between reliability (being consistent) and validity (being on target). Is it possible for data gathering to be reliable but not valid? Is it is possible for it to be valid but not reliable? Considering the 'on target-not consistent' quadrant of the diagram should provide food for thought in addressing these questions.

Diagrammatic representation of reliability and validity



Being consistent is an indicator of reliability. Being on the bullseye is an indicator of validity.

You can have reliability without validity. To take an extreme example, consider using an adult's height as a measure of intelligence. The measurement of height is highly consistent (compared to most educational measurement), but as an indicator of intelligence it is highly questionable to say to the least. If height is meant to measure intelligence, then it fails to hit the target, yet the consistency of measurement makes it very reliable. Other less extreme examples of invalidity are using written tests to assess a performance skill and using attendance at class as a measure of learning. So, are there ways to help engender reliability and validity in data collection? This next section on triangulation examines one of the most important aspects of this problem.

Triangulation

Triangulation is a method of helping ensure that what is portrayed is a faithful representation and not an artefact of the investigation. It is much like a doctor calling for second and third opinions after an initial diagnosis of a disease. Having a back injury and going to a general practitioner, an acupuncturist and a chiropractor for advice is like the method of triangulation. If the advice were reasonably consistent, we would be more confident about our knowledge of what was causing the back pain. So too, the method of triangulation attempts to confirm validity by comparing results obtained from different perspectives, using different data-gathering procedures. The method is based on the assumption that if there are no differences in findings despite using different data collection procedures, then the findings are likely not to be an artefact of data-collection. Thus, the findings must be due to factors inherent in the situation being investigated.

Radically different collection procedures for the same phenomenon yield the most convincing evidence. For example, in a study of student expertise in TAFE classrooms, Stevenson and McKavanagh (1994) used a combination of video tapes, interviews and questionnaires to provide validated data on teacher and student actions, and knowledge developed by students. Here, the triangulation was used for two complementary purposes. Firstly, the different collection procedures gave a common perspective on each variable and provided evidence that the variables were validly measured. Secondly, the consistency among the different data-gathering procedures provided support that each of the procedures was valid in itself. The importance of this is that we now have greater confidence in each of the instruments, so that, in future studies, it will not be as necessary to use all instruments to study the same phenomenon.

To return to the disruptive classroom example mentioned earlier, a qualitative researcher might find, through observation and interview, that this is a form of organised 'disruptive' behaviour. This situation could be one in which a certain group of students submits this particular teacher to taunts and trials. Other groups of students may watch with interest and humour, use the time to do other things or feel peeved that time is being wasted. The data gathered initially need to be put to stronger tests, to establish how true they are. Our original description of a 'disruptive' classroom might or might not hold when our data are treated differently. For example, an experiment could be done by observing the class when one or more of the 'ring leaders' were not present, the teacher could be observed in other classes or the class could be observed with other teachers. An analysis could be done on the content covered in this class. The subject may be seen as non-relevant, too difficult, too easy or boring, or the students only attend to keep CES entitlements. Our observations may have been done at the end of a long day or on a Friday before a long weekend, when everyone wants to get away earlier than usual. Treating our first analysis as our final one can be dangerous and misleading. For

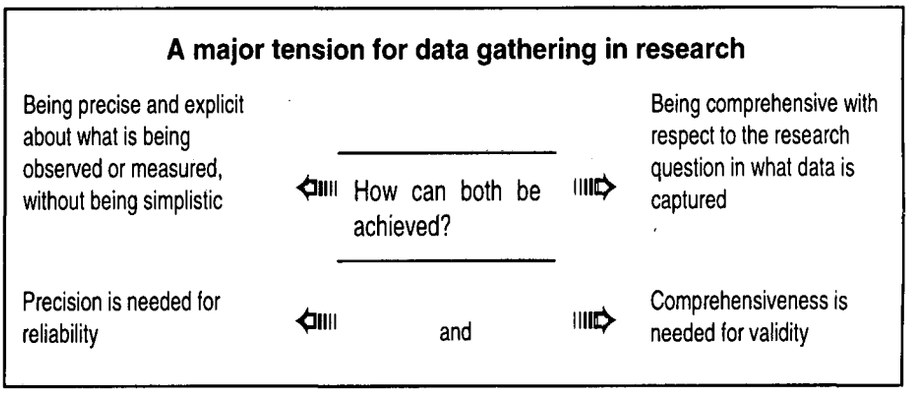
this reason, we try to disprove or put what we find to further tests, by using other methods. This is the process of triangulation.

At another level, the ways we measure may not be accurate, and, like a clock that runs a few minutes slow or fast each hour, will not give a valid sense of what the real time is at the end of the day. Making sure that the instruments are accurate and that we get valid readings is central to good research. Validity, reliability and triangulation are important tools for self-checking. While the main points have been made primarily in relation to quantitative data and statistical analysis, the concepts can be transferred to all types of research. An example of how the validity question is approached in qualitative research is found in chapter 12 which deals with the analysis of qualitative data.

Conclusion

The ultimate aim in collecting and processing data is to portray the realities of what we claim to be examining. In planning data collection, we need to ensure that we are comprehensive in our approach and that we encompass the essence of what is needed to answer the research questions. In other words, the data-gathering process must be valid. Another important aspect of the data is that it should be able to be counted on; that is, it has to be reliable. Being precise in what we do during data collection will aid this consistency. However, there is a danger in striving primarily for reliability, because, with the blinkers of precision in place, we may miss important aspects of what we are trying to portray. In which case the data, and so the interpretations based on this data, will lack validity. Both reliability and validity are important, and while we can have reliability without validity, we cannot achieve validity without reliability. We can see that this is the case if we refer again to the disruptive classroom example introduced at the beginning of this chapter. Some of the representations, such as a tape recording of the whole class, are comprehensive but ill-focussed, in that they capture more of the whole situation yet lack precision. Yet, precision is needed for reliability. Other representations, such as the audiometer readings of noise in the classroom, give precise measures of selected events but lack a view of the whole. Yet, comprehensiveness is needed for validity. From these observations, a number of questions regarding the data base of a portrayal arise. For example, is it possible to portray in a way that is both precise and comprehensive? If not, where should the balance lie between these two extremes? The following diagram summarises this dilemma.

This tension exists with most studies and the solution to the tension is usually a compromise between the two extremes. Methods need to be put in place to establish reliability, but this is not a sufficient condition to guarantee validity. Methods need also to be put in place to ensure validity. These methods include using expert opinion and other ways of checking that variables of the study measure what they purport to measure.



A check that validity has been achieved with your own research is to use the method of triangulation and compare results about the same phenomenon derived from different sources. This method is equally applicable for individual variables or for the study as a whole. If the variables faithfully portray significant aspects of the situation under study, then it is likely that conclusions drawn from analyses of the data will faithfully portray the whole situation.

A check that validity has been achieved in the research of others, whether this be at the level of a whole investigation or of a data-gathering instrument such as a questionnaire, is to put aside initially the author's claim and to decide for yourself from evidence presented what can justifiably be claimed. Having considered the evidence first, your own conclusion can then be compared against the author's claim. If validity has not been established, then the research is suspect.

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11 Quantitative data analysis

John Stevenson

Quantitative data

The outcome of a research investigation is new information which the researcher seeks to analyse and interpret. This information is called *data* and may take the form of numbers, such as scores on a test (quantitative data) or non-numerical information, such as interview records (qualitative data). In both cases, the goal of the researcher is to determine what patterns exist in the data, to summarise the data, to relate these summaries and patterns to knowledge that already exists in the area of investigation and to generate new knowledge. The discussion of data analysis, below, deals first with quantitative data.

In this chapter, some of the common ways of representing and analysing quantitative data are outlined. Firstly, some simple ways of representing data in a summary way are outlined. Then, the importance of using hypothesis generation as a basis of statistical analysis is discussed. Important differences between the assumptions underlying parametric and non-parametric statistical procedures are also discussed. Some examples of statistical analysis are illustrated, including tests for significant differences between groups of different sizes and analyses of correlations between variables. Some ways of using correlational measures to explore reliability and validity are also outlined.

Summarising data

When quantitative data are gathered, they are usually tabulated and scanned to determine any apparent patterns or trends in the data. For instance, it may be that a survey of teachers and principal teachers in a TAFE college on the time they spend on administrative activities yielded the following data:

Table 11.1: Percentage time spent on administrative activities in a TAFE college

	Percentage time spent on administrative activities																	
Tch.	20	10	6	40	15	15	12	23	16	18	9	30	14	9	10	22	13	35
P.Tch.	60	70	24	80	45	50	80	75	39	90	100							

From an initial scan of the data, it appears that the entries for principal or senior teachers are generally higher than those for teachers. Rather than reporting all the data for each individual surveyed, it is usual to report such data in summary form. When data

are clustered into a summary form, the patterns in the data sometime become more apparent.

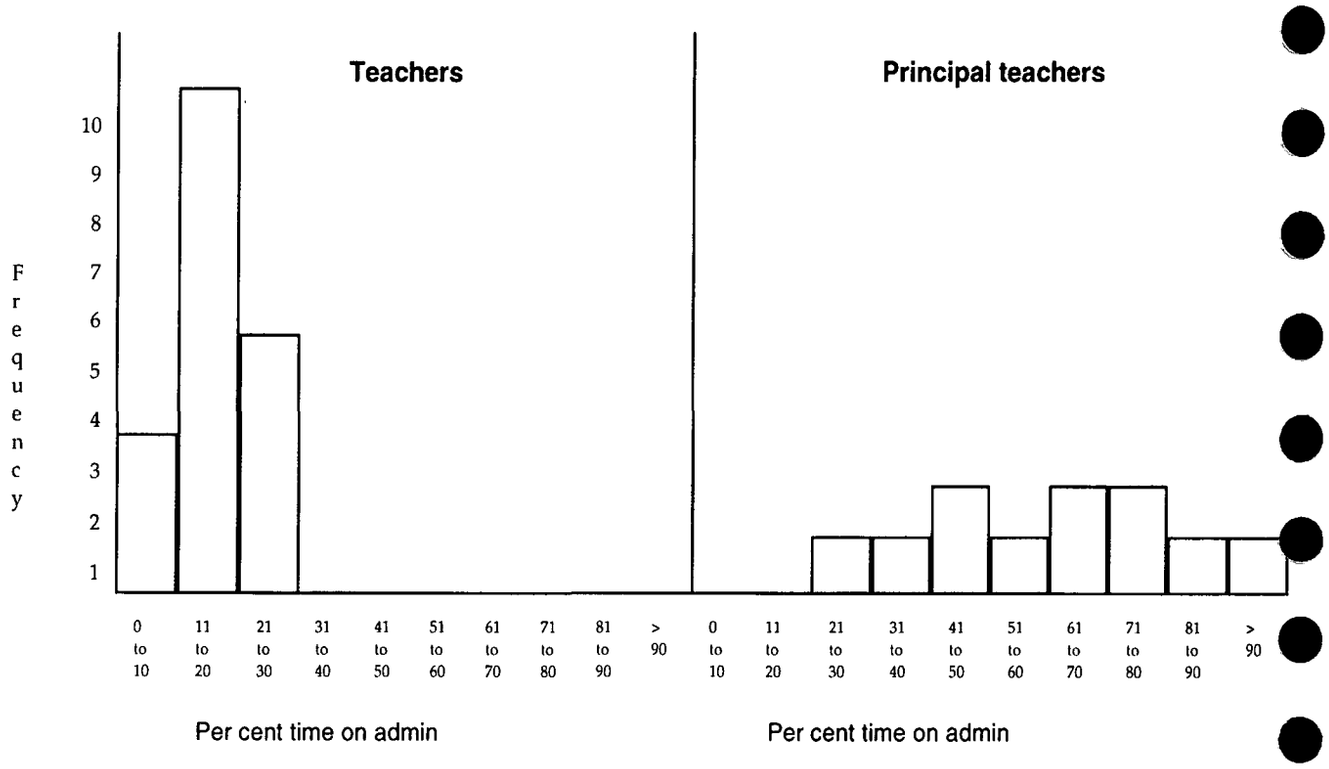
For instance, these data can be summarised as a *frequency table*. To construct a frequency table, it is necessary to cluster the data into *bands*. For the above data, suitable bands may be 0–10.5 per cent, 10.6– 20.5 per cent, 20.6–30.5 per cent etc, as follows:

Table 11.2: Percentage time spent on administrative activities in a TAFE college

	Percentage time spent on administrative duties									
	0-10.5	10.6-20.5	20.6-30.5	30.6-40.5	40.6-50.5	50.6-60.5	60.6-70.5	70.6-80.5	80.6-90.5	90.6-100
Tch.	3	10	5							
P.Tch.			1	1	2	1	2	2	1	1

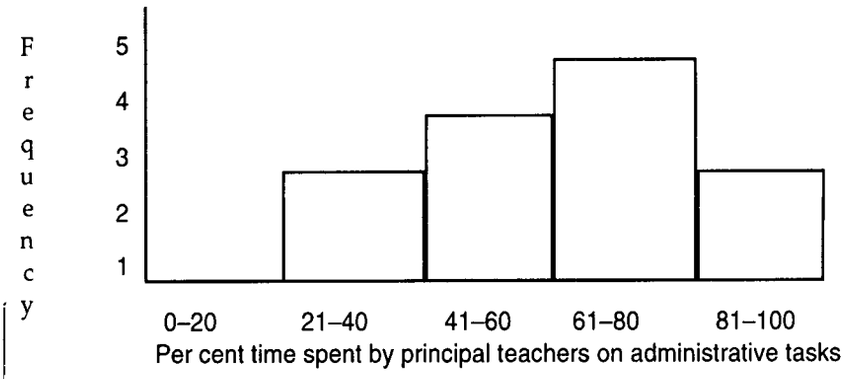
These clustered data indicate that the results for a principal or senior teacher fall into higher ranges of percentages of time spent on administrative tasks than those for teachers, with very little overlap.

There is also a range of pictorial ways in which such a frequency table can be presented: e.g. a bar chart or histograms. For instance, the above data can be presented as a histogram, as follows:



Again, a scan of the summary data reveals that the pattern appears to be one of generally higher percentages of time spent on administrative activities, for principal teachers than teachers. The results for teachers seem to cluster around 11–20 per cent, while those for principal teachers seem to cluster around 41–80 per cent. It also appears that the results for principal teachers are more spread out than those for teachers. If the band size for principal teachers were

changed, say to 20 per cent bands, the clustering would be more obvious, as follows.



Mean and standard deviations

Another common method of summarising data is to report the *means* and *standard deviations* of such groups. The *mean* is reported as the average response; and the *standard deviation* is reported to indicate the spread of the data from the average or mean.

For the data in tables 11.1 and 11.2, also depicted in the histograms, the information can be summarised as follows.

Table 11.3: Per cent time spent on administrative activities in a TAFE college

% time spent on administrative activities (Means with standard deviations in brackets)	
Teachers (n=18)	Principal teachers (n=11)
17.61 (9.37)	64.82 (23.31)

The *means* summarise the data, but do not necessarily represent the score of any actual individual. They are a measure of the central tendency of the data. Note the correspondence between the means and the histograms presented earlier. The *standard deviations* are a standardised way of referring to how far away, on average, each individual score is from the mean. Note the correspondence between the sizes of the standard deviations for the two samples and the spread of the two histograms. One way of interpreting standard deviations is that, if the distribution is normal, then approximately two-thirds of the results would fall within one standard deviation of the mean; 95 per cent within two standard deviations of the mean; and almost all results within three standard deviations of the mean. Check to see if this is the case with the present data. A check reveals that all the data, in this example, fall within two standard deviations of the mean.

Other measures of central tendency that are sometimes reported are the *median* (the central score for the group—the score which divides the sample into two equally sized portions); and *mode* (the most frequently occurring score). In the above data, the mode for the principal teachers is eight (it occurs twice), the median is 65 (half way

between the central scores of 60 and 70). For the teachers, there are three modes (9, 10 and 15) and the median is nine. These scores are useful in summarising the data, but are less amenable to further statistical analysis than the mean and the standard deviation.

Apart from representing the data in an informative way, the researcher would probably be interested in whether it can be concluded that there are significant differences between teachers and administrators in the percentage of their time that they spend on administrative tasks. While the principal teachers seem generally to report higher percentages of time spent on administrative tasks than teachers, there are some principal teacher scores which are lower than some scores for teachers. How then can we determine if principal teachers generally engage in more administration than teachers? The above data are analysed for differences between the groups in a later part of this section. In the following paragraphs, the generation of hypotheses as a basis for such statistical analyses is discussed.

Hypothesis testing

In conducting statistical analyses, the results relate to the theoretical basis of the hypotheses which are being tested. To illustrate this point, consider the analysis of data without any theoretical basis for the tests that are undertaken. One may, for instance, collect data on the increase in the number of dental surgeries in a town. Data may also be available on the crime rate in that town over the same period. Through statistical analysis, it may be found that there is a strong correlation between the number of dental surgeries and the number of committed crimes. This result does not indicate that dental surgeries cause crime. It may be, for instance, that the same factor (e.g. size of population) contributes to both the number of dental surgeries and the crime figures. Thus, statistical analyses may help to establish relationships, but these are not necessarily *causal* relationships. One needs a good theoretical basis for interpreting the results of statistical analyses; and, for this reason, a good starting point is hypothesis generation.

Statistical analyses are often used to assign *probabilities* that the results could have occurred by chance. If this probability is low, then another explanation can be afforded for the results. Thus, in testing research questions statistically, the researcher sets up a *null hypothesis* (H_0) and an *alternative hypothesis* (H_1). The null hypothesis is the hypothesis that the researcher wishes to reject; while the alternative hypothesis is the hypothesis suggested by theory or previous research. In this case the null hypothesis would be that the groups are the same, i.e. there is no difference between them in terms of the percentage of time spent on administrative tasks. The alternative hypothesis is that there is a difference. The statistical test is a test of the probability of the null hypothesis. It is hoped that the probability for the null hypothesis will be at a low level, so that it can be concluded that it is improbable that differences between the groups could have occurred by chance.

The hypotheses can be written as follows:

H_0:	The means of the per cent time spent by each group on administrative tasks are equal
H_1:	The means of the per cent time spent by each group on administrative tasks are different

If the researcher has reason to believe that the principal teachers would spend more time (rather than merely a different amount of time) on administrative tasks, then the alternative hypothesis could be written to reflect this:

H_1:	The mean of the per cent time spent by principal teachers on administrative tasks will be larger than the mean of per cent time for teachers

There are salient differences between these two versions of the rival hypothesis. In the first case, a *two-tailed test of significance* between the means would be conducted, because it is possible that principal teachers could have spent more time or less time than teachers. In the latter case, a *one-tailed test of significance* between the means would be undertaken, because it is conceivable only that the principal teachers could have spent more, rather than less, time than teachers.

Parametric and non-parametric analyses

Statistical testing can take a number of forms, depending on the assumptions that are made and the levels of measurement that are used in collecting the data. One set of procedures *(parametric tests)* makes a series of assumptions:

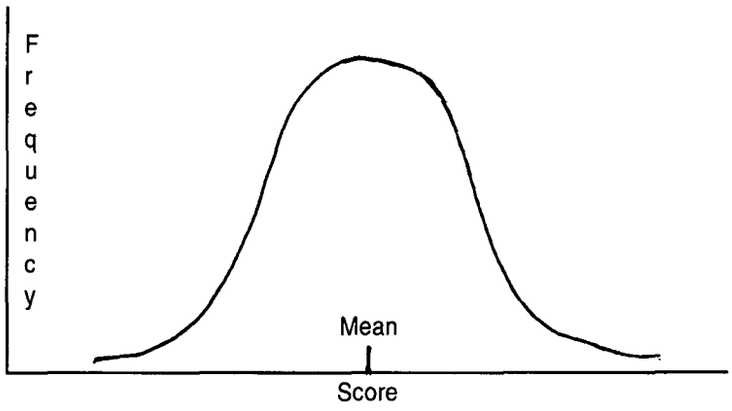
- that the *level of measurement* of the data is interval or ratio;
- that the populations from which the samples are drawn are *normally distributed;*
- that there has been *random assignment* to the groups, and so on.

It is important to remember these parameters, as the validity of the results depends on the assumptions. So let's look at what is meant by level of measurement and normal distribution, in turn.

Four *levels of measurement* are differentiated: nominal, ordinal, interval and ratio. By *nominal* measurement it is meant that the data are simply labels, e.g. male or female, Setting 1 or Setting 2, Group 1 or Group 2, English speaking background or non-English speaking background. By *ordinal* measurement, it is meant that the data can be rank ordered, e.g. ranking students from very high to very low on their performance on a test. By *interval* measurement, it is meant that the data are related to a measurement scale with fixed units and each score is a quantity of those units, e.g. if students are given percentage scores on a test. In this case, the level of measurement is interval if the difference between two percentage marks, e.g. 60 per cent and 70 per

cent, is equal to the difference between two other percentage marks of the same interval, e.g. 20 per cent and 30 per cent. Another example is where students rank aspects of a training session from 1–5 on a number of key items. (In this case, the data are at interval level, only if the difference between a ranking of say 1 and 2 is the same as the difference between 4 and 5 and/or 3 and 4 or 2 and 3.) By *ratio* measurement, it is meant that the data are not only interval, but the zero point is inherently defined. That is, there is a true zero on the test referred to above, so that a person with a score of 80 per cent has twice the capacity as one with a score of 40 per cent.

By *normal distribution*, it is meant that the frequency of various scores can be represented by a bell-shaped curve, where most of the scores cluster around the mean, and very few scores are very high or very low, as shown in the following diagram:



Compare this curve with the histogram given on p.175 for teachers' time spent on administrative tasks. While not a normal curve, it approximates this general form. Indeed, if there were more data, it is likely that the histogram would correspond more closely to a normal curve (see central limit theorem below).

Many parametric tests use the standard deviation and the mean to perform the test. The mean is a good measure of central tendency, *only if the data are measured at an interval or ratio level* and ***only if the results for the population as a whole would cluster around the mean in a normal distribution.*** The standard deviation is a useful way of obtaining measures of probability that certain phenomena occur by chance, *only if the data, from the population as a whole, are normally distributed.*

Non-parametric statistical procedures are those that do not require one or more of these assumptions.

The requirement for parametric procedures that data be normally distributed can be relaxed if the sample size is large. The *central limit theorem*, states that as the sample size increases, the distribution of the means of random samples taken from any population will approach a normal distribution. (The larger the sample, the more reliable the mean.) Thus, if a large *random* sample is taken, researchers often use parametric statistics, providing the data are measured at an interval or ratio level.

If data are not measured at an interval or ratio level, or if other assumptions about normal distribution do not apply, then researchers can consider the use of *non-parametric* statistics for the tests they wish to conduct. There is a number of assumptions underlying each of these tests and they should be examined before using them for particular sets of data. In the paragraphs below, examples are given of some common parametric and non-parametric statistical procedures used to test hypotheses.

Testing differences between groups

A common parametric test for testing for differences between two groups is the *t-test*. Let's use the t-test to compare the means in the example used earlier in this chapter. Table 11.3 suggests a large difference (on average) between the means of the groups. However, the standard deviations indicate that the results are spread, particularly for the principal teachers. So the question remains whether the differences on average (the difference between the means) indicates a statistically significant result, i.e. one with a less than 5 per cent chance of occurring purely by chance.

This analysis is usually undertaken by a t-test. Basically, the t-test converts the difference between the means into standard units (units standardised in terms of the standard deviation of the population from which the groups came). Unfortunately, in this case, the sample standard deviations are quite different and the statistical package would need to make an estimate of the population standard deviation on the basis that the results from each sample cannot be pooled.

The results of a t-test, performed using SPSS for Windows, on the above results is shown in the following figure.

The t-test output consists of several sets of information which are important in its interpretation. Firstly, the means and standard deviations are given (as calculated previously in table 11.3). Standard errors of the means are also given. These are a measure of the extent to which the means of different samples of the same population could be expected to have means different from the ones calculated from the available data.

The next piece of information is a test for the equality of *variances* (variance is the standard deviation, squared), between the two groups. This is reported as an F-value and a probability that the differences in variance found between the two groups could have occurred by chance. In this case, because the probability is so low (.001), it is concluded that there is a significant difference across the groups in terms of the spread of results. Because the variances are unequal, the t-test must be performed by calculating an estimate of the population variance that takes this difference into account.

t-tests for independent samples of GROUP

Variable	Number of cases	Mean	SD	SE of mean
PER CENT				
GROUP 1	18	17.6111	9.369	2.208
GROUP 2	11	64.8182	23.306	7.027

Mean difference = -47.2071
Levene's test for equality of variances: F= 14.199 P= .001

t-test for equality of means

Variances	t-value	df	2-tail sig	SE of diff	95% CI for diff
Equal	-7.70	27	.000	6.129	(-59.785, -34.629)
Unequal	-6.41	12.00	.000	7.366	(-63.260, -31.154)

In the final piece of information, two t-test results are given, one on the assumption that the variances are equal; and one on the assumption that they are not. In this case, because the variances are unequal, the researcher would use the t-value of -6.41 with a 2-tailed probability of 0.000 to conclude that the difference in the means between the two groups is statistically significant.

The researcher can then conclude that there is a *substantial* (17.61-64-82) difference in the percentage of time that principal teachers and teachers spend on administrative tasks and that this difference is *significant* at the 0.001 level.

If the researcher is concerned that the assumptions underlying parametric testing do not hold, then a non-parametric procedure can be used to test for differences between the groups. The results of a Mann Whitney U - Wilcoxon Rank Sum W test on these data is as follows. This test lists all the scores from both groups in rank order. It then compares the ranking of scores from Group 1 with those of scores from Group 2, calculates the mean rank and assigns a probability that the difference between ranks could have occurred by chance.

- - - - - Mann-Whitney U - Wilcoxon Rank Sum W Test

PER CENT
by GROUP

Mean rank	Cases	
9.72	18	GROUP = 1
23.64	11	GROUP = 2
	--	
	29	Total

U	W	Exact 2-Tailed P	Corrected for ties Z	2-tailed P
4.0	260.0	.0000	-4.2720	.0000

In this case the teachers' scores had a mean rank of 9.7; and those of the principal teachers, 23.6. This appears to be a large difference—it indicates that most of the low scores belonged to teachers and most of the high scores to principal teachers. The values of U and W indicate the magnitude of the differences in rank across the groups. The 2-tailed probability is very low, when tied ranks have been corrected for, and it can be concluded that the differences are significant.

In interpreting these statistical analyses, care is needed. While certain relationships may be established as statistically significant, it may not be valid to conclude that the relationship is causal, as discussed earlier. In this particular case, the researcher has found that these samples of teachers and principal teachers reported statistically significant different percentages of time on administrative tasks. As well as considering whether these samples are representative of all teachers and principal teachers, the researcher needs to consider whether other effects may be operating. For instance, did the teachers and principal teachers come from different *kinds* of colleges or sections? Were there any *gender*, *experience* or *age* effects? That is, the researcher must consider if there any other salient differences between the two groups, other than the titles of the position that they had been appointed to.

It may be that these latter differences actually caused the observed effects. In more sophisticated research designs, these latter variables may be measured and more advanced statistical procedures used to determine whether they are related to the measured effects.

Analysing variance across more than two groups

In the above example of a t-test, the output included a test for equality of variance (square of the standard deviation). This is a special case of a general technique called Analysis of Variance (ANOVA). This technique is often used to compare more than two groups, as the usefulness of a t-test is confined to two groups. The procedure involves examining the variance within groups with the variance across groups and assigning a probability that these differences could have occurred by chance. If there are real differences among three groups, say, we would expect that the variance across the groups would greatly exceed the variance within the individual groups.

Consider the following example (Beven 1994). The second-order cognitive holding power was measured for three groups of learners undertaking their studies in three different kinds of text-based learning settings. Second-order cognitive holding power is the extent to which a learning setting presses learners into using such higher-order procedures as problem-solving (Stevenson & Evans 1994). The results were as follows.

Table 11.4: Second-order cognitive holding power by learning setting

Second-order cognitive holding power (Means with standard deviations in brackets)		
Setting 1 (n=92)	Setting 2 (n=128)	Setting 3 (n=97)
3.375 (.527)	3.267 (.535)	2.994 (.567)

An inspection of the table suggests that learners in Setting 3 experienced less second-order cognitive holding power than learners in the other settings. To test this hypothesis, a one-way analysis of variance can be performed. This analysis examines the average variance of individual cases within the three groups with the average variance among ('between') the three groups.

The printout for a SPSS for windows ONEWAY analysis of variance for the data of this example on the opposite page.

The F-value (12.6394) is the ratio of the average variance between groups divided by the average variance within groups, and the probability of this occurring by chance (0.0000) is less than one chance in ten thousand. The researcher can therefore reject the null hypothesis that the groups are equivalent. To test which of the groups are significantly different from other groups, a Scheffe test has been conducted. The printout shows that both Groups 2 and 1 are significantly different from Group 3, but not significantly different from each other. Hence, it can be concluded that the second-order cognitive holding power in Settings 1 and 2 are significantly higher than that in Setting 3.

Alternatively, a non-parametric test can also be used to analyse the differences among these groups. The output from a *Kruskal Wallis 1-way Anova* procedure, using SPSS for Windows, on the opposite page.

Here the chi-square statistic has been used to compare the mean rank of scores, for each group, with the expected mean rank if there were no difference between groups. Because the chi-square is so high (24.3), the probability of this occurring by chance (significance) is very low (0.0000), and the null hypothesis that there is no difference between groups can be rejected.

----- ONEWAY -----

Variable SOCHP
By Variable SETTING

Analysis of variance

Source	D.F.	Sum of squares	Mean squares	F Ratio	F Prob.
Between groups	2	7.4382	3.7191	12.6394	.0000
Within groups	314	92.3933	.2942		
Total	316	99.8315			

Multiple range tests: Scheffe test with significance level .05

The difference between two means is significant if MEAN(J)-MEAN(I) >= .3836 * RANGE * SQRT(1/N(I) + 1/N(J)) with the following value(s) for RANGE: 3.48

(*) Indicates significant differences which are shown in the lower triangle

Mean	SETTING	G G G r r r p p p 3 2 1
2.9941	Grp 3	
3.2673	Grp 2	*
3.3750	Grp 1	*

----- KRUSKAL-WALLIS 1-WAY ANOVA -----

SOCHP
by SETTING

Mean rank	Cases	
187.74	92	SETTING = 1
165.31	128	SETTING = 2
123.41	97	SETTING = 3

	317	Total

			Corrected for ties		
Chi-square	D.F.	Significance	Chi-square	D.F.	Significance
24.2842	2	.0000	24.3365	2	.0000

Correlational analyses

When the researcher is testing an hypothesis that two variables are related in some way, a common calculation is the correlation between the variables. Both parametric and non-parametric correlation co-efficients can be calculated from two sets of results. The parametric method *(Pearson correlation co-efficient)* examines whether the variables can be plotted against each other on a straight line.

For example, it may be hypothesised that older workers would ask fewer questions in an on-the-job training situation than younger

workers, because previous research suggests that older learners are less likely to take the risk of appearing to lack knowledge. Thus, if this were true, it would be expected that as age increased, the number of questions asked would decrease in a linear manner. The Pearson correlation co-efficient is calculated by examining the extent to which data fit on the straight line or fall some distance away from a straight line. If the co-efficient is 1.0, there would be a perfect fit; if it is zero, then a straight line does not represent the data and a linear relationship does not exist.

The non-parametric methods calculate the *Spearman* and *Kendall* co-efficients. Neither procedure requires a normal distribution or interval level data. Both of these procedures use the rank order of the data. That is, they convert the initial values for each variable with ordinal rankings. Each procedure examines the differences in the paired ranks for each case. (The main difference between the two procedures is that the Kendall co-efficient is more applicable if there is a large number of tied ranks).

To illustrate, consider the following results. The following fictitious data may be collected from a training situation in a workplace. The trainer may have monitored the number of questions that individual trainees asked during a training session, and related this to data available on the trainees' ages.

Table 11.5: Number of questions asked in a training session by age

Age	No. of questions asked
18	9
22	8
23	7
35	4
38	4
40	3
26	6
45	3
50	2
27	6
60	1
46	3
23	6
47	2

Three kinds of correlation co-efficients, generated by SPSS for Windows, are given below. The first printout is of the Pearson correlation co-efficients.

The correlation co-efficients indicate a strong relationship between age and the number of questions asked. A 2-tailed significance value has been attached to the correlation co-efficient. (Given that the researcher has theorised that increased age will be associated with decreased questioning, a one-tailed test could have been used. However, since the default value for the package is a two-tailed test, and this requires no assumptions about the direction of the

relationship between age and questioning, let's persist with the two-tailed test for illustrative purposes).

--- PEARSON CORRELATION CO-EFFICIENTS- - -

	AGE	QUESTS
AGE	1.0000 (14) P= .	-.9639 (14) P= .000
QUESTS	-.9639 (14) P= .000	1.0000 (14) P= .

(Co-efficient / (Cases) / 2-tailed significance)

" . " is printed if a co-efficient cannot be computed

The results indicate that the correlation is substantial (-0.96), where the minus sign indicates that as age increases, the number of questions asked decreases. If we square the correlation co-efficient ($0.96^2 = 0.92$), this indicates that 92 per cent of the variation in the number of questions asked can be accounted for by age; i.e. one can predict the number of questions someone will ask from knowing their age. The correlation is also significant ($p<0.000$).

The output from non-parametric procedures for the same data shown on the following page.

These results are very similar, in this instance, to those gained from making parametric assumptions about the data. The sizes of Pearson and Spearman correlation co-efficients are often similar, whereas the Kendall co-efficient is often lower than that gained by the other methods.

As with other statistical procedures, in interpreting correlation co-efficients, care must be taken.

For instance, one may not be able to decide, from these data alone, that as one gets older, one is less likely to ask questions in training situations. There may be other variables that affected the result.

For instance, in interpreting the results, one needs to know such information as the following:

- Was this a typical training session?
- Did other factors affect the question-asking behaviour, e.g. the gender and ethnic origins of the trainees, the language used in the questioning, the prior knowledge of the trainees, the age of the trainer?

```
- - - - KENDALL CORRELATION CO-EFFICIENTS - -

QUESTS      -.9488
            N(  14)
            Sig .000

              AGE

(Co-efficient / (Cases) / 2-tailed significance)

" . " is printed if a co-efficient cannot be computed

        - - - SPEARMAN CORRELATION CO-EFFICIENTS - -

QUESTS      -.9856
            N(  14)
            Sig .000

              AGE

(Co-efficient / (Cases) / 2-tailed significance)

" . " is printed if a co-efficient cannot be computed
```

Suppose a large percentage of the older trainees were women from a non-English-speaking background. Could we be certain that it was their age that was responsible for their smaller level of question-asking?

To unravel the operation of a number of variables that could have contributed to the result, the researcher needs to use other techniques such as partial correlation co-efficients and multiple analyses of variance. These techniques are beyond the scope of this introductory chapter.

Measuring validity and reliability

Statistical analysis relies on the assumption that measurement is *valid* and *reliable*. By valid, it meant that the data measure what is intended; and, by reliable, it is meant that the same result is obtained when the instrument is used on different occasions.

Correlational procedures are useful in confirming validity and reliability. In the case of *validity*, one might correlate the results from administering a new instrument with the results of administering another instrument that measures the same or a related construct. For instance, theoretical considerations would suggest that students reporting a high level of second-order cognitive holding power (SOCHP) would be using deep approaches and deep strategies in their learning. Clark and Dart (1991) undertook correlational measures between SOCHP and the variables 'deep approach' and 'deep strategies', using an instrument which measures these variables (Biggs 1987). They gathered results from 470 students in 32 classes with 17 lecturers. The results were as follows.

Table 11.6: Correlations of SOCHP with deep strategy and deep approaches to learning (32 classes, correlations between means)

	Correlation with SOCHP
Deep approach to learning	0.55 (p<0.001)
Deep strategy	0.55 (p,0.001)

Because the correlations are substantial and significant (it is unlikely that they could have occurred by chance), these results add support to the validity of the scale of the instrument which measures SOCHP. Stevenson & McKavanagh (1994) also examined the validity of the scale of the instrument that measures SOCHP, by examining correlations between teacher and student actions in 27 TAFE classes and the levels of SOCHP that were reported. Their results were as follows (note also how the probability levels are reported).

Table 11.7: Correlations between SOCHP and teacher and student actions

	Correlation with SOCHP
Teacher presenting	-0.40*
Teacher initiating	-0.59**
Student initiating	0.60***
Diversity of action	0.39*

* indicates significant at the 0.05 level; **, 0.01 level; ***, 0.001 level

The correlations are, as expected, lending support to the validity of the scale of the instrument.

One common method of measuring reliability is by determining a measure of the correlation of items with other items on the same instrument. Cronbach's α is one such measure. The results of analysing the scale SOCHP, on data gathered from 1203 students using the reliability procedure of SPSS for Windows, is as follows.

The results indicate that the correlation of each item with the scale overall is between 0.25 and 0.52, that the overall *reliability is 0.82* and its reliability does not improve substantially if any individual item is removed from the scale. Thus, the reliability of the scale is quite good.

More sophisticated procedures can be used to examine the internal factor structure of the scale (e.g. principal components analysis), but this is beyond the scope of this chapter.

RELIABILITY ANALYSIS-SCALE (ALPHA)

		Mean	Std dev	Cases
1.	Q1	2.9817	1.0007	1203.0
2.	Q2	2.9925	.9929	1203.0
3.	Q3	3.4231	1.0729	1203.0
4.	Q4	3.0050	1.0416	1203.0
5.	Q7	3.2311	1.0107	1203.0
6.	Q11	3.1380	1.0586	1203.0
7.	Q12	3.0116	.9193	1203.0
8.	Q13	3.2228	.9620	1203.0
9.	Q15	3.1804	.9891	1203.0
10.	Q19	3.1721	1.0445	1203.0
11.	Q21	3.3525	1.1166	1203.0
12.	Q22	2.9983	.9057	1203.0
13.	Q27	3.0632	.9896	1203.0
14.	Q29	3.1446	.9903	1203.0

N of Cases = 1203.0

Statistics for scale	Mean	Variance	Std dev	N of Variables
	43.9169	59.9465	7.7425	14

Item means	Mean	Minimum	Maximum	Range	Max/min	Variance
	3.1369	2.9817	3.4231	.4414	1.1480	.0193

Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Alpha if item deleted
Q1	40.9352	51.8826	.4899	.2692	.8071
Q2	40.9244	51.9968	.4863	.3400	.8074
Q3	40.4938	52.5780	.3996	.3187	.8138
Q4	40.9119	54.6861	.2711	.2014	.8229
Q7	40.6858	52.2024	.4603	.3022	.8092
Q11	40.7789	50.9794	.5190	.3934	.8047
Q12	40.9052	52.6516	.4834	.3421	.8079
Q13	40.6941	51.5220	.5430	.3612	.8035
Q15	40.7365	53.4571	.3810	.2084	.8147
Q19	40.7448	51.1187	.5180	.3988	.8048
Q21	40.5644	51.8051	.4290	.3564	.8118
Q22	40.9185	52.4509	.5088	.3091	.8063
Q27	40.8537	54.1183	.3330	.2477	.8180
Q29	40.7722	52.1411	.4772	.3121	.8080

Reliability co-efficients 14 items

Alpha = .8212 Standardized item alpha = .8229

Summary

In this section, some simple methods of representing and summarising data have been outlined. These include the use of tables to represent data, the banding of data into frequency tables and the use of histograms to depict data in a more pictorial form. The concepts of mean and standard deviation in representing summary information about data have been introduced.

It is emphasised that statistical analysis requires the use of good data for analysis. Some procedures for examining the validity and reliability of measurements have been illustrated and discussed.

The relationships between hypothesis generation and statistical testing have been examined. Examples of null and theoretically expected hypotheses have been given to illustrate the role of rejecting null hypotheses in statistical testing. The differences between one and two-tailed testing have been explained.

The assumptions underlying parametric and non-parametric statistical procedures have been outlined. The needs for normally distributed data and measurement at different levels have been examined.

The section illustrates the use of parametric and non-parametric testing in examining hypotheses about differences between two groups and differences among three or more groups. Finally, the section illustrates the use of simple correlational procedures.

It is beyond the scope of this section to examine more complex procedures. However, the reader is advised to consult the statistical references listed below to extend understanding of these procedures. Some of these references come from economics and business. This is because many of the advances in using statistics in the social sciences originated in economics, and provide a good basis for using statistical procedures in education.

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12 Analysis of qualitative field research

Bob Funnell

Why a different form of analysis?

Qualitative, or field research, is done mainly through the methods of participation, observation, interviewing, analysis of texts and documents. The types of research done are mainly presented in the form of the case study, evaluations and other types of reports and in the form of a life history—of a person, an organisation, a culture or a group. Statistics are employed in field research, but they are not used to discover generalisations across a population. They usually serve the purpose of situating the case in comparison with other cases (e.g. one college in a system of colleges and institutes, one section within a number of sections in that college, one client group as opposed to others, or even one person compared to other people—a director, teacher, student). Statistics are not a major part of analysis because, in most cases, the researcher participates in the research context, allowing for either an in-depth study of events as they occur or for the opportunity to discover effects over time. Analysis done by a participant observer who worked in a section of a college has to be different to that done by a person who administers a survey questionnaire. If the research was about implementation of a new course the qualitative researcher would, for example, be in a position to describe the transition points and events that took place and to listen, observe and interview at these and other times. The analysis would be tentative, initially, and have to take place at various stages throughout the research process. This compares with a quantitative survey where the analysis is structured according to the questions and variables, takes place after the data is secured, and where the statistical procedures are similar to those used by all researchers. Some other differences between the two types of analysis can be highlighted to distinguish between the processes involved.

In qualitative research, analysis takes place at the same time that the research data are being collected and the prescribed steps are less clear. The researcher has to continually go over and review the field notes, observations, interviews and any other clues as they are collected so as to make sense of what has been found to that point in the project. This reviewing of information has to be done for the research to move on. Thus, when we analyse field research, we have to keep asking what we know now and what this tells us about our next few steps in solving our puzzle. In this respect, all research is driven by a curiosity and a desire to find true and useful information.

The qualitative approach, however, is not seeking scientific precision in the sense that mathematical and other procedures are a central part of analysis. It can be better compared with the modes of inquiry used by a detective piecing together clues, an investigative journalist tracing a story, or a novelist or playwright looking at creating a scene by trying to see it from the perspectives of the various characters. The analysis proceeds through an ongoing testing, adapting and discarding of what might be called mini, flexible and short-term hypotheses. For example, 'I think that this is the case, I'll watch, ask questions, get more information to see if this is worth following further'. In pursuing questions of this type, our anticipatory theory about the research shifts and the analysis keeps reminding us of how vague our initial thoughts were. In the end, analysis serves the purpose of explanation and interpretation which, as Neuman (1993, p. 414) suggests, 'are close to the concrete data ... rich in detail, sensitive to context, and capable of showing the complex processes or sequences of social life'. Here, Neuman says that the explanations we produce in qualitative research will be divided into two categories—those which suggest that something is 'highly unlikely' and those which argue that something is 'plausible'. As the research is not about generalisations across populations, making such statements from particular cases is the best that can be done. What qualitative research can do is to bring much more detail about a case than other research methods.

One final word before proceeding to the processes of the analysis itself. In doing qualitative research we encounter and record information that covers all of the forms of knowledge discussed in chapter 2—personal experience, common sense, authority, tradition and theory. The researcher has to arrive at a theoretical interpretation, if plausible and believable explanations are to be proposed. You will find, as an example, that a style of management or teaching is highly unlikely to (or plausibly can) meet the expected outcomes in the case you are presenting. Your should then show the theories and concepts you have based your explanation on. If not, you run the risk that your research will either be seen as your opinion, or that those you are trying to convince of the logic of your analysis will read what you have found back into their own commonsense assumptions. When either of these situations results, the research intention is not advanced. In closing this section, an analysis for qualitative has to differ from quantitative research, because the logic of the two design processes differs. Quantitative research seeks broad generalisations; the coding of the data is a part of the process of how the research instrument is designed before data are collected as is the method of analysis. How analysis is to be done is built into the research design. Qualitative is not about broad generalisations. The coding and analysis of data is ongoing throughout the research process and changes to adapt to the research situation.

What will influence your analysis?

Analysis is time consuming and can be either an exhilarating or a frustrating part of research. However, it will usually take twice as much time to collect data as it will to analyse it. Time, therefore, is of the essence. In the analysis of a project, you will need time that is often not taken into account when the research began. This is the time needed to understand what is happening and to interview people you didn't consider in your design, as well as the time needed to reflect, read and write drafts of your finished product. Research time is always limited. All researchers have files that they would analyse further and write up if they had the time. Having the time not just to do the actual data gathering, but to reflect on what you are finding, will be the biggest factor that will influence your analysis— limited reflection means limited analysis. For these reasons, it is best to over than under estimate the time you have available and to adjust what can actually be done within that time. The purpose that the research is serving is a second factor that will influence analysis. Before beginning, ask yourself some questions. Why am I undertaking the study? Who is it for? What can I expect of myself? What do the people or organisation requesting the research see as the purpose of what I am to do? If the purpose becomes too cloudy then so too will the analysis, which will again impact on the time needed to complete the research. The fit between time and purpose can, however, become too tight and lead to what Rist (1980) terms a 'blitzkreig ethnography'. Blitzkreig is a German word literally meaning 'lightning war'. Rist used the term blitzkreig ethnography to describe suspect qualitative research done in education. The process is one where researchers moved into schools and did a quick number of interviews. These, sometimes one-off interviews were just as quickly written up research which, while they had only scratched the surface of the issue, were made to appear to have in-depth grounding in the cultures and meaning systems of schools. Purpose and time can be brought together in this manner and the purpose suffers. It can be compared to situations where journalists in newspapers who, when short on available news, do the round of their contacts for something interesting. Having found something, they then 'beat it up' into a plausible story. A blitzkreig, or research that is done too quickly to meet pressing problems of meeting a purpose within time limits, is easy to identify. As in the example from journalism, the product is usually superficial and does not hold up under critical examination. Life being as it is though, qualitative data will often have to be gathered so that a feel for what is happening can be gauged. As such, analysis of this data could serve a purpose (especially within tight time frames), but the extent to which the data can be trusted in the long term has to be stated.

There is one factor, although not often raised, that will influence the analysis of both qualitative and quantitative data—the fact that research can go wrong, we can be led up blind alleys and in some cases we have to start again. For this reason, you should employ the assistance of an advisor when you do research and, where possible,

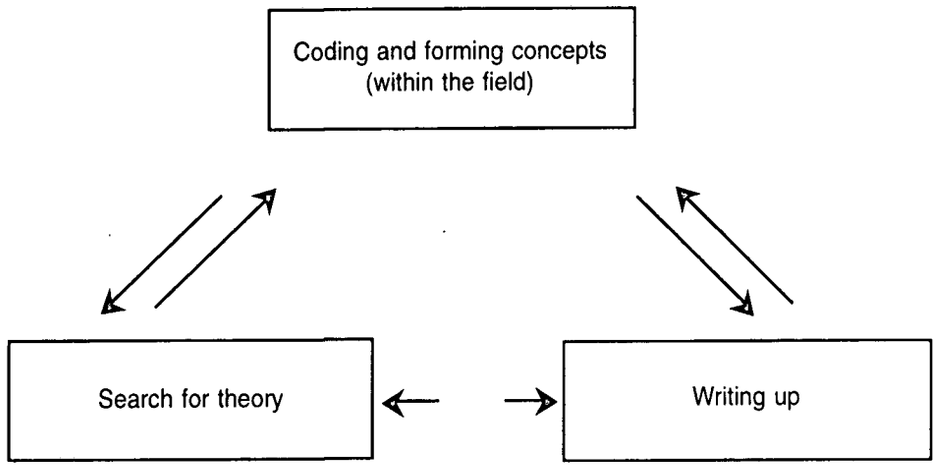
do initial projects with someone else with some experience in research. Any major problems can then be anticipated and remedied. Making mistakes is a part of the research process and often our mistakes only become apparent to us when we analyse what we are finding. If possible, form a group of some type that can be used as a sounding board and that can offer friendly but critical advice as the analysis proceeds.

The process of analysis as it is or should be

To this point we have discussed the nature of qualitative data analysis. In summary, the main aspects are that it is ongoing and analysis is done at all stages of the research process. Analysis is complex in a way that makes it differ from quantitative research, because the manner in which the analysis will proceed is not initially built into the research design. The intention of analysis is to piece together cases that are built on perceptions of people within the situation. The process is one of interpretation that links plausible explanations with some theoretical concepts. Finally, due to constraints such as the time needed and purpose of the research, loss of direction and confusion at various points of analysis are a part of the process. As such, it is a sound idea to seek out a person or group who can assist and advise you, while you attempt to gain a feel for how analysis of qualitative research is done and to find a method of analysis that best fits your own style of research. The remainder of this chapter, while directed to these points, offers a starting base. A fuller coverage of the process of qualitative data analysis than the one contained in this chapter can be found in Neuman (1994), Kellehear (1993) and in Miles and Huberman (1984). All are highly recommended and are drawn on in what follows. Within all of this advice for new players (and older ones as well) is, however, an assumption that only some of the directions given may be taken in during reading. The finer points will only make some real and lasting sense during research and sometimes even after a piece of research has been completed.

Miles and Huberman (1984) devote their entire book of over 250 pages to qualitative data analysis in an attempt to cover all possible scenarios faced by researchers. They outline twelve steps for analysis in chapter 7. Here, they argue that these steps should be incorporated at various stages of the research process, beginning with research design and ending with drawing conclusions and verifying what has been found. Their book also contains a number of diagrams that might be useful for presenting aspects of analysis. The scope covered is too broad and involved to be described here in full. Instead, I will condense and adapt their steps for analysis into three phases. The phases includes when we are in the field, when we search for theory and during the writing up and explanation of our case. There is much overlap between the three phases. They tend to develop this way as the research progresses. Most of the in-field time is spent on coding and forming concepts. Once the concepts are formed, there is usually some public opinion and some theory about how the issues within

our case should be viewed. Our task, then, is to apply a measure such as the 'highly unlikely and plausible' categories raised by Neuman and mentioned earlier, to see the extent to which the explanations in our case are consistent with and vary from public opinion and theory. What we find from our first two phases of analysis informs what we write in our formal presentation. Most importantly, it will determine to a great degree how we structure our final report, what data we will include and what parts of our research will be most strongly emphasised. These three inter-related phases are shown in the diagram below.



This diagram shows what we will take to be the three strategies followed in the analysis of qualitative data. Strategies are plans devised to achieve an objective. Tactics are manoeuvres made to advance our plans. Miles and Huberman (1994, p.215) say that a data analysis strategy is one that provides a systematic approach to finding meaning' and tactics are 'the ways of drawing and verifying conclusions that the analyst employs during the process'. Some tactics that can be employed to ensure success in each of these strategic phases of analysis are outlined in the next three sections. Illustrations and examples are drawn mainly from research I have done on the restructuring of TAFE colleges in Queensland. Our three strategies are at the head of the columns in the box below and the tactics employed in each part of analysis are listed below them.

Codes and concepts (within the field)	**Theory**	**Writing**
Counting Patterns Themes	Themes Components Reading Plausible Unlikely	Why this topic? The research setting Field notes People and events Themes Writing
Relationships typical atypical		
Explanations plausible unlikely		

Coding and forming concepts within the field

Coding is one of the first tasks that has to be done once a researcher is in the field situation and it is not always easy to begin this task. A good point to start at is once some information has been gathered—perhaps after some initial interviews, observations and other types of fact-finding such as when written materials have been collected. Codes are categories that we build up to retrieve and classify information as we sift through our data. Much of the early part of research is dedicated to getting our coding straight and checking with those in the research situation as to how correct we have been. As we code we often find inconsistencies in our research question. American researchers Spradley and McCurdy (1972) have pointed to this aspect of coding in their study of how police interacted with 'derelicts' who slept in parks. In their interviews they found that the people described as 'derelicts' by police and as alcoholics by health workers, referred to themselves as 'tramps'. When posing a further question about what tramps do in their daily lives, they were surprised in that fifteen kinds of tramps were categorised—all descriptions related to how travel, food, accommodation and money were found. More research of this type led to more coding and categorisation and a study of the cultural experience of urban tramps. Imagine that you have no knowledge of the TAFE system and you wanted to do some research on teachers and students—the list would take some compiling. It would require reference to handbooks, interviews with staff and students and mean puzzling about differences between apprentices, associate diploma, access, fee-for-service, etc. and the various categories within them—e.g. block-release bricklayers, day-release hairdressers, trainees who work and study, high school students who attend colleges and so on. Coding can be done initially then for clarification purposes and through asking naive questions, reading documents and going through research notes. When coding this way, try to find a method that suits you. Some researchers use a highlighter pen and mark their notes, or circle terms and definitions that might be useful for coding. Other people use a card system which is helpful as cards can be sorted and resorted and moved into different piles as categories are arranged and rearranged. At this point, having spent so much time developing a coding system, you should ensure that copies are made of what has been done. I once had a carry bag stolen which contained the only copies of my masters' thesis and all of my codes and categories. Either photocopy notes or type your coding to disk—make sure your notes are safe!

Counting for codes

'Who are all of the people involved here? What do they do? How does all of this link together?'. These are the types of questions that coding and categorising help us to simplify in the early stages of data gathering. The types of coding we have talked about this far have dealt with words and phrases. We can often add to what we are piecing together by organising some numerical data into categories and codes. This will be a central part of an observational study or one that uses unobtrusive measures. We are, however, often observing in an unobtrusive manner as we go about our research, so it is a good

idea to bring these aspects into our analysis. Time and space, as we have said elsewhere, are strong organisers and structure much of what is done in everyday life. However, these factors are so often ingrained into our activities that they tend to become invisible unless we take the effort to consider them. Things that could be counted and coded are timetabling, hours that students are in class, how many do part-time work, subjects offered, hours that teachers work, ratio of part- to full-time, number of staff to students and staff to management. Budgets, resources, how often equipment is used, and by whom at what times of the day, are all things that can be measured and can add to an understanding of what is going on.

Counting and coding in this manner is especially helpful if you are researching in a situation with which you are familiar. Other factors to take note of are seating arrangements and other uses of space. Who sits where in staffrooms, classrooms, meetings and in breaks shows patterns of interaction, as does looking at who does not take up space. For example, recording patterns about which staff members don't go or rarely go to the staffroom, which students attend regularly and irregularly, who attends meetings and who volunteers or declines to be on committees, projects and task forces can bring a pattern and order to our analysis. Often when we conduct interviews we do so in one part of the physical space of the institution or situation that provides the context for the case we are trying to explain. Some time then, can be taken to gain an overview of the physical dimensions of our research setting. Consider here, doing drawings or locating plans of the site showing boundaries, buildings, recreation and other areas— also bring in some sort of list of people and positions to link the two. How do people refer to buildings, campuses and other areas; as 'A Block', 'admin', 'the basement' or 'the penthouse', with some pride or as derogatory terms? Where we work some of our staff are housed in a white transportable building known in our circle and with our students as 'the chook shed'. In New South Wales TAFE, the old central office building was called 'cockroach castle'. The names given to buildings, sections and different parts of an organisation offer a good means for uncovering meanings through the coding of spatial information. A clearer picture emerges when we begin to cross-tabulate with other categories found through the other means for coding discussed this far. It may be cases where, for example, in finding out why some staff don't use the staffroom and refuse to join committees and others do, that there are underlying patterns and themes that can be located through collecting more data and further analysis. In this case, the analysis and the research moves to another stage in which patterns and themes emerge.

Finding patterns and themes

The location of patterns and themes from numerical information, observations and interviews involves the collection of enough data to allow us to begin to form concepts. A concept, as used here, will be defined as a word or a phrase that is employed to make sense of what was, is, or might be happening to ourselves and others. In this sense the word *ageing* is a concept, as is the phrase *we are all getting older*. In

our context, *the national training agenda, competition, CBT, fee-for-service, management* are all concepts that are related to what is occurring in vocational education and training. However, these and other concepts do not stand alone, nor do they mean the same thing to all those involved in education and training. It is in discovering the various clustering of concepts and the meanings that different groups place on them that we can see themes emerge in analysis. To make this clearer, I will provide an example and then suggest how you can create concepts and follow themes in the analysis of your own research.

During 1992 and 1993 I undertook a study of the restructuring of Queensland TAFE colleges. The research question was: 'how is new policy being viewed and received by those in colleges?'. Interviewing and observation were done in a number of Queensland colleges, as well as more limited research in colleges in other States. Queensland differed in their restructure from other States (apart from South Australia) in that, in the terms of the new award, all senior positions above teacher were abolished and ex-senior staff were to return to teaching. One management line of associate director (or 'AD') replaced previous management positions and it was said that teachers would absorb the tasks done by the previous seniors. Teachers forming into semi-autonomous work teams led to 'teaming' becoming a new concept in college organisation. As well, many colleges accepted a 'matrix model', one in which all teams reported a different AD for different functions. For example, the teams dealt with the studies AD for matters related to curriculum, the administration and finance AD for matters about enrolments and budgets, and so on. Understandably, transition took some adjusting to as teachers were not used to working in teams and ADs had little or no experience either in managing in flat structures or in co-ordinating teams, especially across a matrix organisation model. In this transition three concepts—*teaching, management* and *administration*—became problematic and led to themes of conflict over what teaming meant, confusion over who had to do what and of placing of blame on others. An example taken from the report (Funnell 1994) follows; quotes are in italics.

> . . . ADs often sought a management model when explaining their mode of working with teams as creating situations— in which teams made decisions about incidental duties and took responsibility for them—with their job being one of facilitation. For example:
>
> *. . . Management is now an activity, to be done by teams, it (management) is not a class of people. Teaming will bring out latent management skills of teachers. There is still a lot of talk about 'them and they' making us change. Teams still have a lot of things to learn, they (teachers) have to learn to take responsibility . . .*
> HRM AD
>
> *. . . So, they whinge a fair bit and some of them have got a lot of preparation to do, some of them are still grappling . . . a lot of it's*

blown out of proportion. They get very anxious over things before they actually arrive . . . CBT, RPL, all these types of things. 'Oh shit another change', you know, and they get real worried about it without dealing with it as it comes and I think that's part of the problem. And when people say we'd like to do a bit more planning, it starts all over again. All we're trying to do is formalise a lot of what they're already doing, but they don't see it that way. They see more, more, more all the time. We're just trying to tidy up the loose ends. . .
Finance and Admin AD

When time is pressing and different duties have to be done, there is often an observation made that 'the teaching seems to sink to the bottom in many ways'. The following views expressed by members of one technology team, while not indicative of teams as a whole, echo something of a general feeling of the extent to which management and administration impinge on teaching.

. . . We thought this award was supposed to be able to keep teachers teaching but it's not. Where's the guy that doesn't want to be the senior teacher? He wants to be in the classroom in front of the students. He's had years and years of experience and he's great at it and he's good there. But he doesn't get the pay rise because he hasn't gone to senior teacher level, so they said OK, let's change the award so that this guy can still be recognised . . . but leave him in the classroom. But that's bullshit. It hasn't happened . . .

. . . That's the whole point though. It comes down to saying one thing or the other. You're either a teacher or a manager. You can't do both. You can't do both successfully. But they want you to be both and be a clerk at the same time. But that's what they're trying to push on us now. What they're saying now I feel is that they're going to say, no we don't want you to do both. We want you to put on tutors and demonstrators and you're going to be managers. That's what they're saying . . .

There is often a conceptual split between managers and teams —the above views on administration and management seen by teachers as 'a mutual admiration between bean counters' that trivialises teaching. Management can view teachers as being so immersed in the everyday, that they cannot see an overarching logic which, if adopted, would make what is now confusing much more straightforward. Teams will most often consider management so immersed in their own world that they are blind to the realities of teaching. Even now, when some teams are organising their affairs to varying degrees, the impact of management and teaching on the administration of the college—the 'tying up of loose ends'—forces increased load on the administration sections. Each of these groups feels that their decisions are being countermanded by others and that delegation is so top down that it is futile to act on locally made decisions . . .

The point that keeps coming up in the use of the themes and concepts found in this research is that there will be explanations within explanations. As such, we find that we have to dig a bit deeper to find out how other concepts and themes interact with the ones we are dealing with. Hinted at in the above excerpt are those of curriculum issues, CBT and RPL; not seen and needing more emphasis is the fact that ADs have to deal with matters external to the college as well as 'work with teams'. In this research, the theme of 'teaching versus management and administration' was a strong and relevant theme, but it has to be seen in comparison with other themes in which, for example, the opposite might be the case. At this point, we should consider how concepts are formed and how themes can be identified by identifying what is typical and what is not typical in the case we are trying to analyse.

Typical and atypical relationships

When we locate concepts that are used by others to make sense of some aspect of a situation, we can start to identify themes by going over our field notes and looking at the different meanings held about them and then at the resulting interactions between people and groups over a period of time. Themes begin to be identified through observing the interactions, noting discussions and interviewing. By this time—if you have the time—you can start to develop a theory of sorts about relationships. In the example of my research on restructuring, the new award, flatter management structure, working in a matrix model, all meant that management, administration and teaching staff all had a new, and often troublesome relationship, with their jobs, with each other and with the TAFE system. I did have a number of means for determining the extent to which this was typical and atypical. There were comparisons that could be made from my field notes on colleges in Victoria and institutes in New South Wales where the colleges were still organised into schools and where heads of school and senior teachers were still a part of the organisational structure. As well, I had notes on colleges in South Australia where a similar transition had been made to self-managed teaming. To this extent, the question of what is typical and what is not can be isolated by working on multiple sites—your research design could be set up to include more than one setting. This is not always possible or desirable, in that the amount of data to gather and analyse escalates—and it is time consuming. Perhaps a good approach is to look for the typical and the atypical in the actual case. When you have what appears to be a promising theme, look for examples of where the theme does not apply, or applies in some examples and not in others.

What is plausible and what is unlikely?

As we said earlier, our analysis has to isolate the plausible as well as the highly unlikely, in order to understand the dynamics of the case we are investigating. This phase of analysis—which might be termed plausibility (from different points of view)—is the stepping stone used to develop theories or stories that are acceptable to those in the situation. Our power over our analysis is greatest when we can assemble our data to show conditions and relationships that are most likely to produce themes and those in which they are not likely to occur. What we do here sets the analysis up so as to become the basis

for situating our case in wider theory and the framework for the structure of what we finally write in our report. When we isolate some concepts, there can be a tendency for us to assume that they apply evenly across the research situation, but if our analysis is to be thorough, we have to accept that this is unlikely to be true. In the research I have been describing, it would have been plausible to argue that 'teaming' was not being 'a success' in its implementation. There were situations in which teams were said to be functioning very well. The conditions in which this was the case had to be located and contrasted with those in which it was not so. Teaming was initially plausible for a number of reasons. In terms of micro-economic reform, cutting line management (senior teachers) expanded the numbers of available teachers, resulting in an increase in productivity —the number of student contact hours (SCHs) could be increased. Teaming could also be the basis for more industrial democracy, the chance for teachers to decide what should be done and to take on more responsibility. For directors and associate directors, teaming was a possible challenge and an opportunity to bring in and master new management skills. It would follow then, that it is most plausible that teaming will succeed in conditions where SCH requirements can be met, where teams share and divide responsibility and where the relationships with management are supportive. This is true, but only up to a point. The table below depicts the range of intermediatory and overarching factors that make it difficult to come up with one clear explanation of what factors influence the processes of teaming. The bottom right hand corner of the diagram shows a continuum listing teams as being—successful, autonomous, in-progress, complicit, fragmented, undirected, operating in pre-award mode, unco-operative and recalcitrant. Factors that influence this outcome relate to the possible type of team that is formed, the structure, organisation and financial situation of the college and the dynamics within the team itself and the relationship it has with other staff. Thus we can attempt some forms of hypotheses about where teaming is or is not likely to succeed—by reference to our notes, to the codes and categories we have been developing. In this way, we test the extent that our concepts hold, when, where, how and why.

Given what we know this far, we can say that if a team has programs is in growth industries, has strong industry links and is in a position and able to raise revenue, it might be successful. But this will depend on the existing dynamics. Some staff might be against teaming and come from a work background where authority structures are clear cut and where doing budgets and filling in paperwork is not the norm. From our own research, we can provide examples. They can be generalised only so far. But, the clustering of factors, as in the diagram shown above, can show the extent to which this applies to other situations. Others can draw from this information and use it in their situations to help understand the problem in general. Given these conditions, others can challenge our analysis and tell us where they think we are wrong or misguided. Our diagram of team factors influencing teaming above could, in this case, be taken a few steps further by applying all of the factors in the 'Dynamics' section to each

Factors influencing the processes of teaming and some outcomes

Types of teams	**The college**
Teams within teams	Multi-campus
Service teams, e.g.	Location
– communication	Metro-inner suburbs
– computing	Outer suburbs
Curriculum specific teams, e.g.	Country/large/small/inland/coastal
– hairdressing	Greenfield site
– metal fabrication	Place in market and industry
Program teams, e.g.	Growth industries
– Assoc. diploma	Industry links
– literacy	Fee-for-service
Administration	Position and ability to raise revenue—federal funds
– 'office'	
– ed. assistants	**and related**
Library	Ability to 'buy' team co-ordination and administration time
Commercial services	Financial situation—debt, surplus
	Cost of delivery of offerings—paper, pen, computer—versus traditional apprenticeship base
Dynamics	
Ex-senior staff in team	**Some outcomes**
Mix of teachers, e.g.	Successful
– experienced	Autonomous
– traditional	In progress
– beginning	Complicit
– part-time	Fragmented
– contract	Undirected
Relations with AD	Operating in pre-award mode
Size of team	Unco-operative
Previous work background	Recalcitrant
Recent work experience	
Place in school/college 'pecking order'	
Role taken by AD	
Time allowed for team admin.	
Principal teacher(s)	
Size of 'safety net'	

of the team outcomes. If a team was considered successful, certain questions about dynamics could be posed. I could ask, for instance, what size was the team? What was the mix of staff within the team and in which occupational area did they work before entering teaching? I would then pose these questions about dynamics by analysing each of the other team outcomes in my list, using tables such as those which follow. The following table shows how I would isolate factors which would give some plausible reasons about why a team was successful—using a theme of team dynamics.

Team dynamics	'Successful' teams
Ex-senior staff in team	
Mix of teachers, e.g. – experienced – traditional – beginning – part-time – contract	*Data about teams is placed in this column so that 'successful' teams can be identified*
Relations with AD	
Size of team	
Previous work background	
Recent work experience	
Place in school/college 'pecking order'	
Role taken by AD	
Time allowed for team admin.	
Principal teacher(s)	
Size of 'safety net'	

Having done this, the task would be to give plausible reasons from team dynamics as to why other teams were still, for example, operating in a pre-award mode—why were some teams continuing to keep a so-called previous order alive? Having equated team dynamics with outcome, we could argue that it is unlikely that a team with certain interactions would commit themselves to the new concept of teaming, while teams with another set of dynamics would plausibly 'make a go of it'. Analysis would not stop here. Other factors influence the plausibility and likelihood of a new process such as teaming working smoothly. In my case, I then did the same process, as I have just described to factors relating to type of team and type of college with outcomes. In terms of analysis in general, this means drawing up more tables as shown in the example above. Finally we would end up with a large chart, on a large piece of paper (A3 or butcher's paper), on which the influences of type of team and college and team dynamics could be plotted. From this, we could start to show the conditions in which teaming would plausibly be likely to flourish and conditions in which it would be unlikely to take hold. The diagram drawn below shows how this large table might begin to take shape. Once we have shown what is plausible and what is unlikely (which is a form of hypothesis), then we can test its validity by drawing on particular cases, particularly ones in which our explanation does not hold. It is important to attempt to locate such instances, look more closely into reasons why they are occurring, and report them in your final writing up of the study. It is through isolating what is plausible and what is unlikely and then noting cases that vary from the norm, that the dynamics of change might be found.

Outcome/ concept	Type of team	The college	Team dynamics
Successful			
Autonomous			
In progress			
Complicit	*Information added from fieldnotes to fill in detail that will provide overall detail*		
Fragmented			
Undirected			
In pre-award mode			
Unco-operative			
Recalcitrant			

Conclusion this far

Some approaches to coding and the forming of concepts have been covered in this section. Reading back through the advice that has been advanced by others and myself prompted a memory of seeing successful swimmers from a large meeting watching themselves swimming in their races earlier in the day, as they were being interviewed in a television studio. The comments were that 'it looks so easy watching but it was so hard while we were swimming'. Doing research might not compete with swimming in terms of physical exhaustion, but reading what might seem to be a neat step-by-step walk through the process camouflages the traps, false starts and feelings that a solution will not be found that are part of the game of research analysis. Coding, developing themes and concepts takes time. Many pieces of paper with diagrams, lists, charts and other scratchings are made and altered and re-altered, as we work to make some meaning appear. In this phase of research it is analysing our data, gathering it, finding more information and finally going back over what we have done at least two or three times, that takes time and effort. When our analysis of the data reaches a stage where we are confident that it holds some plausibility, it is time to search for some theoretical spaces in which it might fit and some where it has little or no place. A new section is needed for this point.

Search for theory

There has been a lot of argument in field research about the approach that should be taken to theory. Some people take a view that field research should be theory free; the strength of what is being found should be in the description and analysis of the data. From this perspective, theory can impose a meaning on the case that is not there. This is a valid complaint. Conversely, as researchers we can neither do 'theory free' studies nor can we produce accounts that are beyond some form of theory. All that we do in research is filtered through a lens—our own predispositions and the theory that is

implicit in our research questions. Qualitative and other forms of research grasp only so much of the world and the observations we make of it are selective. Theory helps to sharpen the focus of what we see and record. We said in chapter 7 that qualitative research is concerned with multiple realities and that participant observation was a method that helped us gather some of these realities into a manageable explanation. The search for theory in qualitative research should be seen as an extended form of participant observation—done by asking questions of key informants who aren't in our research situation. In the location of theory, we are in fact only going to someone of authority and asking their opinion about how we should or might better understand what we have found. In the case of research, we are doing this more often than not by reading rather than through face-to-face contact. This is not unlike very different situations in our own lives when we reach a point where we are looking for clarification. A mother with her first newly born child will observe the child's sleeping and eating patterns for a period of time and then will go to experts who care for babies. These can be friends, their own mothers and other mothers, staff at clinics and a variety of popular books on babies about how they should eat and sleep. In all of these instances, the mother will describe the case as she sees it for her baby and check this against what others say about cases with which they are familiar. Some of these 'theories' will be tried out and accepted and others will be seen as having little or no relevance to her baby. The consultation with these experts in the field confirms which part of the wider theory applies most in her case. At many stages of the analysis of qualitative research, but particularly the latter stages, we consult with the theories that might clarify our case further than we have in the analysis of our data. Particular caution has to be taken to ensure that these people don't take over, that they don't become too bossy, take us on a tangent that has nothing to do with our case and talk so loudly that they drown out the voices of the people and events that we are describing. Seeking theory then, is merely asking experts for their opinion—only about our case—and then taking what is most useful to clarify and place a sharper analytical focus on the case, thus making it more useful to a wider audience who might read what we have done. If we are to keep an upper hand in our dealings with theory, we have to be prepared with the questions that we want answered, in order to make our consultation relevant.

Themes, components and reading

As in any interview that is held towards the end of a research process, we should have a good idea about what we are going to ask, because we want final clarification. For this reason, I would suggest that you separate components and related themes out of your research and relate them to different theories that are being used to explain the phenomena in which you are interested. The components and themes I have chosen are shown below.

Components	Themes
The training agenda	Change
Award restructure	Teaching vs administration and management
Micro-economic reform	Role of associate directors
College restructures	College structure and its relation to conflict and stress
Head office restructures	The processes of teaming
Differences between States	New roles for administration sections and staff in them
Self-managed teaming	Decentralisation and devolution
Competition	

In trying to make sense of these components and themes beyond the data I had collected, I had to read in some areas with which I only had little knowledge before I began the research—economics, teaming and management theories. I also read in areas that are a part of my own training—the sociology of organisations, culture theory and theory dealing with occupational change and biography. This is not to suggest that reading should be this broad. Rather, there will be components and themes that will take us beyond the theory that we are comfortable with, but we should stay in touch with familiar theory when it serves the purpose at hand. The reason that my reading took such a broad turn was because not many staff in colleges were sure about the meaning of the components listed above—apart from the influences they were having on day-to-day teaching, administration and management. I had to 'talk' with experts in management and economics, through reading, as my task was to show how these components, as policies, were being viewed from within colleges. What reading does is to allow us to push and extend the plausibility of our case. In the case I have been discussing, for example, some policy will be implemented in certain conditions and is unlikely to be taken seriously in others. It is with the information gained from reading about how components and themes are dealt with in related theories, that we can show what is plausible and unlikely in the case we are dealing with. An example is needed here.

There is some theory presently being debated about credit transfer between secondary schools and the TAFE system. As a result of doing research, you might find that the enrolment procedures and organisation of some sections and program areas easily facilitate credit transfer. In other sections and programs they do not. Students are therefore disappointed that they will not be given the credit that they were promised when they did certain modules in Years 11 and 12 at high school. The analysis of your data will hopefully show the conditions in which it is plausible that transfer of credit will be granted and those in which it will be highly unlikely. In reading, you might find that there is some literature which deals with this aspect of credit transfer and other literature in which the themes in your case are not mentioned. Thus, the problems of credit transfer are unlikely to surface if one theory is at the basis of movements of students

between high schools and institutions that should provide advance credit. Where some theory acknowledges problems in implementation, it might not take the themes you have uncovered into account. This factor can then be highlighted as something that needs to be acknowledged in considering credit transfer in the future in your own situation and perhaps in further research.

Theory, when taken as a means for making your own research findings more plausible, need not be something that is abstract and removed from the process of doing research, but should be a necessary part of it. I should stress again that the approaches to analysis of data that are being discussed in this chapter are often most applicable when there is time available to reflect upon information collected. Also, qualitative research takes time. When time is short you will need to adapt your design and analysis to fit within the time available to you.

Writing up

A piece of research is not finished until it is 'written up' in some format. This could be as short as a presentation to a small group, a page in a newsletter or a short report to a steering committee or to an ITAB. Alternatively, you may write longer reports about your fieldwork. The writing up of a research project provides some form of closure, a feeling that the process has been completed. In that the analysis of qualitative research is ongoing, so too should be the writing up of some feature of the research in progress. However, this is most often easier said than done. As James Spradley (1980, p.160) says, every researcher 'begins the task of writing a cultural description with the feeling that it is too early to start'. In a short appendix to his book on participant observation, Spradley (1980, pp.180–2) outlines some 'developmental research sequence writing tasks' These are short pieces that can be written at various stages of research while they are still fresh in your mind and that can be used in the final document. Following Spradley, something could be written about: why the topic was chosen; about the research setting; the methods you began using; how they changed as the research progressed. Field notes can be the basis for describing people and events and for describing themes. The writing about different themes will also be the basis on which you organise writing the end report which is the final stage of analysis. Writing is also made simpler through what is called the creation of files.

Most researchers create files, but the manner in which this is done is often a reflection of the researcher's personal style. A large amount of written materials are gathered during fieldwork. Creating files makes this mass of information more manageable. A file can be a manila folder which is devoted to information about a particular theme, person, topic, or sequence of events. Your files will change as the research progresses and you should arrange and rearrange them as you organise the final drafts of your report, as your main files will become the information for each of the sections that you write. It is

often the names that we give to files that become the headings in our final document. There are a number of case studies and field reports that you can read to gain a feel for how field research is written up. A few are listed at the end of this chapter. Use them for guidance and not as examples that have to be followed in detail. Your own data and analysis of it will ultimately direct what you write, this is the end point in the analysis of data collected in fieldwork.

Conclusions

In this chapter we have shown how the analysis of qualitative data takes a form that is different to that taken in quantitative research designs. It has become apparent that a number of factors will influence analysis; the amount of time available, the extent to which the research design changes during the process of doing the research and the people you have the chance to interview and events that you experience during the course of your study. You will have seen that coding, forming concepts and locating patterns and themes is crucial to analysis. So too is the seeking to show what is plausible and what is unlikely to occur in different conditions that is uncovered during the research itself. Finally, this pattern of analysis extends from the research situation into a search for theory and also into the processes of writing. The types of analysis detailed in this chapter touch on the main approaches used by field researchers in general. The books listed below should be consulted when needed. There is, however, much more that can be said that is not included here. Finally, the approach to analysis has been presented in a personal style and has been directed at research that is only about some aspects of vocational education and training and not others. With more field research in vocational education more can be said about doing research within it. The writing of research reports is the topic that is dealt with in more detail in the next chapter.

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13 Reporting your research

Patricia Funnell

Purpose

Writing up your research report needs careful planning and preparation. From the outset, you must keep in mind your reasons for doing research and who will be exposed to your findings. Simply put, the written report is a statement about what you have found—the results of your investigation. As you start your 'writing up', you must keep in mind the following three factors.

The *purpose* of your report.
Are you trying to:

- simply *inform* a group of people about a situation or phenomenon previously unreported/uninvestigated or revisited at a later time or in a different place?
- *establish a relationship* with the target reader?
- *persuade* a person, group of people, to adopt your view on an issue?
- *get results or create action, perhaps even influence decision making,* possibly through convincing a funding body, industry group, department or union to take on board your findings and any possible recommendations?

Audience

The purpose is very much linked with *your audience.* You must consider who the target readership of your research findings will be, if your reader needs to have a background in the subject under review, including whether a special vocabulary or training is needed to comprehend your findings. Will your target reader know less than you about the general topic? Does your reader have time to read your report, think about it and return to it at leisure? Linked with this is whether the potential audience members will be motivated to read your report, or might they be compelled to read it for some extrinsic reason (like some teachers when marking assignments). Which of the following does your target audience belong to:

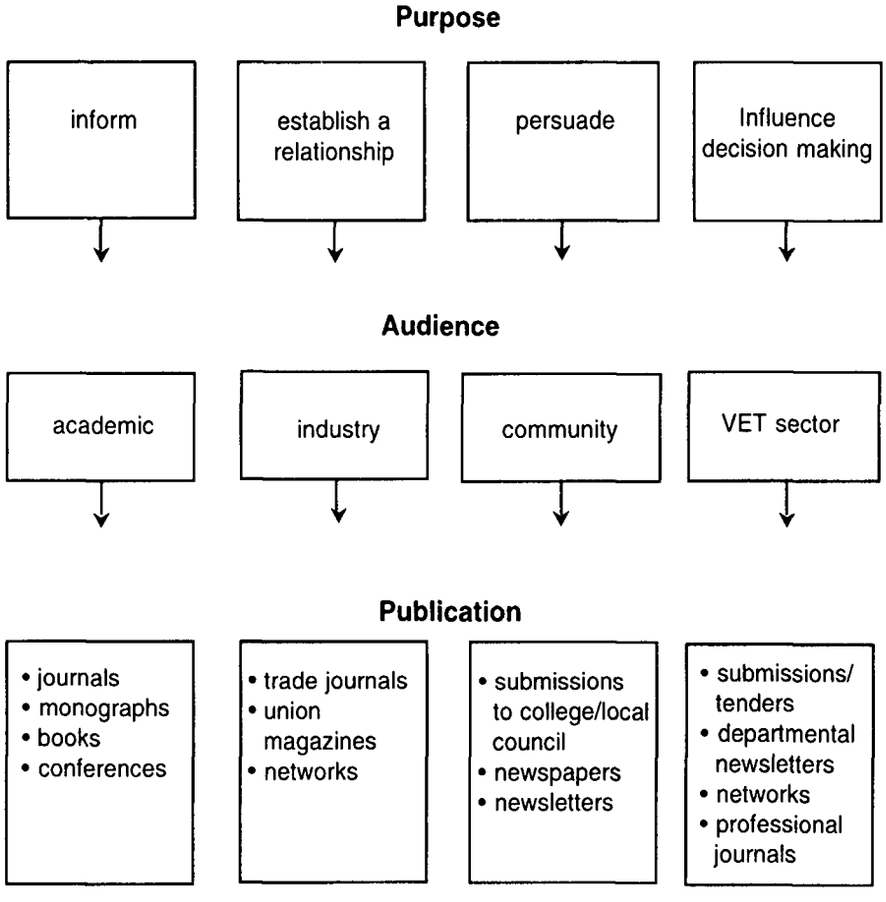
a *academic*—fellow researchers, students, teachers, etc.?
b *industry*—those working within your industry area, including those in decision-making positions?
c *community*—local college or wider community?
d *VET sector*—departmental or national decision-makers within the system, other teachers, members of professional associations?

Places for publication

Finally, *where you intend to publish* is inextricably linked with your target audience and will influence what and how you write. Do you therefore wish to publish:

- in academic forums, for example, in journals, monographs, books, at conferences?
- to industry groups, for example, in trade journals, union magazines, networks?
- within your local community via newspapers and newsletters?
- within the VET sector, perhaps to ITABS/consortia or DEET through submissions/tenders, in departmental newsletters, through established teacher/trainer networks or professional association journals?

In summary, the research writer must determine the outcome for each of three factors.



Apart from these three factors, however, before you start writing up your research, you should also consider such alternatives as the localised nature of the audience and the formality of the writing to be used. The tone of the report of your research will be affected by all of these factors, as will the length of the presentation.

In this chapter we shall focus on three particular forms of writing—a formal academic research report, a submission/tender and a newspaper report. These have been selected to represent the range of writing into which your research will normally be presented. Further information about possible publications and how to get your work published will be considered later in this chapter.

Writing a formal academic research report

The formal research report is probably the most daunting of the three examples described here. Where teachers/trainers will feel quite comfortable with writing submissions or newspaper/newsletter articles, the prospect of writing an academic paper can be positively frightening. Hence, a great deal of time will be devoted to this form of writing. Please note, however, that much of the information provided here is applicable to the other forms also.

Where to start

Writing is a painful process. It is fraught with frustration and makes us question our intellectual capacity to perform. Usually, however, once complete, the pain is forgotten and is replaced by pride for our product. How can we reduce the expected pain and angst? Some ideas are presented below.

1 Ideally the research report should be written as the research is being done. This is easier to do if you have been released from your normal duties in order to do the research project. Writing can be especially difficult when it is done on top of other workloads. Many of us who have done some form of study while we worked will know this to be the case.

2 Writing is by far the easiest part of research to put off to the last moment. You will probably be aware of the extent to which you procrastinate in completing writing tasks (amongst other things) and you should perhaps look closely at the pattern you already have in regards to deadlines when deciding where and when to start writing. Whatever advice is offered in this chapter, you will have to carry your own dispositions to deadlines as you start writing your own research. All writers fall on a continuum between disciplined, regular output and spasmodic, irregular and frantic meeting of deadlines. Be thankful if you are very organised and be ready for strain and tension if you are, like us, people who work to deadlines that are far too tight for comfort and sanity.

3 Try to start writing as soon as you can after beginning a research project. You could break the writing process into a series of tasks. It is helpful to do some writing as your research progresses, particularly if you are undertaking some type of field research. Apart from your field notes, start writing about your interpretations fairly early on. Writing three or four pages each

week about significant topics will simplify the final task, as many of these pieces will find their way into the final product. For field research, relevant topics could include: locating an informant; interviewing an informant; describing first impressions of the people and the situation; explaining difficulties in asking and analysing questions; and describing the situation in the terminology of people from different institutional subcultures. Throughout the writing of the report, be as organised as you can at all stages and don't be too hard on yourself if you fall behind deadlines.

4 Make sure you have it clear in your head what the research is about. Consider the problem, situation, object or event you are exploring in terms of whether you are trying to describe or define it, whether you are attempting to show causes or effects involved, if you are comparing (or contrasting) it with another, or evaluating it and in so doing, attempting to predict outcomes or put forward recommendations.

5 Read while you write. Visit the library and find other people's research and writing to give you ideas. Such reading will help you to select themes, or central messages, and a list of topics to give your writing direction. (Make sure you record bibliographic details when you take notes.) Writing up qualitative research is particularly difficult for someone new to academic writing. As you find themes and ideas to guide your writing, state them briefly on cards and keep them before you as you go. This will stop you meandering and help readers to grasp the meanings of what is being said.

6 Above all, see the writing through to the end, as this is the only way that others can become aware of what you have found and what you've got to say about it. An old saying is that 'research is not done if it has not been written up'. What is the point of the research if you do not tell others about it?

7 Keep in mind the relationship you are trying to develop with your reader and the language appropriate to that relationship. We have already discussed four purposes for writing: to inform, establish relationships, persuade and influence decision making. We normally think of these as being on a continuum from one point where we are seemingly objective—where description is provided in a fairly neutral way—to the other end of the scale where a strong argument is clearly articulated, where data is selectively presented, where counter-arguments are identified and convincingly dismissed. The term argument is used to describe your position or view on the problem, situation, object or event you have researched rather than a passionate or nasty fight. An argument in a formal piece of writing must be reasonable, be backed up with proof or evidence and should be presented in a logical way. If, from the outset, you write in a highly emotive (i.e. persuasive) way, you stand the chance of alienating the reader that you are trying to inform or who you are trying to bring around to your viewpoint. Not every reader will bring to the text a receptive

outlook. Often the key to successful argument is to present your research findings in a seemingly neutral fashion—adopting the tone that a newspaper reporter or scientist might use—and providing as much data (within reason) that will support your stance. Think of the contexts within which your findings are to be published—academic or professional journals, newsletters, newspapers, submissions/tenders, trade magazines. Highly emotive language does not usually work in the confines of these publications.

Given that your research is underway, the object now is to simply give you some hints and advice about how you might go about the task of writing up your formal research paper.

Planning the report

Why plan? Planning the report and its possible contents gives you a good picture of what should be included. Whilst all the best plans, like rules, were made to be broken, at least if you start out with a plan, you will reduce the chances of leaving out something that is desperately important. Plans help you to capture ideas before they are forgotten throughout the horrendous process of writing. Your plan should outline any major headings or topics that will be included in the report and will help you put sections into an appropriate order. Sub-sections or points can then be included in appropriate places.

Again, think about the purpose of your report, the intended audience and the publication. Most academic publications will produce a style guide for prospective contributors. If the publication you are aiming for does not produce this type of guide, spend some time trying to become familiar with the *type* of material presented and *how* this material is presented. Read survey reports, destination studies, ethnographies and participant observation studies to gain a feel for the way they are presented and written. In the absence of a prescriptive style guide, choose one which suits you as a model for sequencing and setting out. Most academic reports follow a fairly standardised structure. This will be dealt with in the next section.

Structuring your writing—getting the sections in order

If good writing was easy to do then everyone would be able to do it. Mostly, if not at all times, writing is a process of clarifying what initially seems to be opaque and unclear. In order to make what we have to say clear, we have to make sure that what we write 'tells a good story' and that our report has a logical order that a reader can follow. Each of the sections should lead to a conclusion that can be followed, and agreed or disagreed with by our readers. How might this be best attempted? In the advice that follows, we shall initially focus on academic writings—those that are formal and perhaps with a wide-scale audience—as these are sometimes the hardest to produce. The advice is sound for other forms of writing also, but variations for different publications and audiences will be discussed later.

Structure

Introduction

The introduction to your research report must clearly explain *what the research is and why it was undertaken*. While this seems to be straightforward enough, too often writers do not clearly let their readers know the significance and purpose of their reports. The *scope* of the report needs to be addressed here also, particularly if the research has been commissioned by another body and terms of reference have been provided. If this is the case, such terms should be included here. The introduction will therefore outline for the reader the bounds of your research so that they can clearly understand how much ground you will cover. A short explanation of the *background* to the situation under discussion can further inform readers. You could explain, for example, what events have taken place that have led to the current situation. Readers are very busy people. Get to the point of your research fast. Why is your report worth reading? If you can't tell them the *significance* of your research (and findings) in your introduction, chances are your reader will go no further. The introduction is also important as it acts as a tour *guide for the remainder of the report*. It should clearly signal what sections make up the whole and (briefly) what will be contained in each section. From the outset the readers should know where you plan to take them and the depth of coverage they can expect. If your research is quantitative by nature, you will normally have developed an hypothesis, or a number of hypotheses, that you set out to prove or disprove through your research. Make sure your hypothesis is clearly stated in the introduction.

Given the importance of your introduction then, you need to consider the most appropriate time to write it. For some writers, preparing the introduction first can help them to better organise their sections, as it acts as a type of plan to their writing. Others prefer to write their introduction last after the rest of the report has been drafted. In this way, the contents of the report have been completely (or near to completely) worked out and an introduction written last thing will clearly be a very accurate guide for what follows. You will have to determine for yourself the best time to prepare your introduction.

In summary, your introduction should explain:

- what the research is
- why the research was undertaken
- the hypothesis
- significance of the research
- scope of the report (terms of reference)
- relevant background information
- what the remaining sections of the report are and what each contains.

Body

The body of be your report also must be clearly structured. There are usually four sections that are included in the body—the methodology used in the research, the results, your analysis and a discussion. Use clear headings for each section and employ sub-headings where appropriate.

The *methodology* section of the body of your report must clearly outline how your investigations were carried out. You must explain how the information contained within your research was gathered. For example, if you collected survey data, you should outline: the contents of the questionnaire (the questionnaire itself should be contained in the report as an appendix); how the survey was developed; how the population sample and size were selected; where, when and by whom it was administered; the number of useable returns; problems encountered in the administration of the questionnaire; how the data collected was analysed, etc. Similar information needs to be provided for qualitative research, including a description of the selection of subject/site, the duration of fieldwork, etc. This section needs to be reasonably prescriptive. Readers need to know how you collected your data. They may use this as a measure for how reliable and valid your research is and will respond to your results accordingly. Any measures that you have taken to establish reliability and validity should be explained. For example, if you have undertaken a content analysis, the percentage of reliability between coders should be provided. There is little point in undertaking steps to ensure reliability if you do not explain these to readers—they may be too quick to disregard your findings in the absence of this information.

The next section of the body of the report will outline the *results*. Here, you should attempt to provide the results without any in-depth analysis. This section is the simple presentation of the data or 'facts'—interpretation will come later. Clearly, all the data you have collected cannot be reported here. You need to selectively present the information that will be of most relevance to your argument and to your reader.

Your *analysis* of the findings or results constitutes the third section of the body of the report. This can be where any argument you are proposing is won or lost. The analysis of the data is the interpretation of the significance of the material that your investigations unearthed. How can your results be explained? What do the results mean? For more detail on how to go about analysing your results, please refer back to chapter 11 (Quantitative data analysis) and chapter 12 (Analysis of qualitative field research).

The *discussion* is the fourth and final section of the body. This section probably constitutes the single most important part of your report, as it clearly outlines what you thought about it all. Here, you attempt to relate your study to the theory and to other studies. This is probably where you attempt to answer the 'so what?' question. What is worthwhile about your study? What does it contribute? Why should

people be interested in reading about your study? If you undertook quantitative research, how might the findings from your study be generalised to other situations or populations? (Remember that the aim of qualitative field research is not to generalise.) When presenting an argument it is in this section that you attempt to anticipate questions that the reader may have and try to provide reasonable (plausible) answers. If you are wishing to provide a strong argument, it is here that counter-arguments should effectively be quashed. Take care, however, to identify the 'facts' unearthed in your study and rely on these for your comments/opinions. If you cannot back up your argument with your findings, you will find that your argument will be dismissed here. Also, if you present your opinion as fact, you may also be dismissed.

In summary, the body of your research paper should explain:

- methodology
- results
- analysis
- discussion.

Conclusion

The conclusion of your report should quickly sum up your findings and whether your hypothesis (if one was presented) was or was not proven. The conclusion should not introduce any new information or ideas, but simply summarise or restate the major findings of the study. The conclusion should be simple and readable and merely reinforce what has been previously stated, drawing together ideas. It is a simple reflection on the research and the report itself.

As part of this section, it may be appropriate to provide recommendations. This is not usual practice within academic writing, but certainly is a feature within business reports and governmental reviews. Recommendations within this context suggest possible courses of action that may remedy some of the perceived problems outlined in earlier sections of the report. Such advice must be based on the researched evidence on hand. Recommendations should not be new to the reader, in that previous discussion within the report should have clearly signposted the need for such recommendations outlined at the end. It is a ridiculous situation where recommendations are contrived on the basis of a need to provide recommendations in the report. If solutions do not present themselves, do not fabricate them. Also, recommendations are provided in reports (often commissioned research) where those requesting the investigation are in the position to rectify the situation. Do not make recommendations to readers who are powerless to act on them. You may wish, however, to make forecasts for the future based on your findings.

End materials

There are often sections of the report after the conclusions. These include the bibliography or reference list, endnotes and appendices.

Bibliography/ reference list

It is normal practice to include a reference list or bibliography at the end of a written report. These acknowledge the use of other readings or research which have been of use to you in undertaking the research and in preparing the final report. Generally speaking, a reference list will provide details only of those publications used directly (or referred to) in the report, replacing the older practice of providing footnotes at the bottom of pages. The bibliography includes all the publications used in the preparation of the research and report, whether directly referred to or not. A little more detail about how to prepare and present the reference list/bibliography and how to reference material within the text will be dealt with later.

Endnotes

Providing footnotes on pages through the body of the report has very much fallen out of favour. References, as we have seen, are outlined in a list. Other footnotes that provide further explanatory information too bulky to include in the main text, are now provided as endnotes. These should be clearly numbered and placed together at the end of the report (before any appendices), or at the end of a chapter.

Appendices

Further important information that you would like to give the reader, that is even bulkier than that possible to provide as endnotes, is normally placed in appendices. Such items may include copies of questionnaires, charts or additional complex tables. Appendices should be clearly labelled, usually as Appendix A, Appendix B, etc. and each should have a title.

In summary, the conclusion of your research paper should explain:

- summary of your results and analysis
- recommendations (if appropriate)
- bibliography/reference list
- endnotes
- appendices.

Now that you should be clear about the contents of an academic report, let's consider the style within which such a report should be written.

On style

An important principle of style in writing up research is to use plain language wherever possible. Of course, the style adopted has much to do with the target audience and the publication you are writing for (most academic journals, for example, have some form of style guide or this can be gleaned from looking at sample articles). However, the biggest mistake of fledgling report writers tends to be in trying to write in an overly 'academic' style—attempting to adopt the tone that is perceived to be appropriate for academic writing. Fortunately (but unfortunately for those wishing to adopt such a style), academic writing has undergone considerable change over the last few years. It now tends to be far more readable and less condescending in tone

than in the past. Academic writers now assume that their readers share their level of intelligence (though they may be very busy or unfamiliar with some information) and tend to talk directly to their readers.

Sometimes writers feel intellectually inferior to their target readers and attempt to use words that they are unfamiliar with. Using vocabulary beyond what is within your natural sphere can appear contrived and you run the risk of using words out of context. It is best to stick with what you know. Sometimes it is possible, particularly in qualitative research, to use the actual words and terminologies of the informants of the study. This may make the study more readable (and enjoyable). It is always a good idea, however, to go back to the key informants and check the accuracy of your findings and how they are written and to ensure that the final version is told as those concerned see it and experience it.

Be careful of taking refuge in jargon. Technical terms are necessary and are important in explaining an analysis, but they should be used sparingly. When they are used, they should be defined if the reader is not likely to understand the terms.

Be prepared to commit yourself to an idea. Another mistake made by writers new to academic reports is to use the double negative. Examples of this are terms such as 'it is not unlikely' or 'they are not unfamiliar with'. Try to be more positive. Say instead 'it is likely' or 'they are familiar with'. Such expressions are easier to understand and demonstrate more of a commitment to an idea. The key tends to be to write as naturally (and as logically) as possible.

Another element of style which should be considered is whether to use first person ('I believe. . .') or third person ('the writer believes . . .') speech. There are different schools of thought on this one. If you use the first person the expression is a bit redundant—you are the writer, we would naturally take on what you present as your belief. The third person attribution appears these days to be rather contrived and a little 'olde worlde'. When else do we talk about ourselves in the third person? Hardly ever, this writer would suspect!. However, many report writing guides will still insist that writers adopt the third person—presumably it gives the report some air of authority. You should avoid such expressions as 'It is believed. . .', where no attribution is provided. This borders on the reliance on rumour or common hearsay as substantiation. Where possible, just make the statement impersonally and it will generally be accepted as your opinion anyway. Where attribution is unavoidable, it is probably best to write 'I believe. . ., rather than adopting the third person and its disadvantages. The simple truth is that you should always try to present formal reports as factual and unbiased, even if your aim is to persuade or to influence decision making.

In the text itself, try to use the active (rather than passive) voice. This means rather than writing such expressions as 'it was shown in the research that five of every seven students did not feel that they would complete the course', you should write 'this research has shown that

. . .'. Using the active voice means that you write about the person/thing that performs the action, followed by the active verb. (Putting the doer before the done). This will tend to give your report more authority and more of a sense of immediacy.

Make sure that you write consistently throughout your report. If you don't know whether to spell 'realise' with an 's' or a 'z', select one and stick with it. Most computer programs now have a spell-check function to eliminate most inconsistencies with spelling. However, you must also be consistent with other written features such as your use of expressions, use of tense (usual to adopt past tense), punctuation, abbreviations, etc. In this way, readers will soon become familiar with any nuances you have developed and find them less of an imposition as they progress through the report.

As suggested by Walsh (1986, pp.42–48), you should also try to keep sentences short. Overlong sentences, particularly if they contain technical language, are difficult to follow. Say things simply and, if necessary, break long, unwieldy sentences into two smaller sentences.

As you've probably read many times before, good paragraph construction is essential. As most report-writing books will tell you, each paragraph should explain one aspect of the topic only. It can help if you write a topic sentence first, even if only as a guide to your writing. Paragraphs should be cohesive, as this will aid the flow of the argument. It is essential that you have good links between paragraphs and between sections. This helps the reader through your report and gives the general feeling that your report flows. Cloake and Noad (1994, p.27) provide an excellent list of 'transition' words neatly categorised. Their classifications include showing addition (e.g. again, also, and, and then, next, further); cause and effect (e.g. as a result, hence, since, because, therefore); order or sequence (e.g. again, at that time, at the same time, earlier, finally, first, firstly, in the past, later, then, next); comparison or similarity (e.g. likewise, similarly, in the same way); contrast (e.g. although, yet, however, despite, otherwise, to/in contrast, whereas, on the other hand); emphasis or conclusion (e.g. finally, once again, to conclude, to sum up, in short); purpose (e.g. for this purpose, to this end, with this in mind); qualification (e.g. although, but, however, probably, possibly); a reminder or restatement (e.g. as stated, before, as the next section will show); and, spatial order (to the left, above, below, in the distance, opposite to, here, there). For further examples or clarification, please refer to publications by Patsy Cloake and Patricia Noad.

When preparing a manuscript for a book, monograph or journal, you should generally present your work word processed, double spaced and with pages numbered consecutively. Short direct quotations should be presented within the text, longer quotes (over three lines) should be indented, single spaced and do not require quotation marks. Always make sure that the attribution to the source is clearly identifiable.

Manuscripts should be error-free. Always proof-read very closely, and ask others to proof-read on your behalf. It always helps if you can finish a draft of your research report before its due date, so that you will be a little removed from the text and therefore make a better proof-reader yourself. You should check that your argument is clear, logical, convincing and easy for the reader to follow. Make sure that there are no gaps in your argument.

Some rules on style:

- make text readable
- adopt appropriate tone (try to avoid being too 'academic')
- explain technical terms (avoid jargon)
- use the active voice
- keep sentences relatively short
- make sure your prose is consistent
- eliminate spelling and grammatical errors
- write coherent paragraphs
- use transition/link words between paragraphs
- present your work neatly
- proof-read your work.

Dangers to avoid

There are many things you should avoid when writing up your research. The first of these is that you should not write like a tabloid journalist, selecting only the most sensational parts of the story and distorting their importance. Discerning readers soon recognise a 'beat up' and will most likely dismiss the entire research results as untrustworthy. Writers only create 'beat ups' when they don't think they have anything of any real importance to impart. Likewise, avoid exaggerating the importance of the results. You should generally avoid being selective to the point where you only report on results that support your position at the expense of other important and relevant data. In quantitative research, an hypothesis is generated and the investigation takes place in order to prove or disprove the hypothesis. It is no academic sin to be proven wrong. It is a bigger sin to try to disguise this fact.

It is also important to avoid making your report too bland. Do not avoid controversy if it does emerge—it is pointless to present only those results that are palatable if you are attempting to provide an honest assessment of a phenomena. Try to avoid letting the detail take over; for example, in writing up qualitative reports (particularly case studies) don't recount endless anecdotes that may not necessarily be interesting to the reader or suitably informative. Don't allow your report to be taken over by trivialities and irrelevancies. Be aware that you are competing with many other stimuli for your readers' attention—other reading material, family and work matters, recreational activities, etc.

Try not to be too repetitive, but be aware that sometimes repeating the same word or expression can be far preferable to using less-than-good alternatives. For example, how many different words can you find for 'research'? You could use a thesaurus, but words that are synonyms in one context are almost useless in another. For example, sometimes it is best to use the words 'research' and 'study' often in preference to words such as analysis, examination, experimentation, inquiry, investigation, exploration, which may have slightly different meanings and hence cause confusion within your report. The key here is generally to use simple, precise wording rather than anything too clever (which you may not fully understand yourself), or words that aren't quite right.

In summary, you should avoid:

- irrelevancies
- wordiness
- pomposity
- exaggeration
- sensationalising
- blandness.

There are also flaws in the logic of your argument that you should look out for. The following list has been adapted from the work of Cloake and Noad (1994, pp.20–21). They include:

- generalisations (applying your findings to the entire population—or a larger population than that under review)
- oversimplifications (for example, determining that a phenomena was caused by certain factors when there are clearly others that could have been responsible)
- presenting as 'fact' or truth things that might be contentious (for example, 'as one of the best colleges in the southern hemisphere')
- using absolutes (for example, 'female students always outperform their male counterparts in office studies classes')
- faulty analogy/comparison (where one compares one thing to another in order to better describe the first—the qualities of one situation or phenomena are implied to belonging to both)
- that which is illogical
- presenting abstract concepts as reality.

Between the draft and the final version—a checklist

After you have written the draft of your report, you should review your work.
Have you:

- used appropriate language/tone for the purpose, readers and publication?
- assumed your reader is intelligent?
- followed the style guide of the publication you are writing for?
- met any terms of reference?
- written an introduction that:
  - explains what the research is?
  - outlines why the research was undertaken?
  - clearly states an hypothesis (quantitative research only)?
  - explains the significance of the research?
  - limits the intended scope of the report (and terms of reference)?
  - provides relevant background information?
  - outlines the remaining sections of the report?
- written the body of the report so that it:
  - has sections for methodology, results, analysis and discussion?
  - uses headings and sub-headings?
  - uses clearly written paragraphs that contribute to the flow of the argument?
  - has links between sections?
  - follows the plan indicated in the introduction?
- used a conclusion that:
  - summarises the contents and the findings?
  - provides recommendations where required?
  - includes only those recommendations that are possible to implement?
- included clearly labelled appendices
- incorporated a reference list including all necessary bibliographic information?
- adopted appropriate style in using:
  - accurate quotations/citations?
  - appropriate grammar and expressions?
  - consistent (and accurate) spelling, abbreviations, capitalisation, punctuation?
  - clarity?
  - short sentences?
  - explanations for technical language?
  - active voice?
- presented a strong argument by eliminating:
  - opinions as facts?
  - contradictions/inconsistencies?
  - argument that is not convincing?
  - any gaps in the argument?
- in qualitative field research, returned to key informants to check the accuracy of your findings and told the final version as those concerned with it see it and experience it?

Referencing (Harvard)

As previously mentioned, it is important to recognise the important contributions that you have taken from other sources, particularly where their ideas or words have helped shape your thinking and hence your research. You should acknowledge the works of others if you directly quote their ideas, if you paraphrase or if your utilise any facts they have gathered (data). You do this for two reasons: to show

your appreciation through attribution and to avoid claims of plagiarism.

There are a number of systems in use to reference the works of others, but currently the most common system for documenting sources is the Harvard method. Under this system the references are (briefly) provided at the most appropriate place in the text (therefore eliminating the need for footnoting) and the full reference information is included in the Bibliography/list of references. Within the text, it is normal procedure to include the surname of the author followed, in brackets, by the year of publication. If you are using a direct quote, after the year of publication you would also include the page number from which that quotation was drawn. If you are referring to an entire theme or idea, only the writer's name and year of publication (in brackets) are required. In the reference list, the complete publication details of the work must be included. This usually means that for a book, the writer's name (usually surname first), year of publication (sometimes in brackets), title of the book (underlined or italicised), place of publication and the publisher of the book. For a journal article, the procedure is fairly similar—writer's name, year of publication, name of the article (use quotation marks around the title and only use a capital letter at the beginning of the title), then the name of the journal (underlined, like the title of a book), followed by volume number issue, then the page numbers over which the article runs. If there is no author, but an editor, list the editor but be clear to label as such.

There are many good texts around that explain the Harvard system. These books should be available in your library.

Next, we shall look at writing submissions and tenders.

Writing submissions and tenders

Increasingly those working within the vocational education and training sector will be involved in writing submissions and tenders. As State-based revenues diminish, funding will be allocated to public and private training providers on the basis of successful tendering. As we shall see, the relationship between research and writing submissions/tenders is twofold. Firstly, as is the most likely scenario for teachers and trainers, research will be used to strengthen claims for funding. Destination studies, for example, can be used to show funding bodies how successful a training provider has been in the past in terms of placing students in employment in order to justify future monies. Secondly, funding bodies also call for submissions from organisations (and individuals) to undertake funded research. Whilst this type of research has traditionally been the domain of tertiary institutions, those working within the VET sector will be increasingly called upon to take up these types of activities.

You or someone else in your institution has probably heard about funds available for particular projects. Such funds may be offered by ANTA, DEET, ITABs, consortia, community groups, private companies, etc. If you are interested, then you need to find out immediately what the scope of projects will encompass and find out more information about the criteria that will be used in selecting the successful bid(s). (It is often the case that you do not become aware of the existence of the funding until near the due date!) Ask the funding body to forward you any printed materials about the selection process, the criteria/guidelines they will employ and the range of projects to be considered. Upon receiving and considering such information, there are some questions you should consider before preparing a funding submission.

Is it worth preparing a submission?

The first question to be answered by those considering undertaking a funded activity is whether writing a submission or application is worth the effort. This is an important consideration, because there is a considerable opportunity cost involved in the effort required to write proposals and tender documents, with the quite definite possibility that not all submissions will be successful. Whether undertaking research as a means to an end (to strengthen a submission for funding) or as a funded activity on its own, the costs of undertaking research and preparing submissions must be considered. Someone is going to have to expend time and energy in preparing the paperwork, pricing up all of the costs, finding available personnel, facilities, etc.

Even when you think your chances of success in obtaining the funds are fairly slim, it is sometimes a good idea to 'throw your hat in the ring' anyway, just to gain the experience. Perhaps you need to learn more about writing successful submissions and the feedback you will receive from submitting something now will improve your skills in tendering in the future. By writing a submission now, is it possible that you might be increasing your chances for success next time? As with any form of research, much is learnt by going through the process for the first time. In making submissions and tenders, you not only show interest to the funding bodies, you will probably be well equipped to make a serious challenge when a project you are really interested in appears.

Should you write a submission and undertake an activity just because funds are available?

Another question arises concerning whether one should undertake specific activities simply because there are funds available to undertake them. An examination of the pluses and minuses of bidding for activities that have been defined by a funding agency is warranted before writing a submission. Answer the following questions before putting pen to paper:

- Will your organisation benefit in a substantial way by undertaking the activity if the submission is successful?
- What are the opportunity costs of undertaking this project, rather than some other activity?

- Can this activity be undertaken incurring only marginal costs because of the infrastructure that already exists, or will the cost be substantial?
- Is it possible to successfully complete the project within the funding body's time frame?
- Will your personnel benefit professionally or personally from being involved in such a project?
- Will your community benefit?
- Will the effectiveness of your institution be measured by their success in gaining external grants or monies?

Once a decision is made to make a submission for funds, the focus is on how to prepare the submission itself. In writing submissions, important aspects to consider are the guidelines themselves. While each funding body may have specific requirements peculiar to the project, most will have a fairly standardised set of questions of candidates for funding. These are now discussed.

What do funding bodies look for?

Funding bodies may either have specific projects in mind, or a general list of activities that they wish to see completed. The body for whom you are writing the submission will be concerned with (a) whether they need your services and (b) your credibility (Dineen 1993, p.44). You must establish a need for what you are proposing—not just that you've done it before or you're good at it—and that you have the background (educational and occupational), the motivation and the ability to do the job well.

The funding body will have a number of questions that they want answered from your submission, as suggested in the list below, adapted from Dineen (1993, p.44). They might have the following questions in mind when they read your submission:

1 Does what you are proposing fit in with what we need?
2 Have you convinced us that what you propose will work and be achieved?
3 How do you plan to do it, and what assistance do you need from us?
4 How much will it cost and why this amount?
5 Have you convinced us that you can do what you say?
   (a) what is your experience?
   (b) who will assist you?
   (c) what is your track record in the area?
6 How do you propose to spend any finances?
7 How will you tell us (and others) about the results?

Your task, then, is be write persuasively to convince funding bodies that you can offer them the relevant services is a cost-effective way, that you can meet targets and therefore provide them with the

outcomes they are seeking. In so doing, you will probably have to write to a given set of guidelines. These will be discussed next.

The guidelines

Different funding agencies have different guidelines; and these guidelines may vary from project to project. In examining the guidelines, it is important to determine the outcomes that are being sought and the kind of information that is required. Sometimes a funding body will initially only want to scan the field for possible applicants. Here they will seek 'Expressions of Interest'. Other times, there will be a final call for submissions and tenders. The level of detail or information required in an expression of interest is different from that required in a full submission. As well, the kind of information needed to establish one's credentials in an expression of interest is different from that required in a full submission. Some funding agencies are interested mainly in the 'track record' of the applicants; others, in the strength of the proposal itself; others, in the cost-effectiveness of the methodology; others, in the extent to which the applicants will be able to respond to changes that are needed in the direction of the project as it proceeds.

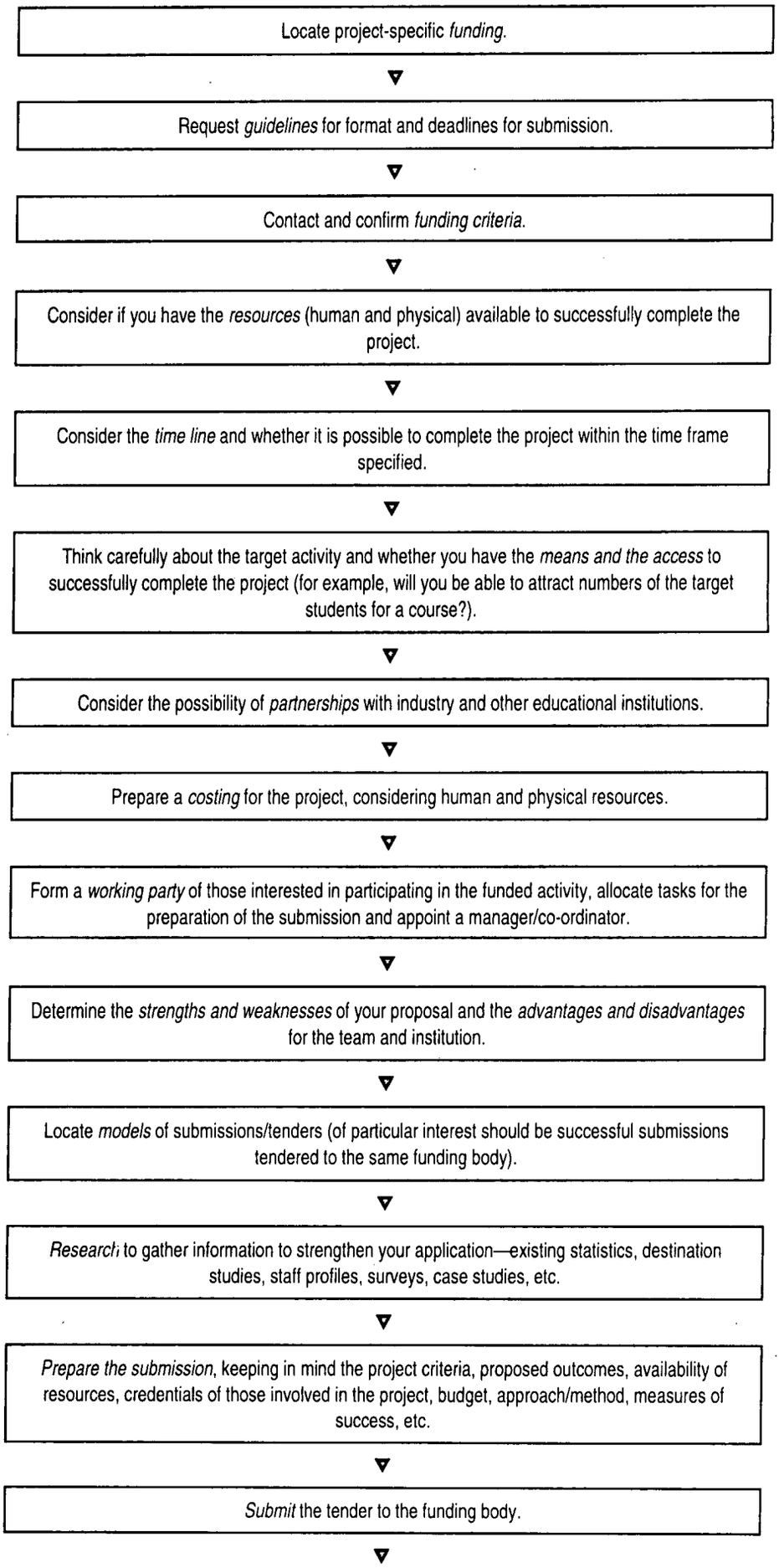
It is therefore important to gauge the kind of response that is required. Of course, the various headings under which one must respond need to be adhered to; but the weight of the response is a matter that can have a substantial bearing on the success of the submission. Some general questions to ask oneself would include:

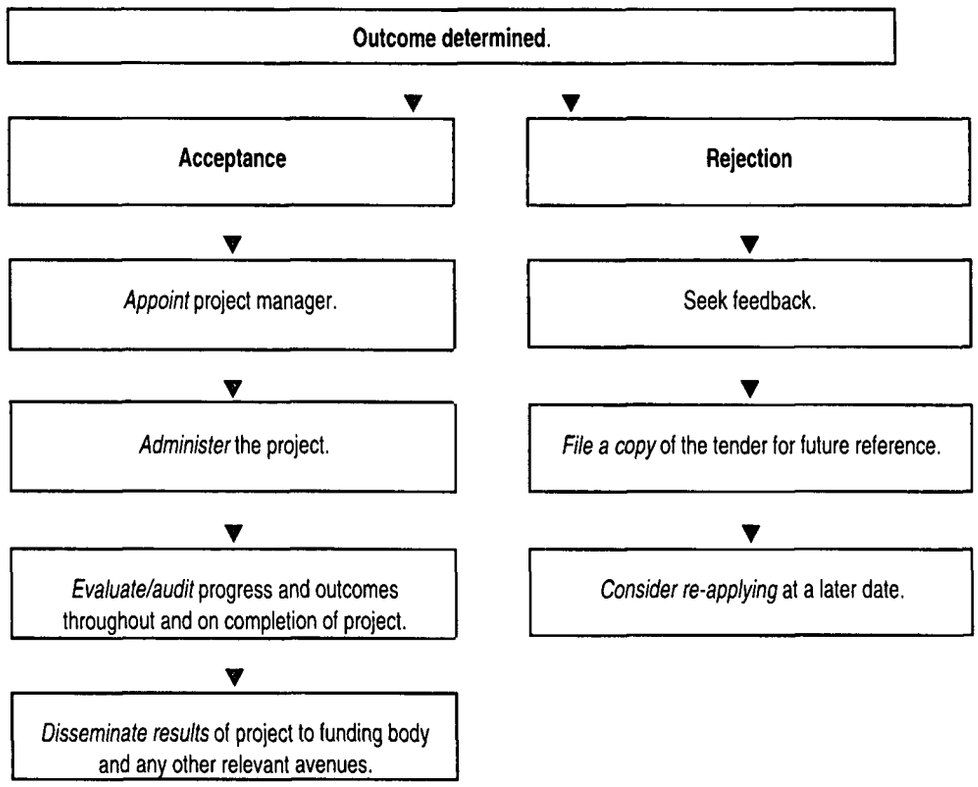
- Are the guidelines seeking information about the strength of the researcher—qualifications, experience, productivity, philosophical orientation, and so on?
- Are the guidelines seeking information about the organisation that is bidding for the funds—viability, commitment to such matters as ethics in research and equal employment opportunity, track record, and so on?
- Are the guidelines seeking information about the methodological approach that will be taken in the proposed research and its justification?
- Are the guidelines concerned about how the results of the research will be used, reported, disseminated or translated into practical improvements? Where is the emphasis?

Let us now consider the process that you will probably undergo in preparing a submission.

The process

The writing of a tender or submission is a process of merging what you are capable of doing into the guidelines of the funding body. There are any number of ways in which this can be brought about. The flow chart that follows is one that can be adapted to your own circumstances.


Locate project-specific *funding*.
Request *guidelines* for format and deadlines for submission.
Contact and confirm *funding criteria*.
Consider if you have the *resources* (human and physical) available to successfully complete the project.
Consider the *time line* and whether it is possible to complete the project within the time frame specified.
Think carefully about the target activity and whether you have the *means and the access* to successfully complete the project (for example, will you be able to attract numbers of the target students for a course?).
Consider the possibility of *partnerships* with industry and other educational institutions.
Prepare a *costing* for the project, considering human and physical resources.
Form a *working party* of those interested in participating in the funded activity, allocate tasks for the preparation of the submission and appoint a manager/co-ordinator.
Determine the *strengths and weaknesses* of your proposal and the *advantages and disadvantages* for the team and institution.
Locate *models* of submissions/tenders (of particular interest should be successful submissions tendered to the same funding body).
Research to gather information to strengthen your application—existing statistics, destination studies, staff profiles, surveys, case studies, etc.
Prepare the submission, keeping in mind the project criteria, proposed outcomes, availability of resources, credentials of those involved in the project, budget, approach/method, measures of success, etc.
Submit the tender to the funding body.



In preparing the submission, you need to show clearly how monies you are requesting will be defrayed. Your budget will need to be fairly prescriptive to demonstrate to the funding body that you have carefully considered the project and all of its budgetary needs. The most important of these considerations are outlined in the table below.

Resources

Positions	Human employment type	Other	Location	Physical equipment/ classroom consumable	General on-costs
Teachers	Full-time	Staff development	Rent/hire	Purchase	Telephone/ fax/pager
Educational/ clerical assistants	Part-time	Industry release	Classrooms/ lecture theatres	Hire	Printing/ copying
Tutors	Casual	Staff replacements	Workshops/ studios	Depreciation	Postage
Admin.	Contract		Workplace/ on the job	Maintenance	Stationery
Stores			Transport	Materials	Electricity
Co-ordination			Library	Learning aids	Institution/ State on-costs
Management				Software	Insurance

Writing up the submission

We spent some time earlier in this chapter investigating how a formal academic report would be written. While many of these comments are applicable to writing up a submission, there are some key differences. These are:

- limited space
- more prescriptive guidelines
- detail that is best provided in lists or tables, rather than prose.

You will find, therefore, that in writing up your submission, you will need to employ some different approaches. The best thing to do fairly early on is to locate past submissions (particularly those that were successful) to use as models. You will note that the use of headings and sub-headings is crucial—they reduce the need for verbosity. Funding bodies usually have limited time to defray their funds and do not need to spend time wading through unnecessary detail. Think of writing a submission as being similar to preparing a job application, where you must address key selection criteria. If the criteria for the submission have not been clearly articulated, generate a list that you (and your working party) feel is most relevant to the funding body to whom you are submitting and to the project being presented. Write clearly to these criteria.

Remember that your credentials are crucial to your success. Emphasise the ability of your college, your program team and the particular people working on this project to successfully see the project through to its conclusion. It will probably then be necessary to include brief resumes of each of the people working on the project in your submission. Hone in on the positive qualities of these people, particularly on their skills or experience in dealing with the type of project under consideration.

You will be expected to write using a fairly 'objective' tone, but remember, ultimately, you are trying to convince decision-makers of your worth. Compile as much evidence as possible to support your claims of superior assets, both human and physical. Why are you the best team to undertake this project? In answering this question, however, be careful of undercutting the financial requirements of the project. Remember the costs of undertaking such a project may outweigh the benefits to your team.

Do not make claims that you will not be able to fulfil, whether they be in the services you are offering, the time-lines you will meet or the budget for which you will successfully complete the project. If you cannot fulfil claims made in the submission, the funding body is unlikely to consider you for further monies.

In summary, you should:

- Locate past submissions (particularly those that were successful) to use as models.
- Use headings and sub-headings throughout your submission.

- Approach the tasks like preparing a job application addressing key selection criteria.
- Determine the funding criteria and write clearly to these criteria.
- Emphasise the ability of your college, program team and people working on this project to successfully complete the project.
- Attempt to convince the funding body that you are the best team to undertake this project.
- Compile as much evidence as possible to support your claims of superiority.
- Include brief resumes of each of the people working on the project in your submission.
- Use a fairly 'objective' tone.
- Do not make claims that you will not be able to fulfil.

Now, let us turn to how to write articles for newspapers and newsletters.

Writing newspaper and newsletter items

Whilst academic journal articles and submissions and tenders are relatively formal types of writing, you may wish to publicise your research findings in an informal, or more localised publication. The ideal place to see your work in print then is most likely to be a newspaper, newsletter or general interest magazine. These could include your local or State-based newspaper, a college/institute newsletter or departmental, industry or union publication. Again, you must keep in mind the aim of your writing, the publication and its audience.

Contextual factors

We are all exposed to newspapers regularly and because of this exposure, we are reasonably familiar with their layout and design and are fairly confident of how news stories are written. Before rushing off to write articles for submission to your local newspaper, however, you need to consider the context within which newspapers are produced.

The space available for news in any one edition of a newspaper is determined by the amount of advertising booked for that edition. Generally newspapers have a pre-determined ratio for advertising to news and, rather predicably, advertising usually takes up around 70 per cent of the total space available. That is why some editions of papers, typically Mondays and Tuesdays in daily papers, are smaller than other days, say Saturdays, because of the reluctance of businesses to spend their funds advertising early in the week. If you are going to submit your story to a newspaper then, you will need to consider which day's paper is most likely to have space.

Be on the lookout for regular feature pages or sections within the target newspaper. Many metropolitan daily papers have an education or higher education section each week. You may increase your chances if you submit your copy for publication in that specialised section. Make sure that the newspaper has received your copy a minimum of three days before the target date of publication (earlier if possible). It is not unusual for larger metropolitan daily newspapers to have an editorial staff of over 100. Unless you know who to send or fax your story to, the best person to address your story is to the chief-of-staff; on smaller papers, send your story to the editor. On larger papers, journalists are deployed to particular 'rounds' or areas of specialisation. These include politics, police, industrial relations, courts, arts, sport, education, environment, etc. Check your paper regularly to see if you can identify a journalist assigned to a suitable round. You may have more success if you can send your story directly to that person. Newspapers, as you no doubt realise, have to be reasonably selective about which stories they publish. They always have far more publishable information than editorial space. You need to target your writing to the criteria that news professionals working for your target publication are likely to employ. So what makes a reported issue or event newsworthy? The list of criteria employed to determine if a story should be included in a metropolitan daily newspaper generally includes the following.

Category	What this means
recency	it's got to be new to be news
magnitude	things that affect a lot of people
consequence	events or issues that happen today (or, technically, yesterday) that will affect many people in future
conflict	conflict on any level—between people, with nature, between nations
outcomes	readers are waiting in suspense for the outcome of an event (e.g. election, sports final, etc.)
elitism	stories about well-known personalities or events that are seen to be 'interesting'
progress	advances in technology, science, medicine, etc.
proximity	events 'close' to readers—geographically and culturally
human interest	'light' stories focussing on the unusual or emotional—'ooh, aah' stories

Local papers or newsletters may employ variations on these criteria. Perhaps proximity will come more to the fore with a local paper, as may human interest. In VET publications, perhaps the category of progress will be dominant. Consider carefully what you think publications are likely to be looking for—these will usually be

consistent with the wants, needs and interests of the target audience (and the needs of their advertisers). If you can target your story so that it meets some of these criteria, you will increase your chances of publication. The best way to do this is to be a regular reader.

Writing the story

News stories are usually written to a fairly stringent formula. Unlike a story we might recount to a friend, starting at the beginning and working our way towards the exciting climax, news stories start with the punchline and work their way backwards, filling in the details. This is known as the 'inverted pyramid' structure. The most important or weighty information appears first and explanatory passages and other details are then added in declining order of importance. This is a little like piecing together a jigsaw puzzle.

There are two reasons for this:

1 Not everybody has the time and interest to read every word in every story. If the main facts are in the headline and the first part of the story, people can be quite well informed without reading right to the end. You will capture the reader's attention immediately.

2 Stories usually have to be cut to fit available space and this style ensures that the sub-editor making such changes will be confident that the last few paragraphs can be cut without losing any of the important facts.

The first sentence in a news story (known as the lead paragraph by journalists) must answer the questions: who? what? when? where? and why? in twenty-five words or less. An example of a typical lead paragraph might read: 'A young Brisbane man (*who*) was killed (*what*) when his car skidded into a telephone pole in wet conditions (*why*) near Southport (*where*) yesterday (*when*).' For a story based on VET survey research, the lead may read: 'Eight out of every ten female graduates of Queensland's TAFE colleges (*who*) find employment within six weeks (*what*), according to a survey released by Brisbane (*where*) researchers yesterday (*when*).' (In this lead 'why?' has not been answered because the lead paragraph would become too long. This question would be answered in the second or third paragraphs.)

After writing a snappy lead, journalists then work their way through the remaining information they have, including the next most important piece of information followed by the next until the full and complete story is told.

Journalists aim to adopt an 'objective' style of writing, where they try not to take sides. They do this because generally the public trusts them to remove personal opinion and to provide the 'facts' from the viewpoints of those people being reported. They remove personal remarks from their copy and attribute all of the information contained within their stories to other people. Often these people are already known to their readers—politicians, police officers, community identities, famous sports or business people, etc. Their stories are seen

as more credible if the information contained within them can be sourced to a known person.

Some rules for newswriting

News stories are written in a very concise manner. They should be easy to read and have a crisp style. Some rules for newswriting are:

- Find the most newsworthy angle to the story and highlight this in the lead. Why is the story newsworthy? Why should people be bothered to read it?
- Make every sentence a paragraph on its own.
- Write short sentences—around 25–30 words, but lengths can be varied to maintain reader interest.
- Check your 'facts' for accuracy. Take particular care with the spellings of names, places, etc.
- When you first refer to someone, use both their first and second names and explain who they are (why would we be interested in their part of the story?). e.g. Institute Director, James Sandwich.
- Use direct quotes whenever possible. In other words, use the exact words used in a speech or interview and attribute them to the speaker. (You should let the speaker know that you intend to publish the comments BEFORE they start to speak.) Even if you are writing about the results of your research, it might be a good idea to have someone of 'prominence' talk about them. Show your results to the director or appropriate associate director and ask for comments. Put the attribution after the quote.
- Attribute quotes using the word 'said'. There is a plethora of alternative speech verbs, e.g. articulate, remark, speak, utter, vocalise, convey, express, relate, tell, announce, declare, state, assert, contend, maintain, voice, emphasise, cry, moan, etc. Try to avoid them if possible. Better to repeat the same word than to throw your reader.
- Try to be fair and accurate. As previously mentioned, journalists try to be 'objective'—in other words, they try to show both sides of the story. Give people the right to reply (at least if they are unavailable you can say that).
- Avoid cliches.
- Re-check anything you are unsure of.
- Use short words and expressions (e.g. instead of 'at this time', use 'now').
- Use past tense in news stories.
- Use active, rather than passive, voice.
- While news stories should be reader-friendly, avoid being too casual. For example, use 'it is' rather than 'it's'.

Above all, you should become familiar with the publication that you are writing for. If you can submit copy to a newspapèr or magazine using their own house style, they will be able to utilise your story with a minimal amount of re-writing.

Points to keep in mind

To increase the chances of publication then, follow these guidelines:

- Keep in mind the criteria the staff of your target publication appears to use in the selection of stories for publication.
- Select and suggest the most appropriate days for publication.
- Submit your copy (perhaps by fax) to the most appropriate person on staff in plenty of time.
- Use the house style of the selected publication.
- Submit photographs with your copy. Smaller publications (local papers, in particular) have limited resources and may not be able to deploy a photographer to 'capture' your story. Submitting a good quality, black and white photograph will greatly increase your chances of getting your story run. Make sure your photograph is interesting and avoid large group shots—when photos are reduced in size, too much detail is lost.
- After you have sent your story, make a follow-up phone call to find out the likelihood of publication. Seek feedback on your copy.
- Find out if anyone in your college/institute places advertising with the publication. If they do, you might like to mention this in your phone call. Despite protestations to the contrary, journalists are sometimes influenced by the economic imperatives of being involved in the newspaper business.

In the next section, we will consider the different types of publication to which you might like to submit your research story.

Publications to consider

There are many different places to whom you could submit a research story for publication. An excellent guide to the publications available that is specifically designed to inform about VET is DEET's *A guide to information networks in vocational education and training*. Published in late 1994, the guide provides invaluable information regarding the publications from government and national organisations, ITABs, mainstream media, professional associations, those specifically of the TAFE sector, unions and universities. It provides details of the title, the publisher, the scope of the publication, the target audience, how much of the publication is specifically VET, the frequency with which it is presented, coverage (e.g. national, State-based, etc.), cost and a contact person—presumably for subscription and for editorial content. We strongly recommend that you consult this guide if you wish to see your work reproduced in a VET publication. Much of the information contained below has been drawn from this excellent resource.

Just a quick note—it is normal practice to submit an article to only one publication at a time, then wait for an acceptance or rejection. Generally, if you wish to submit to more than one publication, there would have to be significant differences in the copy of one article to another. Also, check with the publication about the ownership of copyright for the material you have submitted. If the publisher retains the copyright, you will not be able to publish the work elsewhere at a later date. You may need to negotiate your rights with the editors of publications.

Some sample publications you may wish to contact are presented as follows.

Academic

There are many journals published here in Australia and overseas that might be interested in publishing research articles. Education journals, in particular, may be suitable, but you should also consider journals in other academic disciplines. Some academic journals that may be of particular relevance include the following.

Title	Publisher	How regularly published	Contact
Australian and New Zealand Journal of Vocational Education Research	NCVER	Quarterly	Prof. John Stevenson NCVER 252 Kensington Road LEABROOK SA 5068
Australian Journal of Education	Australian Association for Research in Education	Quarterly	
Curriculum Perspectives	Australian Curriculum Studies Association	Two journals and two newsletters per annum	Editor Curriculum Perspectives Australian Curriculum Studies Association 37 Dilkara Way CITY BEACH WA 6015

Many departments and centres of universities produce their own books and monographs. They also hold regular conferences. You can contact universities directly for this information. You could also consult Campus Review (published weekly and circulated widely throughout Australia and New Zealand—contact the Editor, Level 4, 2 Elizabeth Plaza, NORTH SYDNEY NSW 2060) or The Australian's Higher Education Supplement (see below for details) for information on up-coming conferences.

Industry

Various industry unions and organisations publish their own journals and newsletters. Some examples of these are as follows.

Title	Publisher	How regularly published	Contact
Australian TAFE Teacher	Australian Education Union	Quarterly	Editor Australian TAFE Teacher PO Box 1158 City Road SOUTH MELBOURNE VIC 3205
AIM Management and Training Database	Australian Institute of Management	Quarterly	Librarian AIM. PO Box 328 NORTH SYDNEY NSW 2059
The Building Worker	Construction, Forestry, Mining and Energy Union	Quarterly	Branch Secretary CFMEU 2nd Floor 361 Kent Street SYDNEY NSW 2000
Postal Newsletter	Communication, Electrical and Plumbers' Union	3-4 issues per annum	Publications and Publicity Officer CEPU Communications Division 67 Cromwell Street COLLINGWOOD VIC 3066

Many formal and informal networks are formed, sometimes for a short period of time, while others are more enduring.

Community

Australia has two national daily newspapers, The Australian and the Australian Financial Review. The first, as you are no doubt aware, is a general interest newspaper that includes a weekly (Wednesday) section on higher education, including articles on vocational education and training. (You can submit copy to the Editor, The Australian Higher Education Supplement, News Limited, 2 Holt Street, SURRY HILLS NSW 2010). The latter is a more specialised newspaper, focussing largely on the news of business, management, economics and politics. Though the scope for publication here may be limited, if your research were to focus on an area that coincided with the requirements of this newspaper, you may still have a chance.

We also have numerous capital city (or State-based) newspapers throughout Australia—one in each State and two in New South Wales and Victoria. Finally, most regional centres have their own daily or weekly local newspapers, many of which are looking for good material to include in their editorial pages.

Consider also local and State-based newsletters. These are usually distributed throughout local communities or have a specific circulation to people whose names appear on a mailing list (perhaps as members of a network or association). Whilst your audience here may be extremely small in size or localised by nature, you may have a

great deal of success in attracting readers' attention or getting action with such audiences.

VET sector

Many new publications have emerged over the last few years that can be directly attributed to the growth in the vocational education and training sector and its increasingly structured nature. Nationally, many organisations have been developed and each State has responded with new commissions, etc. Below are just a few suggestions of possible publications you could canvass.

Title	Publisher	How regularly published	Contact
Australian Training	ANTA	Bi-monthly	Dani Parker Secretariat ANTA GPO Box 3120 BRISBANE QLD 4001
Australian Training Review	NCVER	Quarterly	Carol Cheshire Editor Australian Training Review NCVER 252 Kensington Road LEABROOK SA 5068
NTB Network	National Training Board	Quarterly	Diane Ranck Editor NTB Network GPO Box 2979 CANBERRA ACT 2601
Training Torque	DEET	Quarterly	The Editor Training Torque DEET GPO Box 9880 CANBERRA ACT 2601
ITAB News	Vocational Education, Training and Employment Commission	Quarterly	Rod Brownsey Assistant Executive Officer VETEC 30 Makerston Street BRISBANE QLD 4000

There are, of course, a range of local VET publications you should also canvas as prospective avenues for your research work. These may include departmental newsletters, established teacher/trainer networks and the journals of professional association. You can also publish your research by way of submissions/tenders to DEET, ITABs, etc.

Another way to tell others about your research and development activities is by contributing to the Vocational Education and Training Database (VOCED) database and clearinghouse. Contributions may be made to the clearinghouse by completing the document submission form available from any national or State clearinghouse,

together with two copies of the material. Journal articles and conference papers, as well as any unpublished material (e.g. theses) are accepted. For further information, contact the National Vocational Education and Training Clearinghouse Information Network, NCVER, 252 Kensington Road, Leabrook, South Australia or the clearinghouse in your State.

Again, we cannot stress enough the usefulness of DEET's *A guide to information networks in vocational education and training* for those wishing to publish research findings in a VET publication.

Selected readings

Cloake, P & Noad, P 1994, *Academic writing skills*, Centre for Policy and Public Safety, Griffith University, Nathan (Queensland).

Department of Employment, Education and Training, 1994, *A guide to information networks in vocational education and training*, DEET, Canberra.

Dineen, C 1993, *Communication skills: Writing for specific purposes*, Moorabbin College of TAFE, Moorabbin, Victoria.

Nutting, J & White, G 1990, *The business of communicating*, (Second edition), McGraw Hill, Sydney.

Walsh, B 1986, *Communicating in writing*, AGPS, Canberra.

Wrigley, J & McLean, P 1981, *Australian business communication*, (Second edition), Longman Cheshire, Sydney.

Special thanks to Professor John Stevenson for the information about guidelines for submissions and tenders.

14 Simple data presentation

Patricia Funnell

Benefits of using graphics

Developing text for a report has been dealt with in some detail in the previous chapter; however, it is important to consider how else your research findings may be presented within a report for maximum impact. You should consider if there are other ways of presenting your information, visually or graphically.

What are the benefits of presenting information using non-prose methods? Clearly, any graphic used must contribute to the reader's understanding. The following list of further reasons to include graphics in reports may be of interest (adapted from NCS008—Graphic Communication):

Increasing Interest

The old saying 'a picture is worth a thousand words' is worth remembering. Good graphics demand attention. For proof of this, just look at an edition of a daily newspaper. Apart from photographs, which are believed to attract the attention of eighty per cent of newspaper readers, tables, diagrams and graphs are used to create interest in the text.

Saving space

Presenting data graphically can save an inordinate amount of words within your report. To explain all of the data that it is possible to encapsulate into a well executed graphic could take reams of paper when explained using words, usually with less clarity. Concepts can get lost.

Saving time

Often it is quicker for the reader to grasp the essential meaning of data when a graphic can be scanned at a glance than when meaning is hidden in the text. Do you read every word you encounter? Do you save time by hoping to grasp the essential meaning from graphics?

Overviewing concepts

Graphic forms of data presentation allow the reader to gain a quick grasp of the essential issues. The graphic can give a kind of 'mud map' overviewing the most essential concepts. Further explanation can be provided in the text.

Clarifying relationships

Often the relationships between data are crucial findings of the research. Where information needs to be compared and contrasted and where relationships between data are relevant, graphics can allow such information to be grasped far more quickly and clearly.

Exposing hidden factors

With the plethora of information available for reporting, it is possible to highlight only some of the findings. Often we seek out the 'large numbers' or 'big' facts but often it is the smaller numbers that might tell us more. Factors that may have been otherwise hidden can be more easily exposed when presented in a visual form.

Analytical thinking

Analysis is not a skill that necessarily comes easily, so any tool that can help in the process is worthy of consideration. You may find that generating graphics can be useful even if few or none make it into the final version of the report. In attempting to present information graphically, the researcher/report writer will be forced to rethink and reanalyse the data collected which will, hopefully, help him/her to clarify important issues. Graphics may be used by the reader for the same purpose. Using non-prose forms should certainly be considered if for this reason alone.

The process

Now that you are no doubt convinced of the merit of including graphics in your report, you need to consider the process in determining what kind of graphic to use. As with writing the report itself, the first step is to consider who exactly will be the reader of your study or report. This will influence the choice of graphic and sophistication of presentation. You will need to consider also their education level, their understanding of what may be considered a specialist area and the familiarity of the reader with the content and the forms of graphic you wish to use. Clearly, some graphics are more difficult to interpret than others. The need to engage the reader's interest must be kept in consideration. The purpose of the report should be rethought—should your graphics be designed to entertain, to inform or are they politically motivated—are you trying to persuade the reader to adopt your viewpoint? The answer to these questions will now influence your choice and presentation of graphic. Thirdly, what form of publication will your 'report' and graphics appear in? (Holmes 1984, pp.60–61). Clearly, a verbal report, a report to students or a paper in an academic journal will all demand different approaches to presenting data graphically—the context within which each is prepared and deciphered are different.

Finally, you need to consider the type of data you have collected as this may determine the choice of graphic. Clearly some forms are more suited to different types of data than are others. In fact, if you consider the forms of graphic communication you could use in your presentation *before* you collect data, your analysis may be enhanced.

More about this later. Let's first consider the most common forms of graphic communication.

Forms of graphic communication

The most common forms of graphic used are the table, bar graph, pictogram, line graph, pie chart, photograph, drawings, and diagrams (including flow, organisational and schedule charts). The main features of each of these, together with their advantages and disadvantages have been placed for your convenience in the following table:

Figure 14.1 Forms of graphic communication

Form	Features	Advantages	Disadvantages
Table	• presents numbers as numbers • uses columns and rows • not a pictorial form of representation • uses headings and 'grids' to guide the reader	• can be used as the basis for creating other graphics • good for large variations between statistics	• can take more effort on the part of the reader to decipher • not as visually stimulating as other forms
Bar graph	• series of bars/columns represent each statistic • length of each bar represents the quantity being measured • the thickness of each bar is standard • vertical and horizontal axes are used • bars drawn in to scale	• each amount or quantity has its own bar and stands independently good for individual quantities in a series • good for a 'snapshot' in time to compare variables or elements	• not good for too many variables or numbers • large numbers of variables could mean the bars become thin and difficult to decipher • not the best method for showing the flow over time
Pictogram	• as above except pictograms use pictorial representations (actual objects) instead of bars	• eye catching	• difficult to show actual amounts • difficult to show fractional amounts

Form	Features	Advantages	Disadvantages
Line graph	• points plotted against horizontal and vertical axes and joined together by lines • usually used to show changes over time • quantity and time are shown together	• very easy to read • comparisons over a period of time are easy to determine • good for showing trends • ideal for making projections or forecasts	• not good when dealing with very large and very small at the same time • difficulty showing changes where there is little difference between numbers • not the best method for comparing elements in one time period • may become very confusing with too many statistics
Pie chart	• shows percentages or parts of a whole, usually showing a circle divided into representative wedges • complete circle equals 100 per cent • pieces of 'pie' are appropriately labelled	• excellent for showing how an entire amount is divided up, e.g. budgets	• difficult to show any more than eight pieces • if pieces become too small, they are difficult to separate from others • difficult to label small segments
Photograph	• depicts the visual 'reality' of a situation or object • photographic representation of a real-life, physical thing	• effectively shows something that exists • will be seen by the audience as 'reality' • can illustrate what otherwise would not be believed	• not useful for statistical data • may contain irrelevant detail
Drawings	• artist's view on an object, situation or process • parts are clearly labelled	• can show internal, external or exploded view • can be clearer than a photograph—extraneous information can be eliminated	• not useful for statistical data • less believable or realistic than a photograph
Diagram • flow chart • organis-ational chart • schedule chart	• abstract depictions of processes, schedules and organisations • use symbols and geometric shapes • may require a key to explain features • shows relationships with lines and arrows	• eye catching • clarifies complex ideas or concepts • effectively summarises a process, schedule or organisation	• not generally useful for statistical information • usually requires textual explanations

Each of these forms of graphic communication will now be discussed in turn.

Tables

Everyday examples of the table include calendars and timetables. The table is widely used in research reports as well as an effective way of presenting statistical or numerical data but should not be overlooked as a means for summarising conceptual information too. (Consider the table above.) Tables summarise the relevant data into a very readable form. Because 'facts' are categorised, and presented in vertical columns and horizontal rows, they can be found quickly. Comparing and contrasting information can also be an easier task when data are presented in tables.

It is essential, therefore, that in creating tables each piece of information is clearly defined in terms of the categories to which it belongs. In fact, as mentioned earlier, one of the great advantages in using graphics, particularly tables, as a researcher/writer, is that their creation can help you to clarify and define what is important. Creating a good table can also be the basis from which other graphics (e.g. graphs) can be generated, where that data can easily be transformed into the new format. Many computer programs, including those designed for word processing and spreadsheeting, have the capability of generating tables from inputted (statistical) data.

The features of tables are quite straightforward, but unless you have been involved in writing reports or teaching certain maths or science modules, it is unlikely you have thought about how they are designed. Unlike other graphics we will discuss, the table is not strictly 'visual'—that is, numbers or facts are presented as numbers or facts and not transformed into a different graphic representations (Holmes 1984, p.54). The table then is a good place to start. Let's consider the table's features:

Title

Each table should have a succinct title which precisely outlines what is contained within in it. Each table should be identified consecutively, e.g. Table A: Destinations of students completing studies in 1994, Table B: Destinations of students completing studies in 1995.

Use of a grid

All information in a table is placed in a form of matrix or grid where all the information falls into vertical columns and horizontal rows. This framework, whether lines are used between each cell or not, clearly allows the reader to determine how each piece of information relates to other vertical and horizontal information.

Measures

The measures used should also be explained. For example, are dollars the unit of measure, or are percentages used?

Order

Any data presented should be ordered appropriately, for example, if comparisons are made on a year-by-year basis, these should obviously be placed in consecutive order.

Headings

The headings on each column and row should be clearly written or, if abbreviations are used, these should be explained below the table.

Totals

When dealing with statistics an extra column or row containing total amounts should be included, for example, where percentages are used the total should add up to 100. If necessary, brief notes explaining any interesting nuances could be used, for example, where the total of the percentages do not equal 100. It is always possible to note interesting points by using an asterisk (*), explained below the table.

Consistent approach

If more than one table is used, the same or similar order of information into columns and rows should be adopted. This makes comparison of data easier. It also saves time for the reader in deciphering the data.

Duplication of information

Try not to duplicate information from one table to the next. The question you should ask yourself about all graphics you wish to present is: 'Does this graphic add meaning to the report?' Readers are usually very busy and do not wish to have their time and attention wasted on redundancies. You may feel that the first table you generate is useful to the report but upon later analysis realise that most of its contents are duplicated in a following, more complex, table. If this is the case, scrap the first table. This could occur, for example, in a report where you have surveyed a group of students and wish to initially present demographic (background) data. Later you develop a table to show responses to particular questions where the demographic data are repeated. In this case, if the data are not complex, eliminate the first table, summarising the contents into the body of the text.

Tables are particularly useful if you are trying to reproduce or summarise a huge amount of data or trying to compare a large range of numbers, from the very small to the very large. Often such a spread of statistics is difficult to plot on various types of graphs. Also, in dealing with statistical information, often the precise figures need to be reproduced. As we will see in the following discussion of graphs, such preciseness is sometimes difficult to achieve in other forms of visual communication.

It is difficult, however, when using tables to show clearly how trends emerge and making predictions can be difficult. Also on the negative side of tables is that they are not as visually stimulating as other forms of visuals and they may take more effort on the behalf of the

Some examples of tables and graphs

(The following are from *Competency-based education and training: Between a rock and a whirlpool,* by Harris, Guthrie, Hobart and Lundberg, 1995)

Table

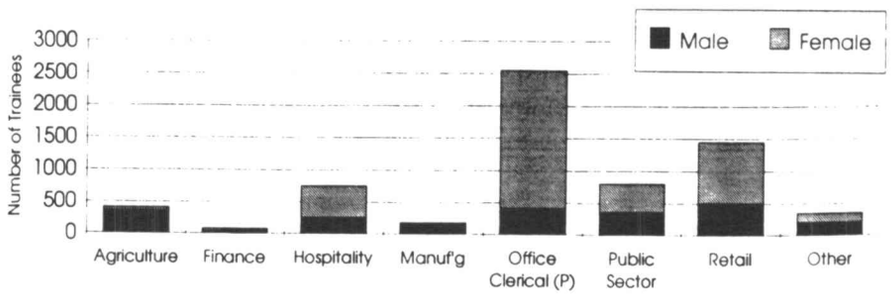
Enrolments in Universities by Field of Study and Gender, 1987, 1992 (percentage)

%	1987		1992		Difference	
	M	F	M	F	M	F
Agriculture	2.5	1.1	2.7	1.2	0.2	0.1
Architecture	3.2	1.4	3.0	1.4	-0.2	0.0
Arts	16.4	32.2	15.4	28.4	-1.0	-3.8
Business	24.2	12.8	25.8	16.7	1.6	3.9
Education	11.3	25.3	8.2	19.0	-3.1	-6.3
Engineering	14.3	1.0	14.8	1.7	0.5	0.7
Health	6.4	12.5	6.6	16.7	0.2	4.2
Law	3.4	2.4	3.7	2.8	0.3	0.4
Science	16.7	9.5	18.6	10.8	1.9	1.3
Vet science	0.4	0.4	0.3	0.3	-0.1	-0.1
Nonaward	1.3	1.5	1.1	1.0	-0.2	-0.6
Total	**100.0**	**100.0**	**100.0**	**100.0**		

Source: NTB Network, 12, December 1993, p. 5

Bar graph

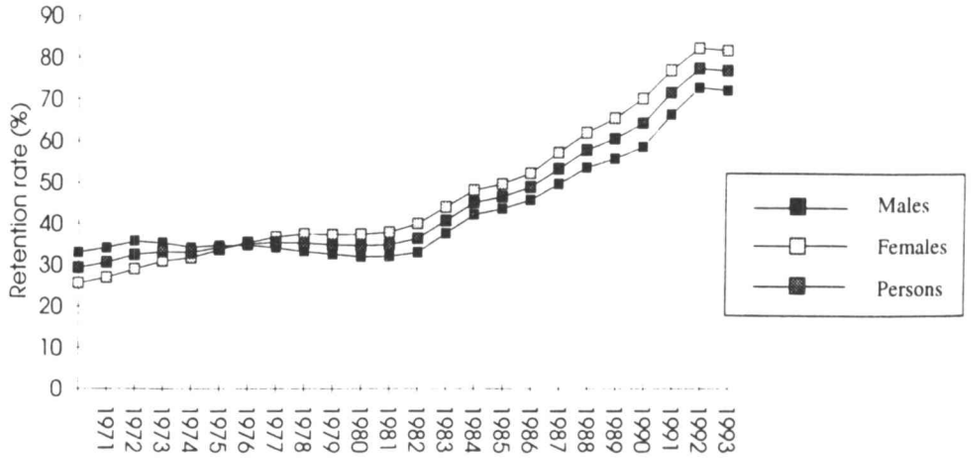
Participation in Traineeships by Gender and Industry 1985–94



Source: DEET, A*TS Quarterly Performance Report*, March 1994

Line graph

Year 12 Retention of Men and Women in Australian Schools, 1970–93



reader to decipher. Avoid using tables where there is little data to reproduce, either use an alternative graphic form or include the information into the general text of the report.

Graphs

Graphs are also useful in presenting statistical or numerical data and may be able to overcome some of the disadvantages of using tables. The most common forms adopted are bar graphs, line graphs, pictograms and pie charts where information can be quickly gleaned by the reader. In the first three cases, horizontal and vertical axes are used, clearly labelled.

Statistical information presented in a table is suitable to, and could easily be transformed into, a graph. The key, however, is not to overdo it in trying to present a variety of graphics. Each graphic has to be understood independently, using different thought processes. Whilst one table after the other could bore the reader, the advantage is that the reader has to do less work each time in deciphering the information.

Generally, the horizontal axis is used to show time (e.g. years), length or distance. The vertical axis is used to show height or depth.

Where incremental measures are used (e.g. years, or every ten percentage points), these must be clearly labelled for each axis. You should take care in your selection of a scale as different scales can give misleading perceptions of the differences between items. Trends can be exaggerated.

Again, the most appropriate order for information should be selected. Where consecutive groupings are outlined, for example, years, these will be placed in numerical order, regardless of the findings. However, the data may be arranged from smallest to largest or vice versa, for example, where causes are outlined using percentages. Alternatively, like groups may be clustered together.

A graph can be excellent for showing various rates of change over periods of time. It can immediately show high and low points and changes, whether they are slow, fast, steady or erratic (Beisler et al. p.64). Graphs are therefore also useful for making predictions because rates of change have been plotted out.

Bar graphs

Bar graphs (or histograms as they are sometimes known) represent data in individual bars or rectangles plotted against the axes. The bars are always drawn to scale, so that comparisons are easier—put simply, the longer the bar, the greater the quantity. It is easy for the reader to discern how great or small the differences are in quantities associated with each of the elements or variables. Bar graphs usually represent a situation at a particular time, rather than comparing across time frames (see line graphs for a more appropriate method of showing changes over time).

When creating bar graphs, all the bars should be the same width, if the widths vary it may be difficult for the reader to determine any differences in heights or length, in other words, to compare and contrast results. The bars are clearly labelled, usually at the axis. There is usually space left between individual bars or clusters of bars so that each can be read independently (Holmes, 1984, p.24). Avoid creating a bar graph containing too many bars—deciphering such graphs can become difficult, particularly if bars become too thin.

Generally though, bar graphs are simple to read. Part of their beauty in that when variables or characteristics within data are compared, they can be clearly signified by the use of different colours or patterns for each bar or components within bars. An explanation, or key, for these colours and patterns should accompany the graph.

The point at which the axes cross will usually be the zero point but often when differences between large numbers are being illustrated, a larger start point may be selected.

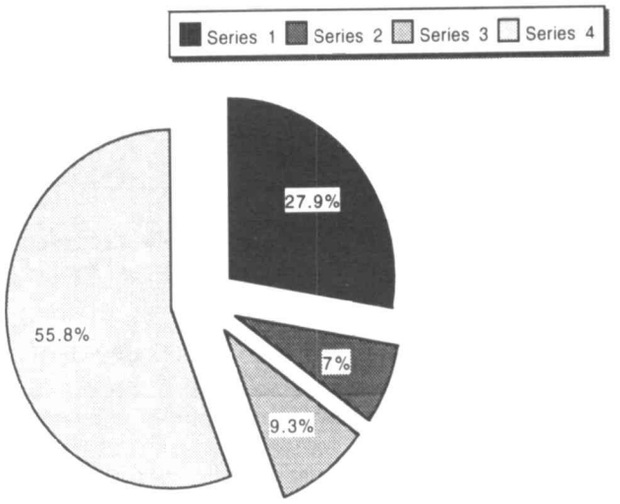
A variation of the bar graph is the component bar chart (Beisler p.70) which shows the way in which the whole item is divided and is useful to make comparisons between the make-up of a group and between groups. For example, if you are looking at the breakdown of occupational groups by gender, it may be interesting to present the information in a component bar graph where, for each occupation, the total number of people employed is measured, but within each bar different colours or patterns indicate how many women and men have been employed in the occupation. This may be useful data for each occupation, but also for comparing across occupations. Be careful, however, for each bar should probably not try to show any more than three variables within each bar. Bar graphs may become too confusing for the reader if too many elements are shown within a bar. It becomes increasingly difficult to determine the statistics for each element.

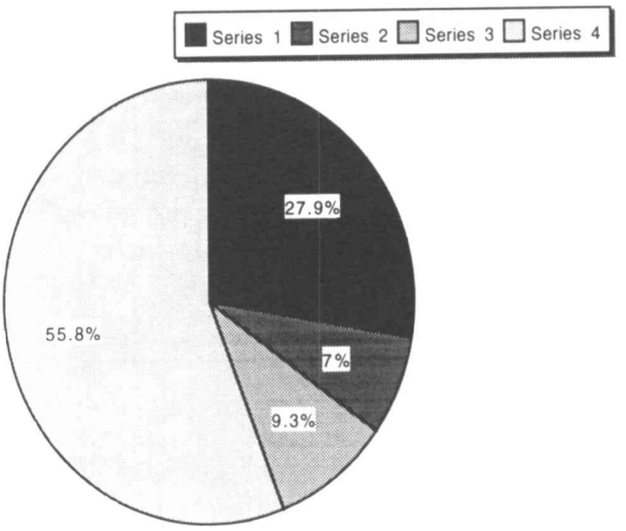
Pictogram

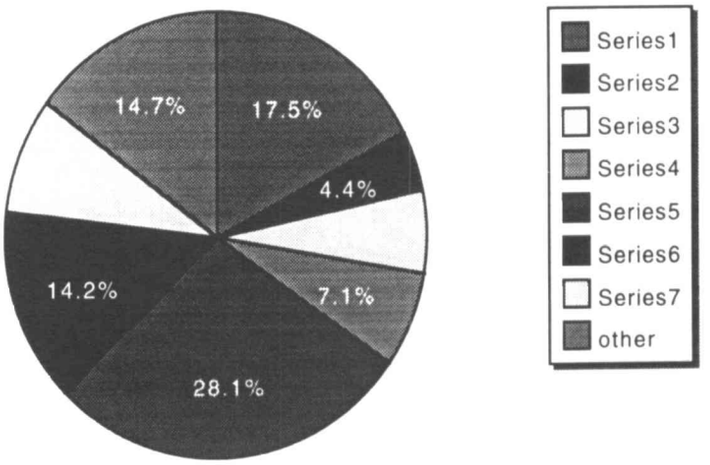
Pictograms are a type of bar graph with different visual appeal. Here drawings or symbols that are representative of the thing being measured are substituted for the bars. Pictograms are used because the symbols are thought to have greater visual appeal, an example being the use of a stylised figure to represent thousands of people or the dollar sign ($) to show how budget is defrayed. Readers find pictograms quite eye-catching.

Pictographs are less likely to be used in formal reports where visual interest is of less importance or in situations where precise amounts need to be shown. It is very difficult to show fractional amounts in pictograms—how do you visually cut up a dollar sign representing a thousand dollars when you wish to show five hundred dollars?

Examples of pie charts







Line graph

Line graphs are also useful, particularly to show trends over time. Here points are plotted and joined together by short lines, often recreated to form a single, continuous line from one point to the next. Line graphs are also for visualising trends of periods of time and therefore for making predictions. They are also known as 'fever charts'—consider the type of charts kept by nurses in hospital for recording the temperature of a patient (Holmes 1984, p.23). They are often used to plot profits or losses for an organisation for each year over say, a decade. Predictions could then be made about projected profit/loss based on the trend of rises or falls indicated.

Increments in time, or any other independent variable, are usually plotted on the horizontal axis. The changing quantity (for example, profit) is seen as the dependent variable and is usually measured against the vertical axis. Each plotted point on the graph then will show the intersecting point between the time and the quantity being measured. Line graphs are especially easy to read but you should avoid this form if you are dealing with statistics where there is little difference between variables—the visual impact may be lost. Similarly, line graphs do not cope well with statistics that stretch across a very broad range—from very small numbers to very large numbers.

Above all, line graphs are a good way to enable simple comparisons to be made across periods of time or, where two or three lines can be plotted on the same graph, visually depicting changes for a number of groups or variables over time. In such cases, each line must be visibly different and should be clearly labelled. Avoid including a multitude of lines on the one graph because this can become very confusing.

Pie graph

Pie graphs are extremely easy to read and understand. Unlike the other graphs previously discussed, the pie graph does not use axes to measure the differences in variables. Instead a circle is drawn to represent the total amount of something, and it is divided or cut into wedges, the way that one might cut up a pie. Each triangular piece of the pie is labelled and clearly represents the proportion of the total amount devoted to that category, variable or factor.

Pie graphs are useful to show the breakdown of percentages or other calculations that add up to a whole. The complete circle, the sum of each of the parts, will add up to 100%. One advantage of a pie chart is that each piece can be compared to the relative size of other pieces and to the whole. The pieces are usually divided in descending order of size, in other words, from largest to smallest, and each piece or sector will be labelled, usually with a description or percentage of the total.

There are some disadvantages of using pie graphs. Firstly, some of the pieces can become too small to effectively show their relative proportion to other pieces, for example, if a wedge represents 5 per cent or less of the total. These very small pieces are also difficult to

label. Generally, a pie can not be adequately read if it is broken into eight or more pieces. One way to get around this problem is to join the smaller pieces together under the heading 'Other' and to explain to the side of the graph (and in the text of the report) what components make up this category.

Many new spreadsheeting and graphics computer programs can generate three-dimensional pie graphs. While they may be even more visually appealing to the writer of the report, to the reader they can be reasonably confusing. These programs usually represent the 'pie' at an angle where the pieces to the front can appear disproportionately large by comparison to their counterparts. In addition, the 'depth' of the pie can also be confusing. The reader has to make mental adjustments to make sense of the data given. Generally, three-dimensional graphs, particularly pie charts, are not recommended (Foyster 1994, p.5).

If you wish to make your pie graph more visually appealing, you could consider, as an alternative, more artistic variations of the circular shape. For example, you could use a person's face or the face of a clock to make your pie graph more eye-catching (Holmes 1984, p.51). This form is to the pie graph what the pictogram is the bar graph. Another variation may be to take a shape other than a circle which could then be 'sliced' up. Take care, however, that the segments of the new shape are in proportion.

Photograph

Photographs are commonly used in publications to depict what is seen as the visual reality of a situation, place, object or event. Photographs provide a relatively realistic view and can simply show us what something looks like. This may be particularly helpful if the object or situation is unknown. Photographs can have great visual impact and can be used effectively to stir the emotions. This may be useful if the object of your report is to persuade the reader to adopt your point of view on an emotive or political issue (overcrowding in classrooms, standard of facilities, etc.).

Whilst photos are usually seen as visual 'reality', the use of a range of different camera angles, lights, filters and lenses, together with a range of post-production techniques such as cropping and reversing can drastically alter the 'reality' the photograph is attempting to depict. This can work to your advantage or disadvantage.

Unfortunately too, photographs can also contain much irrelevant detail or data. With electronic imaging technology that currently exists, however, much of this irrelevant matter can be electronically removed by scanning the photograph into a computer and altering it using any one of a range of relatively cheap photo-imaging computer packages. This may, in the long term, cause great difficulty in trying to use photographs to 'authenticate' reality.

Also, while writers recognise the need to describe and analyse other forms of graphic information, for example, tables and graphs, they

feel less inclined to make comment based on photographic evidence or data, possibly believing that such graphic images speak for themselves. However, comment regarding the content of the photograph (for example, the people/objects depicted, body language, clothing, composition, setting and use of colour) could usefully be made. Further comment could also be made regarding the technical aspects of how the photo was taken, for example, the framing, lighting, shot size, camera angle and any cropping that has taken place. A description of the context within which a photograph was taken can also be useful.

Photographs are not generally used in formal reports but, when used, are often presented simply for decorative purposes, perhaps on the cover of the report. However, the possible impact of a good photograph clearly reinforcing the 'evidence' or 'facts' embodied in the report should be considered. Obviously photos are not useful for showing quantifiable data.

Drawings

Drawings, like photographs can also be used to great effect within reports. Often they can depict an object or process with more clarity than a photograph because all unnecessary detail can be eliminated—a focus can therefore be placed on the important details. In addition, views can be shown that may be impossible to capture with a camera, for example, the inside workings of something. They can also eliminate or 'clean up' that which may be seen by some embarrassing as or offensive (think, for example, of anatomical drawings). However, drawings may be seen as being less 'authentic' representations than photographs.

Drawings can accentuate that which is of greatest importance, especially through the use of angles and perspective, so what is in the foreground assumes the greatest importance. Drawings can also effectively show internal and external views of objects and the various components can be clearly labelled. Exploded views can be shown in a drawing—where each separate part of an object can be enlarged and an indication may be made of how parts of an object, for example, are assembled.

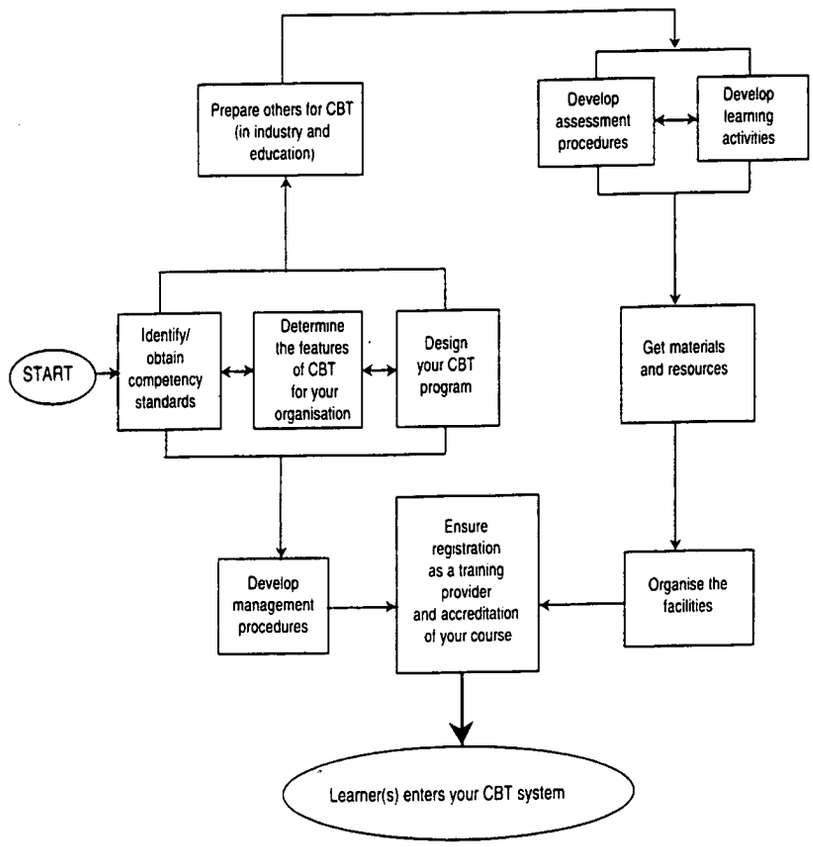
Like photographs, drawings have limited abilities in describing or presenting statistical data.

Diagrams

A diagram is much like a drawing except that rather than purporting to show a physical object with relative realism, a diagram is more likely to symbolically show a process, organisation or schedule. While drawings show objects as they would normally appear, diagrams are more abstract. Flow charts, organisational charts and schedule charts are samples of diagrams which will be dealt with later. Maps, using symbolic representations, may also fit into this category.

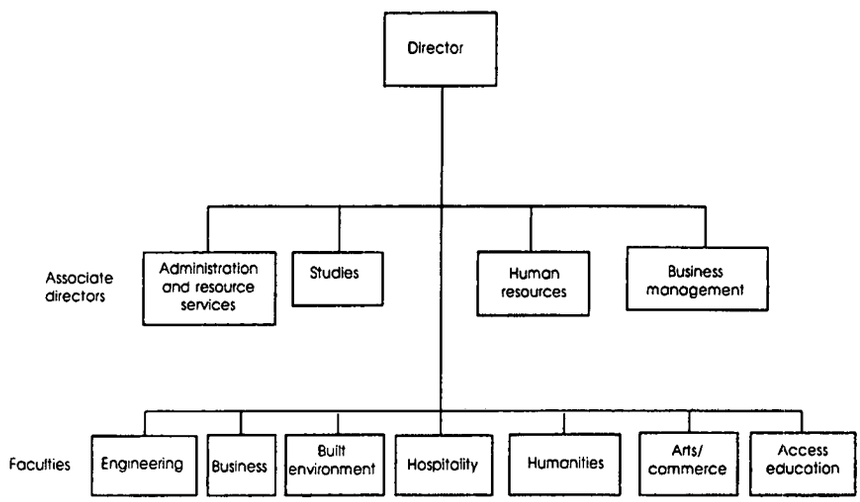
Examples of flow and organisational charts

Flow chart



(From *Competency-based education and training: Between a rock and a whirlpool,* by Harris, Guthrie, Hobart and Lundberg, 1995)

Organisational chart



Organisational structure

(From *Management matters: selected conference papers,* NCVER 1995)

The aim of a diagram is not to present statistical data but to explain objects and events and the relationships between them. Symbols and geometric shapes (circles, rectangles, diamonds) may be used and a key or legend will be provided to explain the diagram.

Flow chart

A flow chart is a diagram that graphically shows how an event or procedure progresses through a number of clearly delineated steps. Geometric shapes feature heavily and arrows clearly show the progress from one labelled event or step to the next. Drawings may be included within such flow charts.

Flow charts may be the ideal way to best show how a rather complex procedure takes place. They are often used in organisations, for example TAFE colleges, to show how procedures, such as raising orders or seeking departmental approval for new programs, take place. Such diagrams would normally have to be accompanied by step-by-step explanations of the process in order to fully inform the reader.

Within a flow chart, events or activities are generally ordered from top to bottom and from left to right but this is not always the case. Within a flow chart there will usually be one start point and one end point (Beisler 1993, p.76).

Organisational chart

An organisational chart again uses geometric shapes, such as rectangles and lines or arrows to show the structure of organisations, such as that of a government department or TAFE college. Each shape, and sometimes the lines between shapes, will be clearly labelled. Such a chart might indicate the arrangement of positions (and sometimes the names of the incumbents) of an organisation's hierarchy and show how smaller units (e.g. teams or program units) fall within or combine to create larger units (e.g. divisions or colleges).

Such organisational charts may also summarise the responsibilities of sections (and therefore the scope of the organisation) and indicate lines of authority and responsibility (who reports to whom and who gives directions to whom). Different types of lines (broken, dashes, etc.) may be used to show special relationships, for example, within a Department of Education or Training, the commission responsible for registering and monitoring programs offered by both private and public providers of training may be connected to the Minister's or Director-General's office by a solid line but to the remainder of the department by a broken line. The broken line may indicate that no direct reporting takes place between the commission and the public provider. Because of the nature of most organisations, often organisational charts will take the overall shape of a pyramid, with fewer positions at the top of the diagram and many more towards the bottom. However, over the last few years, with the emphasis on self-management of teams within organisations, many charts of this nature have been redrafted, with the work units at the top of the

chart, and office bearers at the bottom. Such charts are usually characterised by fewer positions than before.

Schedule chart

A schedule chart is merely a variation of the flow chart or organisational chart in that it is characterised by similar features (geometric shapes, connecting lines, etc.). The schedule chart should outline the major steps in completing a project, who will undertake each step, and the times or deadlines by which they will be completed. The reader should be able to see quite clearly at what stage the project will be at any particular time and what parts have thus far been completed.

The schedule chart may emulate a table, in that the major steps may be listed along the vertical axis and the time line for the duration of the project may be on the horizontal axis. Again the chart must be clearly labelled and each step must have a clear start and finish point. An example of a schedule chart may be a diagrammatic depiction of a course of study, where various modules start and finish at different times throughout the program. In this case, both teachers and students can be made aware of the timing of modules, and also such events as work experience, industry release or holiday periods.

Relating your graphic to the text

Graphics should only be included in your report if they will increase its general effectiveness and enhance or stress the points you wish to make. Each graphic should complement or reinforce the messages embodied in the text and neither the text nor the graphic should make the other redundant. They should work together to achieve the purpose of the report, whether to inform, persuade or to encourage action.

Placement of each graphic within the text should be carefully thought out. You must find the most appropriate place within the written sections to place and to introduce the graphic. Don't make it difficult for the reader to find the graphic. As within the text, where links should be made between paragraphs and sections of the report, verbal links must also be made with the visual elements of the report. Signpost the visual with such phrases as 'you will see in figure 3 on the next page that ... 'or 'in table 2 below, you should note...' and highlight want you want the reader to see. What should the reader draw from the graphic? Be quite specific within the text both before and after the visual. Please note that it is not always possible to place the graphic exactly where you would like to, because of the sheer size of the graphic or because of awkward page breaks. Simply try to locate the graph, table or diagram as near as possible to its references within the text. If possible, limit the number of graphics to one per page.

Make sure that any text included as part of the graphic is both informative and succinct. For example, the *title* should briefly summarise the contents of the graphic and, if necessary, a *subtitle* could also be provided. It is also common practice to assign a figure number to the graphic which would appear first. Titles are usually placed below the graphic but as long as the approach is consistent, titles may be placed above.

Any other written material provided with the graphic must be equally brief. *Labels* are another form of signposting and should be used for any important content, particularly for axes, every line or curve and parts of diagrams, drawings and charts. If in doubt about whether to label or not, the simple rule is to provide a clear but brief label. This is another method you can use to tell your reader that a certain piece of information is important. Again, your approach must be consistent throughout your report.

All *units of measure* and *scales* must be clearly identified, preferably in the title. They should also be clearly noted on axes in graphs and the units of measure used clearly identifiable. Every increment within a scale does not need to be shown, but intervals between marks on the graph should be in proportion and consistent. Care should be taken not to distort or misrepresent your data through inappropriate use of scale (unless that is your aim!). It should be possible to compare different graphs within the same report and so similar scales should be used. This is especially important if two graphs are juxtaposed—placed side-by-side.

It is sometimes necessary to provide other supplementary text with the graphic. This may include, for example, a footnote in the form of a key or legend to clearly explain the use of symbols or icons within the graphic, to provide full explanation of abbreviations used (for example in the header on a column in a table) or to provide the source of the information contained within the graph or table or the source of the graphic itself. Sometimes a footnote may be provided merely to provide further explanation that neither the title nor subtitle could incorporate.

As with preparing written text for the body of the report, you will probably need to draft and redraft your graphics. Part of this process is to evaluate your work. Provided next is some information on how you could effectively review your graphics.

Reviewing a graphic you have created

Look at each of the graphics you have created very closely. A reader will be expected to interpret the information contained in each. You should therefore review each graphic, considering the following questions:

- Is it possible to summarise the content of the graphic in two or three lines? If not, the graphic may be too complex for the reader to comprehend. Does the graphic fully, yet concisely, illustrate the ideas, message and intent you had in mind in the body of the report? Should the information be split into a number of graphics if it is too complex?
- Is the graphic suitable for the intended audience, their educational background and their abilities to decipher the information? Does the graphic offer enough information to justify its existence? Do not include unnecessary detail which might be confusing or hide the important things you are trying to say.
- Is the type of graphic used the most appropriate? What are its features? Is some of the information in this form of graphic extraneous to the needs of your report? Should more detail have been included that this form of graphic precludes? Could the information have been passed on more successfully using a different type of graphic or, in fact, no graphic at all?
- Is the information easy to find and understand? Each graphic should not be too much hard work for the reader.
- Have the textual needs of the graphic been met? Does any accompanying text make the information in the graphic easier to understand? Could both the graphic and text be understood independently? Does the text make the graphic redundant? Remember that every piece of data within the graphic need not be explained in full in the text. Merely highlight the important facts, for example, the high and low points on a line chart, the big and small numbers on a table.

Selected readings

ACTRAC 1992, *NCS008: Graphic communication*, ACT Institute of TAFE, Canberra.

Anderson, P 1987, *Technical writing: A reader centred approach*, Harcourt Brace Jovanovich, Sydney.

Beisler, F, Scheeres, H & Pinner, D 1993, *Communication skills* (second edition), Longman Cheshire, Melbourne.

Coburn, E J 1991, *Business graphics: Concepts and applications*, Boyd and Fraser, Boston.

Foyster, J 1994, 'Do the right thing graphically', *Australian Training Review*, September-December, pp.4–7, NCVER, Adelaide.

Holmes, N 1984, *Designers' guide to creating charts and diagrams*, Watson Guptill, New York.

McMahon, B & Quin, R 1984, *Exploring images: Picture analysis and activities for students*, Bookland, Perth.

15 Ethics in research

John Stevenson

Ethics in research

The question of ethics in research is one which often does not receive the attention that is warranted. In earlier times, research was undertaken which would not be tolerated today. For instance, research which conditions people, research which harms people, or certain forms of animal experimentation and research which exploit participants and other groups.

Apart from general ethical considerations, there are specific ethical questions relating to such matters as:

- conflict of interest;
- the design of research strategies;
- participation in research;
- confidentiality;
- the collection of data;
- the ownership of data;
- the interpretation of results;
- the 'right to know' the findings of research;
- the use and misuse of findings;
- fiscal responsibility; and
- the dissemination and publication of findings.

These questions concern the researcher(s), any agencies involved in funding the research, the participants in the research, any research assistants, the institutions involved and the wider research community.

Let's examine these matters in turn.

Conflict of interest

Conflict of interest is often unavoidable. A researcher has a vested interest in the results of an investigation, where that investigation is related to the researcher's own theoretical position. Similarly, participants in research have an interest in the outcomes, as do agencies that fund particular innovations.

Researchers should deal with conflict of interest, openly and honestly. That is, a researcher should identify possible sources of conflict of interest, make them explicit and take measures to deal with them. For instance, in evaluating a course which one has designed, the researcher could ensure that a variety of views from a variety of sources are collected, could ensure that others, not involved in the design of the course, have a primary role in data collection and interpretation, and so on.

Design of research strategies

One ethical concern with research strategies is the effect that the research will have on participants in the research. Research can be *interventionist*, i.e. it can involve the presence of an observer in a situation or the manipulation of a setting, or it can be non-interventionist, i.e. it may consist largely in such activities as the perusal of published or archival materials which already exist. While research strategies that are non-interventionist have fewer ethical problems in the design of the research, in that they do not directly affect processes in a setting, they have problems concerned with selectivity in choosing which materials to study and which frameworks to use in interpreting the materials.

In *interventionist* research designs, care needs to be taken to avoid adverse effects for the participants. For instance, in testing an innovative teaching method, it is usual to assign learners randomly to one or more control and treatment groups. This is problematic, as one set of learners may receive instruction that is superior to that of others. How can the researcher justify providing a better learning environment for one set of students over another? What will be the likely negative consequences if the treatment is inferior to 'normal' instruction, e.g. the treatment group misses out on learning experiences that are important. The possible extent of such problems is also related to the subject matter of the instruction. For instance, consider the teaching of safety. Conversely, what justification is there for the control group to miss out on the treatment if that turns out to be superior?

The researcher should address these problems at the outset and ensure that negative effects are avoided. It is usually possible to ensure that no participant is worse off than they would have been in the absence of the research. This is achieved by ensuring that treatments are designed to be improvements and that action can be taken to overcome limitations if they occur.

For non-experimental designs, e.g. observational research, the problems are similar. The very presence of an observer is likely to alter the situation which is being observed, and this can have deleterious effects.

In *non-interventionist* research, there are also possible ethical problems. In designing a non-interventionist study, it is important to ensure that there is no undue selectivity in finding and attending to

relevant and appropriate materials. For instance, a difficult-to-acquire document which could present a rival view to that of easily acquired material should not be overlooked. Similarly, it can be attractive to attend to those materials that confirm pre-existing views and to minimise the importance of conflicting evidence. Care needs to be taken to identify the 'lens' through which one looks at evidence, and to identify the kinds of bias that are introduced. These possible sources of bias should be declared in reporting the findings of research.

Participation

Participation in research should be genuinely voluntary. That is, the researcher should ensure that participants can make *informed* decisions about being involved. While this does not necessarily involve making hypotheses known which could influence the validity of the research, it does involve ensuring that participants know who the researcher is, the reasons why the research is being undertaken, the benefits that will accrue to the researcher and others from the research, and the use to which the data and the findings will be put. As well as being informed, participants need to feel that they can withhold participation, without censure.

Researchers have an obligation for full and frank disclosure of findings. The relationship between this obligation and the extent to which confidentiality can be promised to participants needs to be examined carefully.

There have been many cases in social science research where participants have felt betrayed by researchers. They have felt that they have shared their innermost selves and that the researcher's interest and commitment has been transitory—just until the research has been completed. For instance, it has been compellingly argued that before groups consent to participation in research, they have a right to a commitment that findings will be used only to advance the interests of that group.

Consider research that, for example, a TAFE college may be involved in, that shows teaching is antagonistic to policy directives. What are the ethical responsibilities of the researcher? How can rival claims about the use of such information be resolved? Such issues indicate the importance of negotiating at the outset, the researcher's obligations to the participants and other parties.

Confidentiality

It is usual to protect the confidentiality of participants in research. There are confidentiality obligations in collecting, recording, storing and reporting data. Confidentiality can be achieved through such methods as: privacy in collecting data; reporting only group rather than individual data; or labelling individuals and institutions with letters rather than real names. Participants must know from the first what the conditions of confidentiality will be and how their identities will be protected. This obligation also extends to the storage of data in

such a way that it cannot be accessed by people with no right to the information.

In discharging one's obligations to report the results of research back to individuals and groups who participated in the research, it can be difficult to protect the anonymity of individuals from others in the same organisation who may be able to speculate about the authorship of comments that are reported. This difficulty needs to be acknowledged and addressed when deciding how to report findings back to individuals and groups, and in any future dissemination and publication of findings.

Collection of data

Perhaps one of the clearest ethical obligations of researchers is to collect and report data accurately and without alteration. Care should be taken to ensure valid and reliable measurement. There is also an obligation to collect and report all relevant data and to maintain that data safely. For this reason, it is usual for researchers to store their raw data for at least seven years after the research has been published —so that others may have access to the data and conduct further analyses.

However, the obligations in collecting data go further than this. They involve ensuring that the best data available are collected—that is, data from a full range of sources, data from different kinds of situations, data from sources which are known to be especially salient, data which conflicts with preconceptions. That is, the researcher should not avoid collecting data because that data may challenge the argument that the researcher intends to make, or the hypothesis that the researcher wishes to test, or the pre-dispositions of those funding the research.

A particular problem arises in collecting data through questionnaires and surveys. Such instruments are often used in order to gain responses to a uniform set of questions, which can then be analysed statistically. However the setting of the questions can be biased. The questions can de-limit the responses. They can represent just one set of concerns and leave little space for rival or un-identified concerns; they can overpower the respondent so that comments are not made, even if space is provided for them. These kinds of problems are often used to criticise positivistic research, i.e. research where pre-set concerns are examined and actual pressing concerns can be overlooked. One way of overcoming such problems is to involve participants in identifying concerns that will be surveyed, and using these as the bases for instruments; or using such techniques as Delphi to fashion a consensus about the importance of issues in an open-ended way.

Ownership of data

Ownership of data should be negotiated at the outset in research. Possible rival claims for ownership may come from the researcher, research assistants, funding agencies, and the participants in the research. There are no recipes for deciding who owns the products of

research. Rather, agreements need to be reached. Some examples of the kinds of agreements that could be reached are as follows: It could be agreed that the data be owned by participants in the research, and that any use of the data be subject to their permission; it could be agreed that ownership of the intellectual syntheses made from the data rests with the researcher; it could be agreed that research assistance and funding support be acknowledged in any publications arising from the research; it could be agreed that research assistants be invited to contribute to publications directly arising from the research.

Researchers and funding agents need to reconcile competing demands for ownership of the intellectual property that flows from research, as this has implications for publication, use of results and application of findings in possible future commercial ventures. It is usual to agree that the person(s) responsible for conceptualising the research and synthesising the findings owns the intellectual rights.

In choosing to participate, participants need to be aware of who will own information that is collected about them, and the limits to which the data will be put, without further permission. Research assistants need to know who will get the recognition from the research and in what ways their own participation will be recognised and acknowledged.

Interpretation of results

Several ethical questions arise in interpreting research results. These concern the limitations of the research design, the frameworks employed in making the interpretations, the use of others' ideas, and the use made of the interpretations.

The interpretation of results should be rigorous, i.e. only justifiable conclusions should be reported. In interpreting results, the researcher is obliged to acknowledge the limitations of the research design. It would be unethical to claim, for instance, that results from a limited case study could be generalised to the population as a whole. Similarly, it would be unethical to claim the results from a carefully controlled experiment would be directly applicable in a natural setting without such controls. Thus, a researcher should declare the limitations of the research design that has been employed and the limitations that this has for interpreting the results and generalising the findings.

In interpreting results, one examines findings from one point of view or another. For instance in experimental research, an hypothesis is generated from a particular theoretical position. In interpreting the results, the confirmation or otherwise of this positions needs to be discussed. If the theoretical predictions are not upheld, then the theoretical basis of explanations which are advanced, need also to be declared. Likewise, in qualitative research, the 'lens' through which the researcher selects data for attention, interprets those data and reports patterns in the data needs to be identified and analysed. As it

is impossible to free oneself totally from pre-dispositions to data and interpretations, it is important to be aware of these dispositions and to state what they are. Then the audience for the research findings is aware of the bases underlying the patterns that emerge and their interpretation.

A researcher is obliged not to plagiarise. That is, the use of the ideas of others should be fully acknowledged. Any material used from another source should be annotated accordingly. Reported findings should be accompanied by a list of references to the work of others used in the design of the research and the interpretation of results, and the text should refer explicitly to these references.

In using any research findings, including those of the research which is being conducted at the time, it is important to acknowledge the source of the findings and the context of the original research. Otherwise, mis-interpretation of the research is likely.

Right to know

There is an obligation on researchers for full and frank disclosure. It is generally accepted that participants in research have a right to know the results of the research, the interpretations made from the data and the uses to which the research will be put, and how their interests will be protected and advanced.

However, when the research is funded by an external agency, that agency also has rights in connection with the findings. If the results are sensitive, or if the participants have placed limitations on the use of the data, then the researcher may have to negotiate with the participants the dissemination of results to other parties.

An example may be that in evaluating a governmentally funded course, it is found that better instructional approaches could be taken. Indeed, this finding may have been reported by teachers who had reflected on their own practices in the course. Would it be ethical to report to the funding agency that there were limitations in the instructional approaches that had been used, with the possible effect that future funding may be withheld? Or would there be some way of ensuring that the findings were reported in such a way that the trust of the participants is respected and the obligations to the funding agency discharged? These are difficult questions which are answered more easily when prior negotiation has taken place.

These problems can be minimised if consent of the parties is gaomed prior to the research. Nevertheless, some findings may not be made known beyond the participants in the research for various reasons. Confidentiality may be violated or it may not be in the interests of participants for third parties to know the findings, and it may not be ethically necessary to disclose them.

Use and misuse of findings

Once data have been collected and interpreted, the possible use or misuse of findings arises. Again, it is sensible to negotiate this matter before the research commences so all parties know how the research will be used. Early anthropological research is often criticised because the participants shared their personal stories and myths with researchers, only to find out later that the research findings had been used to deride the practices of the participants, or to support their continuing oppression.

Researchers have an obligation to consider how the findings from their research may be misused and to protect participants from such misuse. It is often taken that research should proceed only if it is aimed at improving some phenomenon, e.g. improving teaching and learning; improving participation rates; improving the targeting of funding. Once the purpose of the research is clearly understood, measures can be taken to ensure the findings are related explicitly to that purpose, minimising the misinterpretation or misuse of the findings.

Dissemination and publication of findings

The dissemination and publication of findings need to take account of the possible use and misuse of research findings and the 'right-to-know' considerations outlined above. Care needs to be taken to protect the interest of individuals and groups who have placed their trust in the researcher.

Other matters that need attention relate to the rights for recognition and acknowledgment of other parties. In publishing, for instance, the recognition that accrues should be shared by those who contributed to the research. In dissemination, through reports, conference presentations, workshops and the like, the same obligations apply.

When material is submitted for publication, in journals or as monographs, there is an obligation on the author(s) that the material is original and has not been published previously.

Appendix A: Using the vocational education and training database

Marjolijn Jones

A handbook such as this will have been compiled with the help of information sources accessed in libraries, be they personal, special, or university ones. Some of the resources consulted will have been reference books, bibliographies and databases.

Vocational education and training (VET) are subject areas that are rich in information materials. VET is also fortunate that it has a dedicated clearinghouse information network in Australia and New Zealand, which compiles its own database.

The Vocational Education and Training Clearinghouse Information Network

This information network provides information on:

- published and unpublished documents, articles and non-print materials about vocational education, training and related areas in Australia, New Zealand and internationally, with emphasis on the Asian and Pacific Region;

and

- projects in progress in the vocational education and training areas in Australia and New Zealand.

There is a designated VET Clearinghouse in each of the eight Australian States and Territories and two National Clearinghouses, one for Australia, one for New Zealand. In addition, there are two specialist clearinghouses, one that looks after the adult and community education (ACE) sector and one that records the Australian National Training Authority (ANTA) and other relevant national publications.

In Australia each State or Territory clearinghouse is located at the local TAFE or training authority or in a designated library. The National Clearinghouse for Australia is located at the National Centre for Vocational Education Research in Adelaide. New Zealand's National Clearinghouse is located at the library of the Auckland Institute of Technology.

All clearinghouses collect local or subject-specific information, prepare entries for the Vocational Education and Training Database and provide access to the material collected and indexed.

The role of the Australian National Clearinghouse is to:

- co-ordinate access to information forwarded by the local clearinghouses by producing and publishing the Vocational Education and Training Database (VOCED);
- collect, edit and publish information about on-going research in vocational education, training and TAFE via VOCED;
- be the Australian focal point of the Asian and Pacific Skill Development Information Network (APSDIN) of the International Labour Organisation (ILO);
- be the lead institution in information networking for the Asian and Pacific Skill Development Programme (APSDEP) of the ILO;
- collect and make available national, regional and international information about vocational education and training in database and published formats;
- maintain links and establish partnerships with other related information networks and clearinghouses like the Educational Resources Information Centre (ERIC).

What does the National Clearinghouse Information Network do?

In producing the Vocational Education and Training Database it aims to:

- give greater access to national, regional and international vocational education and training information and materials;
- encourage new initiatives in this educational sector;
- provide avenues and opportunities for promotion, publicity and dissemination of material and information;
- prevent the duplication of research and other initiatives, thus reducing wastage of resources;
- provide help-desk support and training in the use of the database.

Vocational Education and Training Database

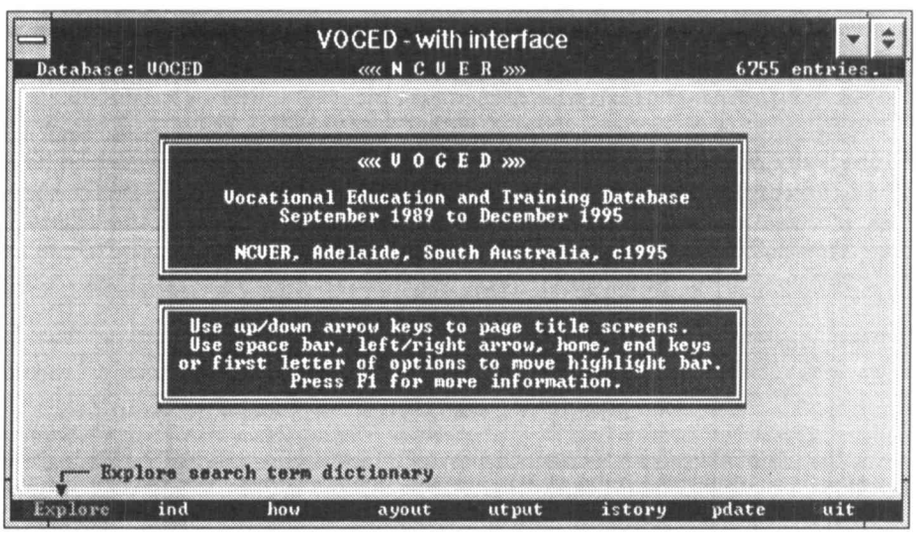
The product of the National Vocational Education and Training Clearinghouse Information Network is the Vocational Education and

Training Database, which appears quarterly from the NCVER in two formats:

- data diskette using the CDS/ISIS (MicroISIS) software
- hard copy.

The database includes entries on:

- research reports
- evaluation studies
- policy documents
- curriculum materials
- survey results/questionnaires
- proceedings (workshops/seminars/conferences)
- theses
- bibliographies
- research projects (ongoing, current and planned)
- periodical/journal articles.



How can documents be located?

Once references are located via the database, requests for the documents should be directed to the clearinghouse from which the material originated.

Where the clearinghouse is not involved in the distribution, requests are to be forwarded to the source or location listed in the 'availability field' of the record.

Some items may only be available through the interlibrary-loan service. For further details, please ask your librarian or local clearinghouse officer.

How can contributions be made to the clearinghouse and VOCED database?

One way to tell others about one's research and development activities is to contribute to the clearinghouse.

Contributions may be made to the clearinghouse by completing the document submission form (printed in the hard copy of the database, or available on request from any clearinghouse, accompanied by (where possible) two copies of the material to the clearinghouse. Journal articles and conference papers, as well as any unpublished material (e.g. theses) are also most valued by the clearinghouse.

Forms to describe new and on-going research and development projects are also available from any clearinghouse.

Asian and Pacific Skill Development Information Network (APSDIN)

The National Centre for Vocational Education Research has been the Australian focal point for APSDIN since 1986. APSDIN is a regional international Labour Office (ILO) initiative. Since 1992 NCVER has been also the lead institution for Information Networking for ILO/APSDEP (Asian and Pacific Skills Development Programme).

The involvement with APSDIN means that awareness of the role of information in the development and improvement of vocational training in the region can be encouraged. Through the VOCED database Australian and New Zealand material can be promoted in the region, providing avenues for partnerships, export potential and consultancies.

As lead institution, the clearinghouse provides leadership and assistance in establishing local information networks, strengthening library collections and services and training in library and database management.

The APSDIN database is currently incorporated in the Vocational Education and Training Database. Information and documentation received from other APSDIN members is processed and edited by the National Clearinghouse for inclusion in VOCED. Where possible, most documents are made available on interlibrary loan from the National Clearinghouse.

Other international information of significance to the Australian and New Zealand vocational education sector is included in the APSDIN section by the National Clearinghouse.

New Zealand

New Zealand joined the Clearinghouse Information Network in 1992. The National Clearinghouse for New Zealand is located at the library of the Auckland Institute of Technology, which is establishing a network of partners through the Polytechnics, encouraging contribution to the New Zealand Clearinghouse and the VOCED database. Access to materials received from Australia and New Zealand is provided by the Auckland Institute of Technology Library.

Through the international distribution of the VOCED database, New Zealand and Australian material together gain very wide exposure.

Adult and community education

In 1994 the Council for Adult Education (CAE) in Melbourne undertook to host the ACE clearinghouse. This important sector is difficult to cover adequately, due to the large spread of activities and locations where ACE is conducted. Information about this sector is crucial, both in reference to progression into vocational education and as a means of life-long learning.

The Vocational Education and Training Database is available on subscription from the address below.

National Vocational Education and Training Clearinghouse Information Network.

National Centre for Vocational Education Research (NCVER)
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Leabrook SA 5068
Australia

Phone: +61 (08) 332 7822
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Appendix B: Current research studies related to VET

(Prepared by Paul Ainsworth)

This appendix contains studies which are related to VET. The list is by no means exhaustive. The studies are grouped into interest areas for when you are looking for background information for a study of your own or if you are seeking guidelines for how to proceed at some stage of research design.

Teaching and learning in TAFE

Teaching contexts

Biggs, J 1994, 'Learning outcomes: Competence or expertise?', *Australian and New Zealand Journal of Vocational Education Research*, 2:1, NCVER, Adelaide.

Bloch, B, Thompson, P 1994, *Working towards best practice in assessment: A case study approach to some issues in competency-based assessment in the vocational education and training sector*, NCVER, Adelaide.

Bruhn, P, Guthrie, H 1991, *Learning Guide no.1: How to write a learning guide*, NCVER, Adelaide.

Cesnich, J, Lundberg, D, & Guthrie, H 1994, *Printing industry training plan: The challenge of change*, Adelaide, NCVER.

Evans, G 1994, 'Institutions: Formal or informal learning?' in *Australian and New Zealand Journal of Vocational Education Research*, 2:1, NCVER, Adelaide.

Gonczi, A 1992, *Developing a competent workplace*, NCVER, Adelaide.

Guthrie, H 1987, *Computer managed learning: A monograph*, NCVER, Adelaide.

Hall, W C & Are, L 1991, *Improving effectiveness*, NCVER, Adelaide.

Simmons, V 1994, *Managing for quality and innovation: An introductory manual for managers of vocational training centres*, NCVER, Adelaide.

Wexler, P 1994, 'Educational corporatism and its counterposes', *Australian and New Zealand Journal of Vocational Education Research*, 2:1, NCVER, Adelaide.

Williams, R, Benson, G, Neate, J, & Palmer, D 1991, *Technologies for teaching*, NCVER, Adelaide.

Wilson, R & Hooper, P 1987, *Computer assisted learning in basic adult education*, NCVER, Adelaide.

Institutes and colleges

Brunner, S & Haigh, J 1990, *A national review of student services in TAFE*, NCVER, Adelaide.

Butterworth, P 1994, 'VET research in Australia: A long way to go', *Australian and New Zealand Journal of Vocation Education Research*, 2:1, NCVER, Adelaide.

Clayton, B 1992, *Predictors of success in TAFE courses*, NCVER, Adelaide.

Cope, R & Sherr, L 1991, *Total management for organizations: Concepts and tools*, NCVER, Adelaide.

Guthrie, H 1988, *Performance indicators in TAFE*, NCVER, Adelaide.

Guthrie, H 1988, *Performance indicators revisited*, NCVER, Adelaide.

Guthrie, H & Loveder, P 1990, *Approaches to multiple entry and exit points for the Associate Diplomas*, NCVER, Adelaide.

Guthrie, H, McCurdy, S, Jamison, B & Bell, M 1988, *Making changes: Evaluation and validation of TAFE programs*, NCVER, Adelaide.

Hall, W C 1987, *The continuing education needs of academic staff: Fulltime TAFE college lecturers*, NCVER, Adelaide.

Hall, W C, Hayton, G, Mageean, P & Scarfe, J 1990, *National review of TAFE teacher preparation and development–stages 1a and 1b: Skills and competencies*, NCVER, Adelaide.

Hall, W C, Dean, S, Guthrie, H, Mageean, P & Scarfe, J 1991, *National review of TAFE teacher preparation and development–stage 2: Models*, NCVER, Adelaide.

Henderson, C 1990, *TAFE college councils: Strategies for increased effectiveness*, NCVER, Adelaide.

Mageean, P 1987, *The continuing education needs of academic staff: Senior college staff in TAFE*, NCVER, Adelaide.

Mageean, P 1990, *Facilitated appraisal for college executives (FACE): A handbook for users*, NCVER, Adelaide.

Scarfe, J 1991, *National review of TAFE teacher preparation and development: Literature review*, NCVER, Adelaide.

Thompson, M & Krzemionka, Z 1990, *Student selection procedures: Business studies*, NCVER, Adelaide.

Walsh, L 1992, *Student destination surveys: Design and development of an instrument for use by TAFE agencies*, NCVER, Adelaide.

What is taught

Barnett, K 1994, 'Training reform and community providers', *Australian Training Review*, March/April/May, NCVER, Adelaide.

Barnett, K & Wilson, S 1994, *Challenges and choices: Study of four providers of adult community education*, NCVER, Adelaide.

Hatherly, S, Theiring, J & McLeod, J 1992, *Technical mathematics*, NCVER, Adelaide.

Hayman, S & Jones, M 1994, *A guide to the vocational education and training database* (3rd edition), NCVER, Adelaide.

Hayman, G & Loveder, P 1992, *Skills audits*, NCVER, Adelaide.

Steele, J 1994 'Benchmarking maths', *Australian Training Review*, March/April/May, NCVER, Adelaide.

Stevenson, J 1994, 'Interests in post-compulsory education and training: Vested or community-based', *Australian and New Zealand Journal of Vocational Education Research*, 2:1, NCVER, Adelaide.

Thompson, P & Storey, G 1988, *Transferable skills in technical and further education: Integration within the curriculum*, NCVER, Adelaide.

Teaching and learning in the workplace

Anderson, T 1991, *Industry liaison for TAFE teachers*, NCVER, Adelaide.
Billett, S 1993 'Authenticity and a culture of practice within modes of skill development', *Australian and New Zealand Journal of Vocational Education Research* 1:2, NCVER, Adelaide.
Bone, J 1988, *Training models used in industry*, NCVER, Adelaide.
Bruhn, P & Guthrie, H 1991, *Designing learning guides for TAFE and industry*, NCVER, Adelaide.
Clark, T 1991, *Getting to grips with on-the-job training*, NCVER, Adelaide.
Clyde, A 1991, *Getting to grips with key technologies*, NCVER, Adelaide.
Ferguson, M D 1992, *Workplace analysis of the printing industry in South Australia*, NPITC, Adelaide.
Hall, W C 1988, *TAFE/industry liaison cassette*, NCVER, Adelaide.
Hall, W C 1988, *TAFE/industry partnership: Towards more effective relationships in course development and implementation*, NCVER, Adelaide.
Hall, W C 1988, *Teaching the social implications of technological change*, NCVER, Adelaide.
Hall, W C 1991, *Links between TAFE and industry: A TAFE perspective*, NCVER, Adelaide.
Hayton, G, Toop, L & Mageean, P 1991, *Methodologies for the measurement of client satisfaction with TAFE services: Summary report*, NCVER, Adelaide.
Poole, M 1992, *Education and work*, ACER, Hawthorn.
Sheldrake, P 1988, *The technical and further education system and industry: Joint use of facilities*, NCVER, Adelaide.
Stevenson, J 1992, 'Australian vocational education: Learning from past mistakes?', *The Vocational aspect of education*, 44:2.
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Stevenson, J 1994, *The changing context of vocational education*, Centre for Skill Formation Research and Development, Griffith University, Nathan.
Stevenson, J 1993, 'Competency-based training in Australia: An analysis of assumptions', *Australian and New Zealand Journal of Vocational Education Research*, 1:1, NCVER, Adelaide.
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