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What tradies know about what tradies
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of trade instructors about knowledge and
knowing

Colin H. Ducker
University of Wollongong

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Declaration of Originality

I certify my authorship of the thesis report submitted today entitled:

What tradies know about what tradies know:
An exploratory study of the views of trade
instructors about knowledge and knowing

in terms of the University of Wollongong Course Rules set out in the
Postgraduate Calendar.

Colin H Ducker

30 June 1995

Abstract

This study began in observations about an apparent tension between the views held by trade instructors and the curriculum and instructional formulations with which they work in the vocational education and training setting. Three research questions emerged: Do trade instructors use frameworks or systems of beliefs, values, attitudes and feelings that guide their approach to knowledge and knowing? What are the main typologies that underpin these frameworks? Do the views of trade instructors embody characteristic ways of presenting or perceiving reality? These questions guided a systematic search for understandings of the ways trade instructors construe knowledge. It involved uncovering, clarifying, and authenticating the ways in which they interpret and give meaning to knowledge and knowing.

The trade instructors in this study portrayed a strong commitment to a typology based on a practical-theoretical dichotomy. They presented 'practical' knowledge as the essence of what constitutes valued and valid knowledge. This is a concept that has breadth and complexity. Essential characteristics of practical knowledge are captured in terms such as 'craftsmanship', for it enables the tradeworker to perform with mastery, excellence and proficiency across a variety of settings, and within the full tutelary spirit of the trade. It outcrops in the tangible processes, materials and outcomes of the trade and these act as the primary referents for what counts as valid knowledge. Because the dominant context in their lives is the skilled trades, these trade instructors derived significant aspects of their views from the nature and practices of work in the skilled trades, including the notion of lineal descent as the process for acquiring valid knowledge.

In seeking theoretical development, the study moved through several major phases: the systemisation of existing theories and research; an in-depth and intensive study with a small number of trade instructors to expose constructs that underpin their views; and a survey of a large number of trade instructors to explore the extent to which the constructs are shared by other trade instructors.

Acknowledgments

Dr Michael Wilson was my supervisor. He was the consummate supervisor - rigorous and incisive, supportive and empowering, generous with his time and his intellect. His commitment to the research effort and to my candidature was principled and unerring. Any attempt I make to represent my appreciation for his efforts always will be inadequate.

I am very grateful to the tradies who worked with me and supported this study - the greyhound, wild billy, the old bloke and all the rest of them. I feel privileged to have been able to gain some insights into who they are and to project, through this thesis, something of what they're about.

I thank, most sincerely, Dr Ken Russell, of the Faculty of Informatics. His responses to my dilemmas about data-manipulation and statistical treatments were meticulous and erudite.

Professor Ron King opened up my study opportunities at the University of Wollongong; and Associate Professor Tony Fielding provided encouragement and direction during the early and tentative steps of the study. I thank them both.

The staff and the graduate students of the Faculty of Education and the Graduate School of Education provided a stimulating and invigorating context within which to work. They created the ferment of scholarly excitement that promotes the research endeavour.

Many of the senior staff of the TAFE institutions in the Illawarra region and the Australian Capital Territory facilitated my work. I thank them all and hope that this thesis vindicates their trust in me.

The members of my family shared the process of my study and gave unending support. Throughout it all, and well beyond, Camille was my mentor, my counsellor and my first-best friend.

C.D

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Chapter One

Theoretical Considerations: The Research Problem and its Background

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The Age

Today's Issue Consists of 3 Pages

**MELBOURNE, THURSDAY
2ND MARCH, 1899**

It has become a trite saying nowadays that the man who would thrive must not only work, but work with knowledge. The unskilled toiler, be he ever so industrious, must remain a hewer of wood and a drawer of water, even if he be lucky enough to get wood to hew and water to draw. A nation of unskilled laborers has no hope and no choice but to fall into national decadency. It is the realisation of this truth which has given such point and pungency to the cry for a policy of technical education.

Free-traders themselves, in view of the striking manner in which German and American manufacturers have overtaken and surpassed Englishmen in more perfected appliances, and in their greater inventiveness, have agreed that the insular pride and unadaptability of the Briton must give place to the pliability of the foreigner unless Great Britain is to surrender under free-trade the pre-eminence which she has achieved. The English workman is not educated as the German is; or as the American is. German statesmen, twenty years ago were wise enough to foresee, what we all see now, that "polytechnic education and philosophic training" were to be the levers of the immediate future. There is not a new discovery, from the treatment of aniline dyes to the electrical working of metals which her manufacturers are not prepared to take instant advantage of. In America it is the same. Every workman, while drilled with the precision of a soldier in a regiment, is taught to act his part not as an automaton, but as a thinker. In the contest between skilled labor working in a groove and skilled labor alert and plus intelligence, the victory has gone to the latter.

All this is in our time the ABC of the workman's primer. Knowledge wins; education takes the palm.

Chapter One

Theoretical Considerations: The Research Problem and its Background

1.1 The Focus of the Study

This editorial portrays particular notions of the kinds of knowledge appropriate for the labour force and the role such knowledge might play in the broader social setting. In essence, the article questions the adequacy of knowledge created in the workplace and handed down from worker to worker through common engagement in the production process. It portrays visions of this knowledge infused with higher attributes and acquired through systematic and directed learning. Though written a century ago, through the journalistic style emerge glimmers of underlying perceptions about what constitutes valid vocational knowledge and about ways of acquiring such knowledge. Perceptions of what constitutes valid knowledge and ways of knowing are the focus of this study.

Since this editorial was published, the knowledge deemed appropriate for workers increasingly has become the subject of organisation and systemisation. It has become the province of education and training institutions - highly formalised agencies for the educative process. Professional knowledge practitioners now use curriculum and instructional formulations - specific to and determined by the institutions - to manage knowledge which, hitherto, was created in the workplace and which workers acquired experientially and, perhaps, vicariously. Specialised processes exist for the extraction, the distillation

and the transformation of this knowledge into forms more suited to instruction and to institution-based learning. And the status of knowledge acquired through institutionalised learning has grown to the point where now it dominates occupational positions across the spectrum - embracing even hewers of wood and drawers of water.

In reflecting on such evolution in respect of technical education in Australia, Murray-Smith (1966) suggests that the initial impetus for change contained no clear concept of what kind of knowledge was being sought. Rather, he suggests, it is more likely that there was a hope that, by establishing a system of technical education, significant community problems and concerns would be addressed. He describes this as a nineteenth century equivalent of painting pregnant cows on the walls of the Lascaux caves in pre-historic times in the hope of a good killing the next day. In some senses at least, the vision has become reality for, as Gilbody (1987) suggests in respect of the modern vocational education and training systems - of which technical education is now but a part - not only has learning become institutionalised over time but also the systems that encapsulate such learning have 'entered a paradigm condition'¹ (Gilbody 1987: 8). That is, there has developed a demeanour and a coherence within and across these systems derived from agreement about purposes, acceptance of fundamental concepts and positions, commitment to particular rules and standards, and the establishment of normative structures that dictate what constitutes acceptable professional behaviour. Such a condition establishes and maintains processes for the selection and organisation of the sorts of

¹ Gilbody here is borrowing from the work of Kuhn (1970).

knowledge and ways of knowing that are acceptable within the paradigm and, thus, within the institutions.

An intriguing setting in which to consider questions about the ways in which this dominant paradigm is enacted in modern times - including those about the nature of knowledge and knowing - is that of training for the skilled trades. Here, the institution of apprenticeship provides both the conceptual and organisational underpinnings for the identification, selection and acquisition of what is considered valid knowledge and valid ways of knowing. In its structure and practice apprenticeship poses a tantalising juxtaposition of the doctrine that serious learning proceeds unmediated by didactic instruction with the modern imperative that learning be pursued through directed and systematic inquiry under the auspices of a dedicated institution - now, primarily, colleges of Technical and Further Education (TAFE). The study reported here is framed within this setting.

In part, this thesis is the report of a study that explores what constitutes valid knowledge and valid ways of knowing in the area of the skilled trades. More specifically, it is the report of a study of the beliefs, values, attitudes and feelings about the nature of knowledge and knowing held by those tradeworkers² who move from the skilled practice of their trade to become instructors³ in colleges of Technical and Further Education. Further, it speculates on the implications of these views for other

² The term 'tradeworker' is used in this thesis in preference to the terms 'tradesman' or 'tradesperson'.

³ The term 'instructor' is intended to include terms such as 'teacher', 'lecturer', and 'trainer', commonly in use in post-compulsory education, TAFE and training. The term 'teacher' is reserved for teachers in schools - except where included in a quotation.

elements of the dominant paradigm that disciplines training for the skilled trades, including curriculum and instruction.

But in addition to reporting the study, the intention of this thesis is to move towards an empirically-supported theory of trade instructors' 'epistemologies' - the term being used here to refer to the general area of beliefs, values, attitudes and feelings concerning what constitutes valid knowledge and ways of knowing. This use of the term 'epistemologies' recognises a distinction between the philosophical propositions with which the term is traditionally associated and the sociological propositions that accompany views of knowledge and knowing. The former are concerned with questions about what knowledge is - Is *a priori* knowledge possible? What is the difference between knowledge and belief? What are the necessary and sufficient conditions for truth statements?⁴ The latter dimension, which more adequately contains the focus of the study and the thesis, is concerned with questions about social forces and their effects on knowledge claims. The thesis draws support from the work of a number of scholars who argue strongly for a theory of epistemologies that relates to a social dimension of analysis, and it is in this sense that the term is used here.

The focus on a social dimension of analysis and its application to trade instructors under the banner of 'epistemologies' has precedent in previous research. For example, Lyons (1990), Luttrell (1989, 1984), Clandinin and Connelly (1988), Noddings (1985) and Young (1981)⁵ each have used this same interpretation in their research. Like the study

⁴ As exemplified through scholars such as Kant, Plato, Locke and Descartes.

⁵ The research efforts reported by Luttrell (1989) and Young (1981) relate to doctoral studies.

reported here, each falls clearly within the field of Education; and each draws on a theoretical and methodological corpus that is an amalgam of different disciplines and points of view. Thus, to varying degrees, the studies are supported by contributions from the disciplines of Anthropology, History, Sociology, Philosophy and Psychology.

Guiding this study were three questions, the explicitness of which disguises both the starting points and the development that occurred as the study progressed. In summary form the questions are:

- *Do trade instructors use frameworks (that is, do they hold systems of beliefs, values, attitudes and feelings) that might, potentially, guide their approach to knowledge and knowing?*
- *What are the main typologies involved in the views held by trade instructors about the nature of knowledge and knowing?*
- *To what extent do these views embody characteristic ways of presenting or perceiving reality - perhaps canons or rules?*

These research questions were not posed at the beginning of the study. The study is in an area where theory that can be made directly relevant to the questions is scantily developed, and for which the existing research base is meagre. Thus, the study began as an area of concern supported only by unfashioned observations, apperception, and intuition. The questions emerged as the framework of the study was crafted from the available literature, related theory and research, scholarly discussion and systematic empirical exploration of the area.

As noted earlier, addressing these questions places the study in a position to be able to begin the exploration of the implications of trade

instructors' views of knowledge and knowing for instructional and curriculum formulations in vocational education and training, and for the formal preparation of tradeworkers as trade instructors. Also, it places the study in a position to identify avenues for further research in the area.

1.2 The Structure of the Chapter

This chapter contains six sections. The first (Section 1.1) is the introductory section that provides a general orientation to the study and answers the question 'What is this study about?'. The second section (Section 1.2) is this overview of the chapter. Sections 1.3 and 1.4 describe how the study emerged from its beginnings in observations through to the early formulation of the research questions. These sections are important because the study sought to break into an area for which there is no tradition of scholarly research, and the pathway into such research needs to be illuminated. Section 1.3 describes the ways in which the researcher's background and current and prior experience in vocational education and training helped to focus the study; Section 1.4 describes the search for support for the study through an early expedition into the theories, research and literature about vocational education and training in Australia available at the time the study was established.

Section 1.5 identifies the major questions addressed by the study, and the guideposts for research distilled from the early expedition into the theories, research and literature on vocational education and training in Australia. The final section is Section 1.6 which provides a general overview of the structure of the study and the thesis.

1.3 The Background to the Study

The initial stimulus for this study came from the researcher's professional activities in the formal preparation of instructors for vocational education and training⁶. Here, the researcher has been engaged in the provision of initial and ongoing professional development for both newly appointed and experienced instructors across a range of vocational education and training settings, including TAFE institutions. A major function in these activities involves addressing the issues and concerns of trade instructors as they engage the curriculum and instructional requirements of the institutions. Across a period of some fifteen years the researcher observed that, as they move from being practitioners in business and industry into instructional roles, tradeworkers struggle to balance the given curriculum and instructional formulations of the TAFE setting against more personal and, perhaps, more deeply held beliefs about the nature of knowledge and knowing. There exist many premonstrations of this struggle, but the following serves to illustrate the issue most aptly:

This bloody syllabus is a dog's breakfast. I was a qualified plumber and gas fitter for 22 years before I came here [to TAFE], doing everything these kids [apprentices] will ever do. I've never even heard of some of this crap. I have to spend hours sorting it out before I teach it. I'm just ahead of the kids. The poor buggers, how do they cope? ... When you get into the yard you can make some sense ... you've got a free go. It's something practical - you haven't got this bloody great list [syllabus].⁷

⁶ It is acknowledged that the terms 'technical education', 'vocational education', 'TAFE', and 'training' are used, and that specific meanings are attached to them in different settings. In this thesis, however, 'vocational education and training' is used to incorporate the institutionalised forms represented by these terms and meanings. The use of the term 'vocational education and training' (VET) is in keeping with the growing trend across Australia, as noted by Kinsman (1993).

⁷ The researcher observed that trade instructors commonly use irreverent or indecorous language, especially in the course of description or argument. Mealyea (1988) noted similar inurement.

This is an extract from an audio-taped interview with a newly-appointed trade instructor reflecting on the task of interpreting a curriculum document for a trade course in a college of Technical and Further Education. In large measure, the conflict faced by the instructor arises from the interaction of the curriculum formulations created by the institution as a way of organising vocational knowledge for instructional purposes, and his own ways of viewing the field. He perceives that he must subdue his own construction in order to work with a new way of thinking about the organisation of the knowledge, and new criteria for the selection of valid knowledge. He makes a distinction between those components of the curriculum that are enacted in classroom settings - the so-called theoretical components - and those that are enacted in workshop settings - the so-called practical components. Clearly, he feels more comfortable with the latter, in part because there are fewer detailed prescriptions in the syllabus about how knowledge must be organised and, in part, because the constructs about which knowledge is organised in this component more closely represent his existing frames of reference.

It is possible to distil from this simple example several of the factors that feature in the study - it portrays a conflict between what trade instructors 'know' by their experience of the workplace and what they are expected to teach under the curriculum and instructional formulations set by the institutions; it indicates the strength of the discord that exists, particularly from the perspective of the trade instructor; it provides hints about the sorts of knowledge formulations valued by trade instructors and the sources of those formulations; and, it alludes to the importance of the authority and status bestowed by becoming a qualified

tradeworker, including the sorts of relationships that are formed with new entrants to the field - in this instance, apprentices.

Beyond such observations about the experiences of others, the manifestations of trade instructors' struggles resonated with the researcher's own experiences. The researcher's career began in a setting dominated by learning through engagement in the production process - the electrical trade and the steel production industry. Like the tradeworkers in the study, this involved coming to value knowledge and ways of knowing acquired within a production setting - acquiring knowledge created in the workplace and passed from worker to worker. The researcher gained the authority and status associated with the qualification and the industrial/business experience, and then undertook the transition from practitioner of the vocation to instructor within the vocational education and training system. Here, the researcher experienced the process of integrating - perhaps, in some instances, suppressing - personal knowledge and ways of knowing with the given curriculum and instructional formulations of the TAFE institutions.

A subsequent stimulus for the study came from the researcher's more recent involvement in broader aspects of vocational education and training, under what became known in Australia as the 'Training Reform Agenda'. This phrase was coined in the late 1980's to encapsulate the realignment of skill formation policies and practices to the task of structural adjustment of the Australian economy and the moves towards greater national consistency in vocational education and training. By design, this was to impact heavily on the arrangements for

training for the skilled trades and on the nature of trade training as it is enacted within the TAFE institutions. Because of their historical origins in disparate and localised settings, the efforts of the many major vocational education and training systems had never developed any commonality of purpose or national focus. An assumption of the move to reform vocational education and training in Australia was that the development of a greater degree of national consistency, ultimately, would strengthen the infrastructure upon which the economic development of the nation could build and go on building (Ducker 1991). The researcher became involved in some of the major developments undertaken under the banner of the Training Reform Agenda - the establishment of the first national agency for the development of training curricula and training materials⁸; the development of standards⁹ for several major industry groups; the articulation of industry-based training with institution-based training¹⁰; and the development of employment-related key areas of competence for postcompulsory education and training¹¹.

The period of the late 1980's and early 1990's was one in which the epistemic culture of vocational education and training was subjected to

8 The researcher was a consultant to the VEETAC Working Party for the establishment of the Australian Committee for Training Curriculum (ACTRAC) and conducted a deal of the initial research and investigation on behalf of the Working Party.

9 The development, review and endorsement of competency standards provides a vehicle for industrial parties to ensure the integrity and continuing relevance of vocational education and training, both on and off the job. The researcher was a consultant to several Competency Standards Bodies charged with developing national industry competency standards, and to the National Training Board.

10 For example, the researcher was a consultant to the National Metals and Engineering Curriculum (NMEC) project.

11 The researcher was a consultant to The Committee to Advise the Australian Education Council and Ministers for Vocational Education Employment and Training on Key Competencies for Postcompulsory Education and Training (The Mayer Committee).

sustained challenge. Of particular importance to this study was the impact of the growth in commitment to an outcomes approach to vocational education and training, a key element of the Training Reform Agenda. This posed a significant challenge to such diacritical training institutions as apprenticeship.

... the apprenticeship system currently relies on time-serving as the basis for entry to tradesperson status. The training system, in apprenticeship and other areas, must move to a competency-based approach where entry to 'qualified' (eg tradesperson) status is based on achieving specified standards of skill.

(Dawkins 1988: 20)

The lessons of history seem to suggest that challenges to a dominant paradigm arise particularly at times of concern for social conditions and values, and western industrialised societies are marked by periods of fundamental rethinking - as represented in terms such as 'industrialism' and 'post-industrialism'. Within educational systems, periods of fundamental questioning are represented in terms such as 'educational progressivism' and 'open education'. As these terms were expressed in Australian education they extended to a questioning of the assumptions that underpinned the entire schooling system, including challenging what was accepted as valid knowledge and valid ways of knowing within the schooling context. More recently, there has been questioning of what knowledge is appropriate to be taught in schools, as represented in terms such as 'pre-vocationalism' and 'vocationalism' (D Gleeson 1989, Golby 1987, Grosch 1987). In similar vein, the Training Reform Agenda challenged what should be taught in vocational education and training and the basis for the development of training

curricula. It challenged the criteria by which the knowledge base for the training of a skilled tradeworker is established and judged. That is, the criteria which for so long were associated with, and internalised by the time-serving master-apprentice model of training were brought under scrutiny. The movement sought to remove these criteria from the tabernacle of institutionalised apprenticeship and to supplant them with explicitly-stated and externally set and monitored competency standards. Further, the emerging regime required that what constitutes valid knowledge and valid ways of knowing for a skilled tradeworker be defined and documented in ways that have never been attempted before in Australia. This became a period in which the dominant perspectives about training for the skilled trades were to be reshaped¹².

These experiences heightened the researcher's awareness of the social theses that surround differing conceptions of knowledge and knowing - as Jarvis (1985) points out, in social processes, of which training for the skilled trades is but one, 'theories, values, beliefs and ideologies will intrude' (Jarvis 1985: 31). It highlighted the need to extend questions about training curricula beyond the simple notion of the training curriculum as organised vocational knowledge and to relate to it as the organised and codified reflection of societal and ideological interests.

1.4 An Early Expedition into the Literature

The concerns that stimulated the development of the study focused on trade instructors' perceptions of what constitutes valid knowledge and ways of knowing in training for the skilled trades, and their apparent dissonance with the associated curriculum and instructional

¹² See, for example, DEET (1988) and ESFC (1991).

perspectives of the training institutions. An early expedition into the existing literature sought to clarify these questions in the light of what was known through theory and research. The process confirmed that the study sought to explore an area in which there existed only a small amount of systematic and empirically-based research evidence that could be made directly relevant to the study. This was not unexpected. It was encouraging, however that - as will be shown in this chapter - amongst the Australian literature there is an embryonic research base developing around the process of transition from practitioner of a vocation to instructor, and that within this there is recognition that some form of syncretism may exist amongst the perspectives about what constitutes valid knowledge and ways of knowing.

The international literature on vocational education and training is more abundant but, in very large part, it is based on organisational contexts considerably different from that of Australian instructors in TAFE. For example, many of the studies that might be deemed relevant to research into the nature of trade instructors' perspectives originate in the United States of America. In general, these have focused on Trade, Industrial and Commercial teachers, the closest American equivalent of TAFE instructors. The context of such studies is, generally, the secondary schooling system rather than a post-compulsory and apprenticeship-based system of training for the skilled trades. In Australia, vocational education and training is a sector different from secondary education and, in general, secondary schools do not provide specific occupational training. Many of the international studies focus on notions such as the 'vocationalisation' of the secondary curriculum and the relationship

between vocational and general education within the schooling sector¹³. Similarly, many international studies of vocational education and training focus on teachers who are selected and trained within the university setting - as are school teachers in Australia - rather than from the ranks of the practising and skilled tradeworker. The substantial difference in background between teachers and trade instructors means that considerable care must be exercised in selecting from the international literature, for a good deal of it is unable to inform the study in clear and direct ways.

The research and literature that deals specifically with vocational education and training in Australia can be separated into two periods, with the early 1970's providing the point of division. Prior to the 1970's there existed very little literature or systematic research in the area of vocational education and training. There had emerged over the years a number of state government reports - some dating back to the late 1800's¹⁴. Most of these merely support the importance of vocational education and training and are consumed by management, administrative and financial matters. Also, there is some research and commentary about the historical development of aspects of vocational education and training - often within works concerned primarily with the other more prominent sectors of education¹⁵. There are a few scattered reports of investigations and research efforts about other aspects of vocational education and training¹⁶, but many of these have

13 Essentially, Australia has abandoned the distinction between 'technical' and 'academic' schools within the secondary sector.

14 See, as an example of these, Fink(1899).

15 See, as an example of these, Barcan (1965).

16 See, as an example of these, Tregillis (1969).

lain fallow - they have not received support in the form of subsequent research or analysis.

Historical commentary on vocational education and training in Australia shows that the earliest attempts to systematise it grew from roots in the mechanics' institutes, working men's colleges and schools of mines in disparate locations around the country during the nineteenth century. Under the title 'technical education', it developed not as an identifiable sector of the Australian education system but as branches of state education departments, the major concerns of which were primary and secondary education. This led to an absence of any perception of technical education as a sector of education with its own responsibilities, and its condition at the end of the 1960's pointed not only to a lack of esteem but also to a belief that if it had any role to play it was limited to furnishing the *rite de passage* for those who wanted to achieve the status of skilled tradeworker. It was the forlorn cousin of state secondary education systems (Robinson 1990; Gilmour and Lansbury 1978). In this context, it is not surprising that there existed little in the way of a culture of research and that vocational education and training had received such scant attention from researchers. Even in the 1990's, 'common talk' within and about the vocational education and training sector suggests that it is characterised by such a degree of anti-intellectualism that research and theory are not valued as a basis for the development of practice.

In the 1970's vocational education and training entered the policy concerns of the federal government, and from that time there has been an upsurge of interest from governments, industry and community,

especially in the area of technical education. The beginning of this period is marked by the release of the Kangan Report in 1974 - a major inquiry initiated by the federal government and which spawned the title Technical and Further Education (TAFE). Subsequent inquiries were conducted in each of the states and territories. This growth in interest extended to, and stimulated research. In the initial stages, much of the TAFE-based research effort focused on the collection of statistical information about courses, enrolments, attrition rates, and demographic detail - in part, a response to the criticisms issued by the Kangan Report (Kangan 1974). Curriculum issues received attention, though much of the interest here was related to the development of the more procedural elements of course construction - research is yet to emerge on basic or fundamental curriculum issues that might lead to stronger theoretical positions. A good deal of interest has focused on pedagogical techniques, with a concomitant increase in activity in the area of 'teacher training' (Ducker 1991: 19). Much of this is more reasonably classified as development than research, in the sense that it is more related to the application of existing techniques to specific contexts than to critical inquiry. For example, in the late 1970's and early 1980's the surge of activity around the concept of microteaching was, in essence, the adaptation of existing work - developed for teachers in general education - to the task of training TAFE instructors rather than the development of theoretical positions that might underpin practice and which might take into account the specific characteristics of teaching in TAFE. More recently, the aspects receiving research attention include concepts commonly associated with the area of adult learning and adult education¹⁷ - self-direction in learning, reflective practice, learning

¹⁷ See, as examples of this, Boud (1985) and Knights (1987).

styles, identity and culture. In a broader context, there is a growing interest in the notion of Competency Based Training (CBT)¹⁸. In these developments is reflected a growing interest in advancing the theory that supports practice in vocational education and training, but it is in its early and rudimentary stages.

Butterworth and Gonczi (1984) undertook a critical analysis of the existing and emerging research. Their analysis led them to criticise strongly both the volume and the quality of research and discussion about vocational education and training. They pointed to the absence of scholarly attention being given to significant educational issues, and to the general willingness of vocational education and training to base its decisions on educated guesses. They argued that much of the flurry of activity that had been generated over the previous decade had taken place within a political and industrial atmosphere, and that this tended to obscure the more fundamental educational issues. It is clear that the research efforts that had emerged were dominated by survey and quantified observation studies¹⁹, statistical and correlational studies²⁰ and situational analyses²¹, most of which were directed at the solution of the most practical aspects of problems. Little attention had been given to the construction of positions that could support improved practice and which could provide an infrastructure for the ongoing development of effective practice. It was very much as Schultz (1988) had noted:

18 See, as an example of this, Collins (1993).

19 See, as an example of this, Richardson (1977).

20 See, as an example of this, Scherer (1981).

21 See, as an example of this, Seidel (1983).

Vocational education research appears, for the most part, to have been devoted to the solution of practical problems. Only in the last few years has the role of theories and/or conceptual frameworks begun to be addressed.

(Schultz 1988: 29)

One of the areas in which researchers have started to generate the sort of ferment required if theory development is to occur is the transition from practitioner of a vocation to instructor. Although the area is yet to develop definition and clear direction, a number of themes are emerging. One of these themes relates to the attitudes, values, beliefs and feelings held by trade instructors about the nature of knowledge and ways of knowing.

Hibburt (1978) undertook a study of tradeworkers making the transition to teachers of woodwork in Victorian secondary schools. The teacher training process provided the vehicle for the study, which focused on the tradeworkers' experiences of teacher training. Hibburt points to a lack of agreement between the teacher role perceptions held by the beginning teachers - former tradeworkers - and those responsible for their preparation for teaching. He suggests that the discrepancy arises because the tradeworkers contest the kind of knowledge base required for teaching, especially as portrayed in the content of the teacher training course. He proposes that their perceptions were generated from the previous training and professional socialisation of the tradeworkers, especially through the system of apprenticeship. That is, tradeworkers bring to the school setting perceptions that conflict with the dominant knowledge formulations of the institution because they were developed in the context of work in the skilled trades. However, Hibburt's (1978)

work was not directed, specifically, at searching for the fundamental nature of these perceptions. Rather, he was concerned to identify ways in which the approach to the organisation of teacher training could be altered to assist the tradeworkers to accept the existing and predetermined knowledge base of the teacher training program and, in turn, the curriculum and instructional formulations of the school. Clearly, this work was framed by the assumption that the curriculum formulations of the school are immutable or, at least, cannot be challenged in the context of preparing beginning teachers. Under such assumptions it is unlikely that questions about tradeworkers' perceptions of valid ways of knowing could move beyond identifying that such perceptions exist and that they are in conflict with the dominant view.

Gonczi (1985) examined the transition of experienced tradeworkers to the role of instructor in the New South Wales TAFE system. The research was conducted through survey and interviews and, again, drew heavily on the instructor training setting. The study found that the beginning instructors suffered from educational, administrative and personal problems, a number of which had been identified in Hibburt's (1978) earlier work. In particular, Gonczi identified the notion of tension between the tradeworkers' perspectives and the knowledge base required for teaching, especially as portrayed by the instructor training program. In large part, his work served to confirm that the tension existed rather than to uncover the essence of that tension. However, within the responses to the surveys administered by Gonczi, beginning instructors used terms such as 'academic' and 'theoretical' to describe the sources of their concerns about the instructor training program and

about the nature of the curriculum with which they worked in the TAFE setting. These terms were used to construct a contrast with their own knowledge and ways of knowing which they described as 'practical' and 'real'. Whilst Gonczi did not pursue this in specific terms or move towards theory development, the work adds to the evidence that suggests that trade instructors may hold particular perceptions of what constitutes valid knowledge and ways of knowing and that they may differ in specific ways from that which is portrayed by the curriculum formulations of the institution.

MacRory (1980) argued that the selection and organisation of knowledge in TAFE instructor training courses is determined by strong preconceptions about the relative worth of academic and vocational knowledge. Using Young's (1971) sociological critique of educational knowledge, he showed how liberal studies and additional technical studies came to be regarded as necessary for beginning trade instructors in their instructor training. He argued that the inclusion of these supplementary studies rested on entrenched assumptions about the superiority of academic knowledge and academic curricula over vocational or practical knowledge. Thus, he argued, the desirability of supplementary studies springs from an underlying view of trade instructors as educationally in deficit because the source of their knowledge is not academically based²². That is, their existing knowledge and experience is not regarded as valid and significant but is lacking in ways that require compensation. These practices and assumptions emerged despite the lack of understanding of the nature of this existing knowledge and how it is shaped by experience of the vocation and the

22 The logic of supplementary studies appears to parallel the logic of what Bernstein (1977) has labelled 'compensatory education'.

apprenticeship system that provides its supporting framework. The propensity to devalue such knowledge, he argues, extends to the curricula in TAFE institutions, and influences the nature of curricula in training for the skilled trades. Thus, the knowledge bases of trade curricula have become infused with knowledge formulated from the 'academic perspective'. MacRory's position is provocative and it links his thinking to the theoretical positions of Young (1971), and Bernstein's (1977) notion of compensatory education.

These same issues were raised by McIntyre in 1981.

The structuring of knowledge in [TAFE]courses insists upon academic forms of understanding which are antipathetic to ways of conceptualising and realising knowledge which arises from experience ... from the outset, teachers must relate syllabus knowledge to their job knowledge and trade experience. They must struggle with the paradox that 'vocational knowledge' is not simply another form of 'educational knowledge', does not take its character primarily from teaching institutions (broadly speaking) but from the way work is organised in society and how skilled work is done.

(McIntyre 1981: 88)

In large part McIntyre reinforces the position taken by MacRory, though it draws much more heavily on the theoretical position of Esland (1971). McIntyre extends the argument to propose that those who make the role transition need to establish a 'teaching perspective', and that this needs to be a development - rather than a replacement - of the practitioner's perspective:

It has hardly been acknowledged that TAFE teachers bring conceptions of knowledge, teaching and learning that are established in experience: that from the outset of preparation these people are not totally unprepared: that the TAFE teacher is not exchanging a vocational perspective for a teacher's perspective, s/he is developing a vocational perspective as a teacher's perspective.

(McIntyre 1981: 87)

McIntyre describes the practitioner's perspective as the 'scheme of ideas, beliefs, and attitudes' (McIntyre 1981: 93) through which a person interprets their work experience, and he suggests that the study of these perspectives needs to examine the relation of instructors' trade knowledge and experience to the trade curriculum. He suggests, also, that the theoretical support for such a study should be available within the work of scholars such as Young (1971) and Esland (1971), particularly because of the 'analytical power' of the sociology of education approach. McIntyre suggests that:

TAFE teachers have ways of conceptualising and realising knowledge which serve as a foundation for teaching. ... teachers' vocational knowledge is organised in relation to problems of practice in their field, and that this strongly affects how they see teaching. The theory-practice relation is a general problem of interest to TAFE teachers, and they view their syllabus knowledge in terms of how students will realise it through practice.

(McIntyre 1981: 92)

In large part, McIntyre's work is based on assumptions about what constitutes the perspectives held by trade instructors, for he presents little empirical evidence to support his descriptions. Nonetheless,

anecdotal evidence suggests that there would be little argument about these descriptions from those who have trained through the apprenticeship system and have developed their knowledge base within the skilled trades.

Brown (1981) investigated the transition for beginning TAFE instructors. She conducted in-depth studies with nine TAFE instructors and reported the results in the form of videotaped interviews and re-enactments of critical incidents. Brown's work serves to highlight a variety of aspects of the transition, including the notion of an 'identity dilemma'. That is, the tradeworkers who move from their industry settings into the role of instructor become enmeshed in uncertainty about whether they remain tradeworkers or become instructors - plumber or instructor? Within this context Brown portrays tradeworkers struggling to reconcile their own ways of thinking about knowledge of the trade with those required for instructional purposes. In particular, they describe their difficulties in adapting to the 'theoretical' and 'academic' approaches required by the curriculum and instructional formulations of the institutions. The outcomes are useful for generating discussion in contexts such as instructor training - a pressing need at the time - and for exposing the issues, but do not venture to the level of interpretation required for theory development.

The work of Tennant (1988, 1983) also addresses the notion of 'identity change', an issue noted by Brown (1981). His analysis of the factors that underpin the range of changes encountered by tradeworkers in the transition to instructor suggests that there are two major components

involved. One of these is based on the ability to be reflective - including concepts such as 'ideal self' and 'self esteem'. The second component:

... concerns the way in which we organise and structure our perception of reality. It is the filter through which we perceive the world ... We are rarely aware of this 'filter', because it constitutes the 'taken-for-granted' world of everyday life. It is only during a 'life crisis' that this filter becomes apparent.

(Tennant 1983: 33)

Tennant (1983) proposes that the change from practitioner of a vocation to instructor provides the 'life crisis' by which tradeworkers become aware of the factors that make up their identity. He gives, as an example of such a factor, the change of status involved when the tradeworker 'deserts the trade to take up a pen-pusher's career' (Tennant 1983: 35). The particular context in which the beginning instructor's 'old identity is most thoroughly challenged' (Tennant 1983: 36) is that of the curriculum that they face, and:

The problem can be traced to the different conceptions held by 'student' teachers ... about what constitutes valid and useful knowledge. This problem manifests itself most vividly in the use of language. For example, teachers in training will often complain about academic jargon.

(Tennant 1983: 36)

Tennant points out that the trade instructors' complaints are not about jargon as such, for tradeworkers use jargon within their trades. Academic jargon, however, is perceived by trade instructors as being different in kind, and the term is used not only to label abstract concepts

but to refer only to those abstract concepts that are not their own. Tennant's work highlights several factors worthy of note at this point. First, he reinforces the emerging idea that there exists some form of dissonance between the world view of the trade instructor and that of the curriculum and instructional formulations that trade instructors face. Second, it stimulates the question of whether trade instructors are aware of their views - or do they take them for granted? - and how they may describe them. Third, it raises the question of the nature of trade instructors' views about what constitutes valid knowledge and valid ways of knowing:

... the type of knowledge and skills with which tradespeople are familiar are relatively contextual and particular. The distinction between these two types of knowledge should not be underestimated. They represent quite different 'world views', and communication between these 'world views' is, at best, problematic.

(Tennant 1983: 37)

Tennant's work does not appear to be based on empirical evidence. Rather, it proceeds by question and proposition. Beyond this, however, Tennant attempts to establish links to curriculum and instruction through aspects of the theoretical position of Bernstein - 'collection code', 'classification', 'framing'. Tennant's argument is that 'an inductive rather than a deductive approach' (Tennant 1983: 37) - based on Bernstein's notion of a 'focused' curriculum - is appropriate in the TAFE setting, primarily because it engenders a curriculum based on common problems rather than general principles²³. Here, Tennant has taken the position that trade instructors hold views that are compatible

²³ Butterworth and Gonczi (1984) make a similar suggestion based on their understanding of the 'world views' of trade instructors.

with a problem-based approach to curriculum and instruction, that this is appropriate in training for the skilled trades, and that this differs from the more common 'academic' approach which is based on the development of general principles.

In respect of their research on the nature of instructors in Technical and Further Education, Butterworth and Gonczi (1984) propose that trade instructors experience identity problems in moving from the role of practitioner in a vocation, with its associated culture, responsibilities and status, to that of instructor of that vocation. They report a number of factors that underpin the 'identity problems' of beginning TAFE instructors. Amongst their potential factors is what they have termed 'the dislocation of ideas gained in Teachers College and work setting' (Butterworth and Gonczi 1984: 8). On the assumption that the major concepts of the instructor training setting reflect the dominant curriculum and instructional formulations used by the TAFE institutions, they move to the question of whether, in the role transition, a 'theoretical teaching perspective' replaces the practitioner's perspective or results in a development of the practitioner's perspective - as proposed earlier by McIntyre (1981):

The difference is important, as the former view assumes the replacement of one type of knowledge (practical, problem-oriented, experiential) with theoretical knowledge (abstract, based on principles). The latter view suggests the development of the practical knowledge (and the valuing of it) so that it becomes both extended and more theoretical.

(Butterworth and Gonczi 1984: 11).

Here is a clear and direct reference not only to the possibility that trade instructors may hold particular views about knowledge and ways of knowing, but also to the possible nature of those views - 'practical', 'problem-oriented', 'experiential'. As with the others who have raised related questions, the researchers did not pursue it - their effort was directed elsewhere - and the research and theoretical base upon which they constructed this part of their argument was meagre. Whilst this work does not explore, in depth, perspectives about the nature of knowledge and ways of knowing within vocational education and training, it does provide a point of departure for further study.

These studies, and other studies of similar direction²⁴, were exploratory and, at times, speculative. They took place within the context of the beginning TAFE instructor and the instructor training context²⁵. They were among the first studies to expose the dissonance between trade instructors' views of knowledge and ways of knowing and that of the curriculum and instructional formulations of the institutions. Such coarse ploughing of the field is necessary to give direction to later, more detailed investigations - by researchers such as Mealyea (1989a, 1989b, 1988), Gleeson (1991, 1990) and Carroll (1990) and, as such, they served to raise issues rather than to pursue them in depth.

There are three major points to be discerned so far from the literature that deals with vocational education and training in Australia, and which was available at the time this study was framed. The first is that

²⁴ See, for example, Krzemionka (1987)

²⁵ It is not unreasonable that the instructor training context is so dominant in these studies, for this was the focus of the first national public forums - post 1974 - devoted to debate about issues that, clearly, were to do with the educational issues affecting vocational education and training in Australia.

the context for much of what has been noted is the transitional process that tradeworkers undertake when they move from practitioner of a vocation to instructor. In particular, instructor training has provided the vehicle for the study.²⁶ Beyond this setting however, there is little evidence to suggest that the question of whether trade instructors hold views that might potentially affect their approach to knowledge and knowing has received adequate attention.

The second major point relates to the nature of the research and literature available at the time the study was framed. It would seem that much of the research is supported by rather meagre theoretical considerations, and has not moved significantly towards theory development. The research efforts that have attempted to build an empirical base often make *a priori* assumptions about the constructs that underpin trade instructors views and generate surveys and interviews based on those assumptions. That is, it appears that little effort has been devoted to determining the sorts of constructs fundamental to the views of trade instructors. None of the research efforts seeks answers within the province of apprenticeship, yet it provides the *rite de passage* to the status of skilled tradeworker.

The third major point is that the research efforts that have taken a theoretical approach have attempted to forge links to established theoretical positions, but these are few in number and rarely have moved from a sound empirical base through to theory development. The literature and research about vocational education and training in

²⁶ An additional reason for this phenomenon is that instructor training has become the province of universities and, thus, provides an opportunity for university staff to pursue research in an area related to their current work.

Australia provides little to guide the development of an approach to research in the area.

Despite the growing interest in research into TAFE issues, both inside and outside TAFE, relatively little of a systematic nature is known about TAFE instructors in general, and trade instructors in particular. The limited amount of empirical evidence that is available from Australian sources varies considerably in its quality, and the following comment from Butterworth and Gonczi still applies:

... the reliance in the past on assumptions, 'educated guesses', and anecdotal evidence, indicates that there is a great need for descriptive studies ... based upon sound theoretical perspectives and a detailed knowledge of the TAFE sector in Australia.

(Butterworth and Gonczi 1984: 13)

1.5 Some Emerging Directions

Despite the expressed reservations about the research base²⁷ that existed at the time the study was framed, a process of careful distillation of the literature and research in the area of vocational education and training in Australia can lead to the identification of some guideposts for the development of a scholarly study of trade instructors' perspectives on knowledge and ways of knowing.

One guidepost is that there are, indeed, important questions to be answered. The works of Hibburt (1978), Tennant (1988, 1983), McIntyre

²⁷ It is acknowledged that other valuable research has occurred in vocational education and training generally. The reservations expressed here refer to that research that might be brought to bear on the present study.

(1981) and MacRory (1980) suggest the possibility that trade instructors may use frameworks that might, potentially, guide their approach to knowledge and knowing, and that these frameworks incorporate beliefs, values, attitudes and feelings. In terms of a question to be addressed through systematic research, this supports the emergence of the question:

Do trade instructors use frameworks that might, potentially, guide their approach to knowledge and knowing?

The nature of trade instructors' views of knowledge and ways of knowing is, essentially, unknown. However, the work of Gonczi (1985), Butterworth and Gonczi (1984, 1981), Tennant (1988, 1983), McIntyre (1981) and MacRory (1980) suggest that it may be characterised by a problem-based approach rather than the more academic, general-principles approach adopted by the institutions as the basis for their curriculum and instructional formulations. The use of terms such as 'theoretical' and 'abstract' to contrast with these views may indicate the existence of a broad underpinning typology based on some form of 'practical-theoretical' or 'vocational-academic' dichotomy. This supports the emergence of the question:

What are the main typologies involved in the views held by trade instructors about the nature of knowledge and knowing?

Further, the existing literature suggests that these frameworks may comprise particular perceptions about ways of knowing and the organisation of knowledge that conflict with the curriculum and instructional formulations of the TAFE institutions. And they may be

shaped by the tradeworker's previous vocational experience, including that of the apprenticeship system. This is particularly evident in the transition from practitioner of a vocation to instructor in the vocation, where the practitioner's perspectives that tradeworkers hold may be challenged by what McIntyre (1981) calls a 'theoretical teaching perspective' that is prevalent within the institution.

The works of Tennant (1988, 1983) and Brown (1981) suggest that trade instructors may not be aware of their own views or the factors that give rise to them - they are taken for granted. However, in the face of major challenge, such as the 'identity dilemma' of the transitional process noted earlier, these factors may become more evident. In particular, the process of reconciling existing views with those represented by the curriculum and instructional formulations of the institutions provides the conditions for the manifestation of the underlying factors that shape the trade instructors' views. This suggests that, for tradeworkers who are new instructors and for those who have been instructors for some time, a question to be addressed by systematic research is:

To what extent do these views embody characteristic ways of presenting or perceiving reality - perhaps canons and rules?

The second guidepost relates to the importance of questions such as these. In one sense, they are important questions to pose because of their timing. They arise in a period where there is sustained questioning of the ongoing viability and efficacy of traditional approaches to the formal preparation of tradeworkers. The Training Reform Agenda is the

explicit manifestation of this period²⁸. Here, apprenticeship, with its foundations locked within a time-serving and master-apprentice model, is under considerable challenge from an outcomes-based, competency movement. It is also under challenge from attempts to reconstruct the relationships between TAFE and other forms of post-compulsory education - schools, on-the-job training, private training providers. Yet what is occurring here rests on very meagre empirical and theoretical understandings of what constitutes the nature of knowledge and knowing within the skilled trades²⁹.

These are important questions also because they can help to address what appears to be conflict between the perceptions of trade instructors and the curriculum and instructional formulations of the training institutions within which trade instructors work - typically TAFE institutions. Indeed, from the research and literature available at the time the study began, it appeared that this conflict was deep-seated and unlikely to be resolved without some considerable attention to exposing the perceptions that trade instructors hold about what constitutes valid knowledge and ways of knowing.

Finally, the questions are important because the evidence available at the time the study began suggested that there had been little research in vocational education and training in general, and in training for the skilled trades in particular. It seems that this is an area of formal, educational preparation which, in large part, has been ignored by the

28 See Funnell (1993) for an example of the impact of the changes brought about under the rubric of the Training Reform Agenda.

29 This claim is echoed by D Gleeson (1989) for the equivalent setting in the United Kingdom.

scholarly community - the questions have not been addressed in any substantial and sustained way.

A third guidepost relates to the approach that might be taken to research in this area. The study derives more from interest in a particular type of phenomenon identified through observation and experience than from a primary interest in a particular and existing theoretical framework. Also, the study is in an area for which there is little research and scholarly literature that can be applied in a clear and direct sense. Thus, it would seem that an appropriate way to proceed would be to begin by gathering evidence and conclude by constructing theory. This is consistent with the 'grounded theory' approach of Glaser and Strauss (1967). Such an approach might contain the same elements as, say, a theory testing approach - theory, hypothesis, method, fieldwork, results (Lewins 1993, Rose 1982) - but would have a different starting point.

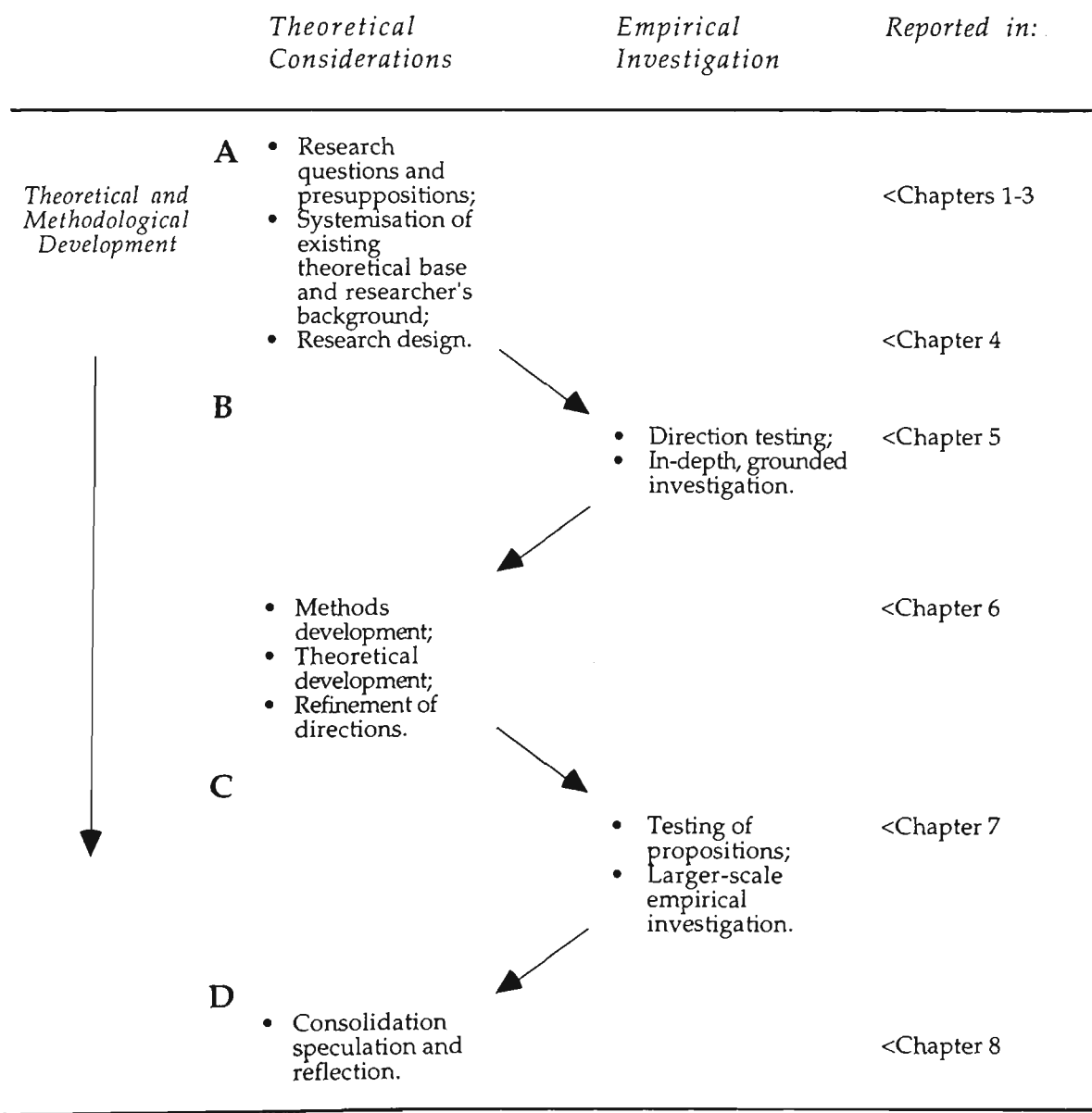
The considerations of this chapter suggest that there are questions to be answered in respect of the perspectives held by trade instructors about the nature of knowledge and knowing. Clearly, the questions need to be embedded within a theoretical framework stronger than that delivered by the theory, research and literature on vocational education and training in Australia at the point the study was established. There appear to be two main avenues that might be followed. First, insights can be gained from the body of literature and research that might be represented by the phrase 'The Skilled Trades' - an investigation of the nature of work in the skilled trades. This is pursued in Chapter Three. Second there is the theory, research and literature emanating from settings that, in important ways, parallel the research setting of this

study. This is pursued in Chapter Two. Hence, the first three chapters of this thesis represent theoretical development by way of the systemisation of existing theories, research and literature, particularly that relating to vocational education and training in Australia, the nature of the skilled trades, and studies in parallel settings.

1.6 The Structure of the Study

The structure of the study is summarised in Figure 1.01.

Figure 1.01
The structure of the study and the thesis



Here, the vertical axis represents movement along two main dimensions. First, it represents movement in the overall research perspective from a broad and open-ended position towards some degree of closure. Second, it represents movement from a research approach based on grounded and ethnographic techniques applied to a limited sample of informants towards one that can be applied to a larger number of informants in ways more consistent with traditional research techniques. In combination, these produce growth in development towards a theory of trade instructors' epistemologies.

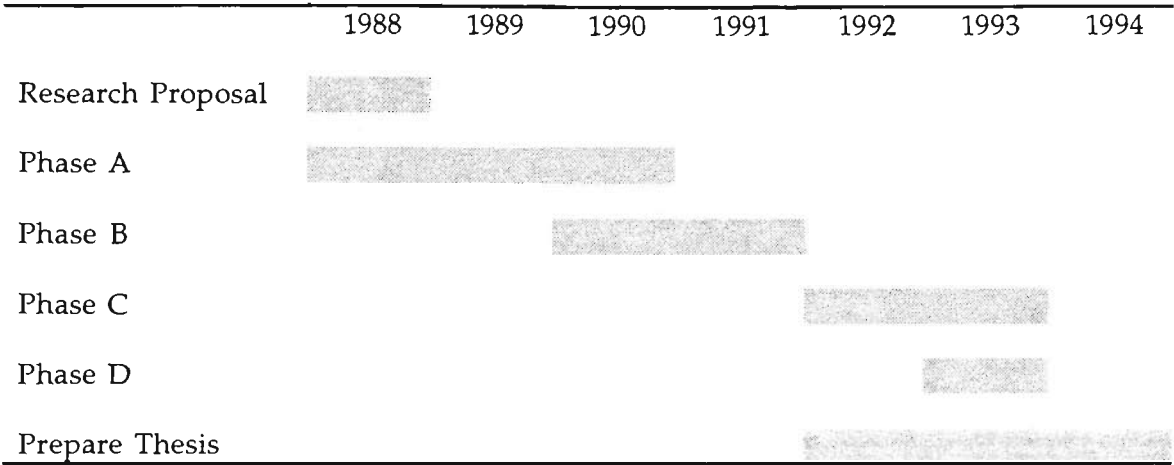
The vertical axis of Figure 1.01 is marked by a number of decision points. These involve reflecting on the outcomes of the previous step and projecting forward to refine the direction of the research. There is a sense in which the study constructs dialogues, between the researcher and theoretical perspectives, between theoretical perspectives and empirical investigation, and between this researcher and a prospective audience of other scholars. For example, the in-depth grounded empirical investigation with a small number of informants - Phase B - gave a basis for reflecting on the presuppositions that had led the research in the direction of such empirical work, and allowed refinement and adjustment of that early theoretical work.

Figure 1.01 conveys, also, the structure of the written thesis. The theoretical development that derives from a process of systemisation of existing theory, research and literature, is presented across the first three chapters. Chapter Four is a transitional chapter in that it moves from primarily theoretical considerations through methodological considerations to the more empirical aspects of the study. In a sense,

Chapter Four continues theoretical development through its emphasis on method. It is followed in Chapter Five and Chapter Six by the early, intensive, exploratory work undertaken to establish empirical support for both the emerging theoretical position and the methodological approach, and to provide a basis for communicating with a larger number of informants. The larger-scale empirical work of the study is presented in Chapter Seven. There is a consistency in this approach with the notion of 'theory building structures' as a way of structuring and reporting qualitative research - as noted by Burns (1994). That is, each chapter and each section attempts to unravel a further part of the argument such that the sequence provides a linked argument that develops across the entire study. Much of what might be said in a final chapter is presented as the theoretical position of the study builds up across the first seven chapters. Thus, Chapter Eight provides a capstone for the study, speculates about the implications of the outcomes for instructional and curriculum formulations in vocational education and training, provides suggestions for further research, and reflects on method and the limitations of the study.

A final point to note about the study is the time period over which it was conducted. The researcher undertook the study as a part-time post-graduate student, and Figure 1.02 presents the research timeline. Whilst this timeline does not reflect the extent to which the phases of the study interacted with each other, it does identify the primary research emphases in each of the years over which the study was conducted.

Figure 1.02
The research timeline



Chapter Two

Theoretical Considerations: Related Literature

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Chapter Two

Theoretical Considerations: Related Literature

If, like Descartes, I ask myself how much I really know, I cannot answer that question until I know what counts as knowledge. Perhaps it also makes a difference what sort of person is making the claim to knowledge and in what kind of context.

(David Pears¹)

2.1 An Introduction to the Chapter

The early expedition into the literature on vocational education and training in Australia generated good support for the study, and served to sharpen the focus. It established that the researcher's early and unfashioned concerns about the perceptions held by trade instructors were shared by others, and that they could be translated into questions worthy of scholarly pursuit. It demonstrated that there was a small but growing corpus of research and literature about vocational education and training in Australia, but that this alone could not inform the study in substantial and direct ways. That is, it did not provide the theoretical or methodological pabulum sufficient to nurture the study and to guide the research effort. Thus, one of the purposes of this chapter is to continue theoretical development through the systematisation of existing theories, research and literature that began in Chapter One.

1 Pears (1971: v)

There are three points to be noted about this expansion of the theoretical considerations for the study. First - and as is the case in most substantial research efforts - more theories, research and literature about tradeworkers in instructional settings in Australia became available as the study unfolded. For example, the works of Mealyea (1989a, 1989b, 1988) and Gleeson (1991, 1990) emerged. These scholars sought to uncover aspects of 'trade teachers identity' (Mealyea's term) and 'trade teachers culture' (Gleeson's term) as they are portrayed in secondary schools in Victoria. Their works represent some of the most substantial and rigorous scholarly investigations in this area, and they provided direction to this study in both the theoretical and the methodological senses.

The second aspect to be noted about the expansion of the theoretical considerations is that it involves reaching beyond the theories, research and literature that are identified because they are proximate to the context in which the study is located. This means bringing to bear on the study theoretical analyses and empirical research efforts that may have been established within different contexts but which, nevertheless, have sufficient parallel in this study to be of considerable value in informing and directing the study. The process of forming a connected whole from the array of theories, research and literature, and using it as foundation for the present study, is the process of systemisation noted earlier. A component of this, and of the theoretical expansion in general, is the further consolidation of the overall research approach, including the drawing of methodological direction from those research precedents likely to be compatible with the assumptions, theoretical perspectives and goals of the current research effort.

Finally, it is acknowledged that construction and expansion of the theoretical position in this way involves a degree of selectivity. Some theories, research and literature are selected, and some are not. Inevitably, this rests on judgments made by the researcher about what can inform the study in the most clear and significant ways, and what theories are sufficiently well established to enable them to be used as points of departure for further work.

It is clear from the nature of the questions posed in Chapter One (see, in particular, Section 1.5) that this study is founded on a complex of assumptions, some of which may well remain latent and taken-for-granted, but some of which are significant enough to require explication. Thus, a second purpose for this chapter is to expose some of the major assumptions upon which the study is founded. For example, to pose a question such as 'Do trade instructors use frameworks that might, potentially, guide their approach to knowledge and knowing?' aligns the general attitude of the study clearly with a theoretical perspective in which knowledge, and its manifestation in educational programs, is seen as problematic and a subject for critical analysis. That is, it assumes that knowledge is not a given but is linked to social processes, groups, social strata, individuals and institutions.

2.2 The Structure of the Chapter

To expand the theoretical base for the study and to expose the assumptions in the manner noted in Section 2.1 requires - at least in part - that the study be positioned against a backdrop of existing theories, and that the links between those theories and the study be made clear. The chapter begins at this point by presenting an overview of established theoretical perspectives

(Section 2.3) that gradually converges to the point where it is appropriate to examine the more empirically-based, but less well established theories.

Then, in the following three sections of the chapter (Section 2.4, 2.5 and 2.6), the theoretical base is expanded by exploring a range of these more highly focused research efforts in order to elicit both theoretical and methodological direction. This is a review of specific studies, selected for their capacity to inform this study in rather direct ways. Whilst each of the main sections within the chapter has a primary focus, it is not possible to keep them clearly delineated and mutually exclusive. Of necessity, there remains some overlap between the formal sections of the chapter.

The final section (Section 2.7) seeks to place this chapter in the context of the ongoing directions for the research effort and to forge links with Chapters Three and Four. In large part, this chapter is a continuation of the process of systemisation of the related theories, research and literature that began in Chapter One and which continues through to Chapter Four. It is the major component of Phase A, noted in the diagrammatic representation of the study and presented at the end of Chapter One (See Figure 1.01).

2.3 A Backdrop of Theoretical Perspectives

There is a vast complex of interdisciplinary literature that might be brought to bear on a study of trade instructors' epistemologies. It is the case that, in any field of endeavour, there exists a variety of theoretical perspectives, and it is not uncommon for many of them to be alternatives or, even, competing. Often, they offer conflicting solutions to the problems upon which the field focuses, and perhaps this is the case in Education more than

any other field. But, to the extent that the theoretical perspectives address the common or shared problems of the field, it is also the case that some overlap occurs, at least in the assumptions upon which these perspectives are based and in the solutions that they present.

It would appear that efforts to mark out the commonalities, to reconcile the differences, to force a sense of coherence, and to encourage succession in theoretical positions constitutes one of the mechanisms by which human knowledge of any field may progress and grow. For example, amongst the grand theoretical traditions, the social theory of Marxism² can be seen as a distillation, a synthesis and a transformation of other theoretical traditions, including elements from the theories of scholars such as Hegel and Feuerbach. Indeed, the noted Marxian concept of the 'dialectic' derives from the previous works of Hegel and, in this sense, it can be argued that the Marxian theoretical position succeeds that of Hegel. Cartwright (1978) also illustrates the point in his anecdote about a visit he received from Kurt Lewin, shortly before Lewin's death:

He came to my house in a state of great excitement to tell me that he had just had a brilliant insight which made him see, as he put it, that 'Freud was wrong and Marx was right'. And he was almost euphoric when he said that this meant that he would have to make a fundamental revision in his entire theoretical approach.

(Cartwright 1978: 179)

Whilst these examples are drawn from grand theoretical traditions, the process occurs across the spectrum of endeavours, including in more highly focused, empirical research with which this study seeks to connect. Indeed,

² Marx is, of course, known as an economic theorist, However, his theories have far too many ramifications to be restricted to the realm of economic analysis.

a major concern of the present study is to undertake such a process with the theories, research and literature that might be brought to bear on the study of trade instructors' views of knowledge and knowing. This involves the systemisation of the literature from which a theoretical platform for the study emerges.

One way in which to portray a form of coherence in the literature available to this study and to identify points of departure is to consider it organised in categories. Such a scheme might present in one category the very broad and collective, grand intellectual traditions - the sorts of perspectives that frequently define a theoretical position, a broad set of assumptions and a line of approach to problems and issues. In general terms, the social theory of Marxism, noted earlier, is a most widely known example of a tradition of this kind, but the works of Durkheim and Weber also might be regarded as examples of such grand theories.

In another category are theories and schools of thought that reflect more specific and more highly focused assumptions and positions. Typically, these are nested with one or more of the grand traditions and draw succour from them. Often, they represent new interpretations of one or more aspects of the grand traditions, but taken from a particular perspective. For example, the works of the philosopher Popper (1972, 1963, 1957) represent such a theoretical perspective. Popper provided a reinterpretation of aspects of existing Marxian theory, portraying it as being particularly 'evolutionist' or 'historicist' rather than as providing a mechanism by which social change can occur and in which there is room for human responsibility³. Also, the works of Young (1971) - works that have been of

³ It is easy to think of Marx' historical analysis as being meant to apply to the development of all societies, and that society is a kind of economic machine.

particular prominence in curriculum theory - illustrate the development of a theoretical perspective in this sense. In the 1960's and 1970's there occurred an upsurge of interest in the nature of knowledge as it relates to the school curriculum. It is widely acknowledged that debate initiated by Young and his collaborators stimulated the further development of a theoretical appreciation of the curriculum as a codified and organised reflection of societal and ideological interests - rather than an administrative organisation of school knowledge (Sadovnik 1991; Aronowitz and Giroux 1988; Jarvis 1985). Early versions of this 'new sociology of education' related power and control to the social construction of school knowledge and culture; later versions focus primarily on the ways in which various school practices reproduce the logic of the workplace and dominant cultural capital within the capitalist order. This approach to the sociology of education was grounded in the broader intellectual tradition of the sociology of knowledge and, whilst not drawing on them exclusively, it re-interpreted and applied theoretical insights from major thinkers within the tradition - such as Marx and Engels - to an understanding of the curriculum as a social and political construction.

A third category of theories - in many instances the terms 'hypotheses' or 'propositions' might be more apt descriptors - are those that are most highly focused. Typically, they derive from quite specific research efforts, and the works of Mealyea (1989a, 1989b, 1988), Gleeson (1991, 1990), Luttrell (1989, 1984) or Benson (1989, 1984) - all of which are pursued in greater depth

Further, students of other societies have taken such strong guidance from Marxian theory that now it appears to be of generalised or universal applicability. This would lend support to the idea that his approach is 'evolutionist' or 'historicist' in the somewhat mechanistic sense implied by Popper. It should be noted, however, that Marx himself did not suggest that his analysis of Western European development should be universal in the sense that it could account for other societies or cultures.

later in this chapter - might be considered examples of such theories. Again, these tend to be nested with broader theories, and often draw more heavily on empirical exploration and evidence.

Inevitably, theories, research and literature from all three of these categories have influenced this study. However, it is from the more highly focused theories, research and literature that this chapter takes many of its leads. In doing so, established theoretical perspectives, and the assumptions from which they are derived, are acknowledged but, generally, taken as given. Little attempt is made to re-establish those positions or to review them in any comprehensive sense. Following Bates (1980), the chapter uses critical questions raised by established theoretical perspectives as points of departure for the development of a platform more closely and directly applicable to the focus of the present study. It is important, therefore, to identify these major theoretical positions and to place them in perspective - as a backdrop against which to view the fundamental orientation of this study. When this has been done, it is appropriate to move to consideration of the more specific research efforts that more directly inform the study.

To the extent that connections can be claimed between any of the grand theories and the present study, it is reasonable to suggest that Marxian social theory provides a relevant, but somewhat distant backdrop. For example, one of the assumptions that underpins the Marxian tradition is that it is not the consciousness of people that determines their existence but, rather, their social existence that determines their consciousness⁴. In the present study, a manifestation of this can be seen in Chapter Three which

⁴ According to Marx, 'Consciousness is ... from the beginning a social product, and remains so as long as men exist at all.' (Marx and Engels 1939: 19).

explores the contribution of the skilled trades as occupations, and the nature of work in the skilled trades, to the formation of the world views held by tradeworkers. There is also some connection with the Marxian notion of the 'relation' being the basic unit in the ways in which social reality is conceived - 'for this factor in this context this is the influence most worthy of noting' (Ollman 1976: 17). The reflection of this in the present study is its primary emphasis on seeking patterns and portraying the major influences on the beliefs, values, attitudes and feelings held by trade instructors about knowledge and knowing. It is not that the study began with or was governed by a Marxian perspective; it is that some of the basic assumptions of the present study are consistent with, essentially, Marxian views and draw some guidance from them.

Of somewhat more direct connection with this study are theories from the second category noted above, primarily those theoretical, epistemological perspectives that provide interpretations that are applicable to the field of Education, in general, and the curriculum, in particular. As noted, there is a range of theoretical perspectives in this area and, at the risk of oversimplification, it is possible to perceive them as organised around particular themes or concerns. One such cluster of influential epistemological theories focuses heavily on a notion of 'the logical division of knowledge'. For example, Phenix (1964) believes that the appropriate schema for the recognition and organisation of knowledge involves six realms of meaning - symbolics, empirics, aesthetics, synnoetics, ethics, and synoptics. Barrow (1981, 1975) refers to two forms of knowledge - empirical and logical - two types of interpretive attitude - religious and scientific - and four kinds of awareness - moral, aesthetic, religious and scientific. Adler (1982) suggests that knowledge is organised by fundamental disciplines, and that there are

three major groupings of those disciplines. One grouping contains language, literature and fine arts - the communication disciplines. Another grouping of disciplines focuses on the exercise of critical judgment - the social sciences. Adler's remaining grouping contains the disciplines of mathematics and science, and these are concerned with measuring and calculating. Another major perspective in this cluster is that of Scheffler (1965), who distinguishes three major 'philosophies' of knowledge. The rationalist philosophy uses mathematics as the model and assumes that the source of knowledge is within; the empiricist philosophy considers natural science the model and depends upon experience and observation for the development of knowledge; the pragmatist philosophy is the experimental scientist who attempts active transformations of the environment and considers mind to be the capacity for the active generation of ideas to solve problems.

Amongst those 'logical division of knowledge' positions that have had particular influence on thinking in educational settings, Hirst (1974) has been one of the most prominent. Although his position has evolved over time, his most well known approach describes distinct forms of knowledge based on differences in the concepts and the logical structure of propositions in the domain, the truth criteria by which propositions are assessed and the methodology employed to produce the propositions. The forms identified by Hirst are mathematics, physical science, religion, philosophy, literature and the fine arts, moral and interpersonal. In this approach, the natural sciences and mathematics, for example, each have their distinctive central concepts and their own logic, such that how one determines whether or not it is true that, say, a combination of two chemicals will have a certain effect is quite different from how one

determines whether the square of the hypotenuse is equal to the sum of the squares of the opposite sides of a triangle. By contrast, stamp collecting or geography do not give rise to propositions that have to be answered in a unique philatelic or geographical way. These are fields of knowledge in which more than one form may be deployed.

A second cluster of epistemological theories is characterised by its emphasis on 'critical theory'. It is regarded by its proponents as dialectical in nature and appears to derive primarily from the works of Habermas. Here, knowledge is organised according to the kind of human interest involved. Habermas (1968) argues for three major groupings. One grouping is represented in the empirical-analytic sciences that encapsulate the notion of technical interest in control and manipulation. A second grouping is represented in the historical or hermeneutic sciences that embody the values of a practical interest in free communication. The third grouping is represented in the critical sciences in which knowledge is judged by its relation to emancipatory social practices⁵.

The theories classified above as 'critical theories' and 'logical division of knowledge theories' are well established, and contributed to the formation of a valuable sensitising backdrop for this study. But the study separates from them in the sense that it moves away from *a priori* assumptions about the forms of knowledge and relies more heavily on a conception that knowledge is a selection and organisation from the available knowledge at a particular time, and involves conscious or unconscious choices. It is not that these theories are rejected. Rather, it is that the study uses a different

⁵ It might be noted that, in the Australian context, the notion of the 'socially critical school', particularly in the works of Kemmis et al (1983), reflects the emancipatory interest of critical theory.

starting point. The position adopted is, thus, much more in keeping with a third cluster of theories that is characterised by its focus on the shared experience of social groups as the source of valid knowledge. As noted earlier, these occur widely in the literature associated with the 'new sociology of knowledge'. Amongst the most central of these works is that of Young (1971) - also noted above. A challenging aspect of Young's work, and the point of departure for a range of other scholars, is the suggestion that knowledge - or what counts as knowledge - be treated as socially constructed:

That knowledge is socially constructed means that the knowledge transmitted in education is neither absolute nor arbitrary but are available 'sets of meanings' which do not 'emerge' but are collectively given. What is regarded as 'logical' or 'valid', is based on various standardized models which are necessarily sets of shared meanings which come to be taken for granted.

(Young 1971: 5)

That is, Young and his collaborators argue that the social organisation of knowledge is best described 'not in terms of the structural properties of events-in-the-world that the knowledge is intended to formulate' (Evetts 1973: 122) but as a product of the understandings negotiated amongst members of an organised intellectual collective. It is an assumption of this position that, in all societies, there is a plurality of social forces many of which, by reasons of their institutional guarantees, are in a position to impose their norms and philosophies on other areas:

It may be specific institutions such as the education system and academics which by their authority and their teaching consecrate a certain kind of work and a certain type of cultivated man.

(Bourdieu 1971: 175)

Theorists such as Young promote inquiry into how and why certain forms and categories persist and their possible links with sets of interests and occupational groups. This has stimulated scholars to use the position as a point of departure for investigation of the perceptions that different groups may hold about knowledge and knowing. It is with works such as these that this study forms significant connections and from which it draws guidance for its development. Thus, a primary connection between the theoretical perspectives within this school of thought and the present study is that it takes what counts as knowledge as open to question; but there is also a connection in that the study explores the relative position of trade instructors, and their world views, to influence what passes for valid knowledge within the trade training curriculum. Whilst it might be noted that little of the scholarly attention generated around Young's position has been afforded to vocational education and training - except in a passing and surficial sense - many of the research efforts which, in some significant ways, provide substance for these assertions, have implications for the study at hand and are pursued in the remainder of this chapter (see Sections 2.4, 2.5, 2.6 and 2.7).

A cornerstone of the approach taken in this study is that it takes what counts as knowledge not as value neutral, *a priori* and immutable, but as problematic and open to critical and ideological analysis. That is, the study is in keeping with those phenomenological theories that have 'called into question the production, organisation, transmission, allocation and evaluation of knowledge' (Aronowitz and Giroux 1988: 145). It is not that this study is faithful to the theories that promote this view or that such theories govern the research in any restrictive sense. Rather, it is that these established epistemological perspectives provide a backdrop that

harmonises with the approach taken in the study, and against which the study develops a character suited to its specific research problem and research setting.

2.4 From Workshop to Classroom: Identity and Culture

The theoretical positions most proximate to this study are from the third of the categories noted in Section 2.3, particularly those theories that relate to the ways in which specific social groups view knowledge and knowing. As noted earlier, it is reasonable to suggest that, in terms of its theoretical orientation, this study may be stabled with the works of scholars such as Mealyea (1989a, 1989b, 1988) and Gleeson (1991, 1990).

Many tradeworkers who make the transition to an instructional role become teachers of technical, manual arts or industrial subjects⁶ within the school sector. This is - and has been - the case, particularly, in Victoria where the history of secondary technical schools - *vis a vis* high schools - is much stronger than elsewhere in Australia. It is in this setting that two scholars, Mealyea (1989a, 1989b, 1988) and Gleeson (1991, 1990), located their recent works on trade teachers⁷. Although there are differences between their individual works, there exists also a strong degree of common purpose. The works of these scholars suggest that there exists a trade teachers' identity and a trade teachers' culture and that they inform,

⁶ The descriptive term for these subjects varies from place to place and is evolving as the general emphasis in schools moves away from specific manual skills towards more generic - and, perhaps, employment-related - skills. Thus, new terms are being used to encapsulate and replace older terms - 'Design and Technology' is an example.

⁷ Both Mealyea (1989a, 1989b, 1988) and Gleeson (1991, 1990) use the term 'trade teachers' to describe those tradeworkers who become teachers of technical and industrial subjects in schools.

sanction and guide the approach of trade teachers to teaching and learning in secondary schools.

Mealyea followed a phenomenological line of inquiry into the occupational identity of trade teachers in secondary schools⁸. He focused on a group of tradeworkers undergoing the transition from practitioner of a trade to teacher of trade and industrial subjects in secondary schools in Victoria⁹. His work was very much about the resocialisation of the tradeworkers as secondary teachers, and he was able to use the teacher education program as a vehicle for his work.

One of the valuable facets of Mealyea's work is that he describes a 'before teaching picture' (Mealyea's term) of tradeworkers. That is, he identifies important elements of the views tradeworkers hold about their identity before they enter teaching - but in anticipation of entering teaching. This is one of the very few research efforts that provide such substantial and substantiated insights to the views held by tradeworkers, and it points very clearly to the place of the trade in the formation of their views the world:

... it is clear that the trainees entered teacher education with a well-defined 'presenting culture' ... Their point of reference is the workshop, making and doing things, solving problems of a certain practical type.

(Mealyea 1989a: 23)

There are three features, central to Mealyea's (1989a) description of the occupational identity of the tradeworkers, that need to be noted at this

⁸ It should be noted that the present study did not use secondary schools as the setting, nor did it use teacher education as a vehicle for the work.

⁹ The setting used by Mealyea (1989a, 1989b, 1988) is the same setting as that of Hibburt (1978).

point. One is 'the degree of independence and control each exercised over their day-to-day work' (Mealyea 1989a: 12). Here, Mealyea notes the importance that tradeworkers place on a form of autonomy that they exercise in the performance of their work. It includes the freedom to use, unsupervised, the specialised skills that they have acquired and which they have developed to the point where they can claim to be 'expert'. This is associated closely with the value that tradeworkers place on the status that the qualification of tradeworker brings. Although not specifically identified in the reports of his work, the rich descriptive work provided by Mealyea (1988) suggests that this independence over day-to-day work is an autonomy within bounds, in the sense that it refers particularly to the techniques, materials, tools and skills of work in the trade - what Bensman and Lilienfeld (1991) refer to as the 'craft' of the occupation - rather than to the broadly-based notion of autonomy more commonly associated with, say, the professions. That is, such autonomy does not presume those attributes that characterise a profession and which enable professions and professionals to be self-regulating. Nor does it presume that, at some level, a tradeworker is not supervised or their work is not framed by some wider authority, for there exist rules and regulations that are set by external authorities and which tradeworkers accept as necessary controls over their work.

The notions of independence and control, that clearly are central to the identity of tradeworkers, are related to another feature identified and portrayed by Mealyea. Tradeworkers carry into teaching particular views of the 'mentor/mentoree relationship' (Mealyea's term) which, it is suggested, they derive from the institution of apprenticeship. These views are characterised by notions of the role of the tradeworker as model and

mentor, friend and sage adviser, and of the mentor instilling in the novice - students, in the case of trade teachers - particular values of the trade. Such values include 'getting the job done', 'doing a good job', 'using correct techniques' and 'acting responsibly'. What Mealyea's works point to here is the extent to which apprenticeship frames ways of thinking about teaching and learning that tradeworkers carry to the teaching role¹⁰.

A third feature of the tradeworker's occupational identity, as described by Mealyea, is the suspicion shown for 'abstract theorising' (Mealyea's term). The context in which this is particularly apparent is in the teacher education program that provides the formal preparation of trade teachers for teaching in secondary schools. Mealyea describes the tension caused for tradeworkers when the content of the teacher education course fails - in the eyes of the trainee trade teachers - to provide concrete advice and information, specific courses of action, and recognised skills to deal with the exigencies of classroom events:

For example, one particular Syllabus Studies lecturer stated specifically and categorically the way in which he expected them to teach, claiming the adoption of his classroom techniques with a focus on vocationalism, would solve their pressing problems and ease their stress. Such forms of clear instruction make them happy, believing the lecturer's approach met their needs.

(Mealyea 1989a: 24)

Here, there are distinct echoes of the sorts of conflict and dissonance noted in the research and literature reviewed in Chapter One. What Mealyea provides is empirical evidence of the dissonance and its nature. Mealyea notes that the dissonance is portrayed, at least in large part, by the

¹⁰ Gleeson (1991, 1990) too identifies that the educational practices of trade teachers are framed by such experiences of the trade.

dichotomy between knowledge selected into the teacher education program and that which tradeworkers perceive as valued and valid knowledge - knowledge and ways of knowing that are located in the practical and the concrete, and which can inform action clearly and directly.

Mealyea developed a model for the occupational transition undertaken by tradeworkers who become trade teachers. An interesting aspect of the model is that the school setting is described as reinforcing the occupational identity of trade teachers. That is, the trade teachers feel more comfortable within the school setting than within the teacher education setting. There is a sense in which this appears to be somewhat paradoxical, for Mealyea depicts the teacher education program as a reflection of the dominant educational perspectives of the school. However, it should be noted that trade teachers within secondary schools tend to be somewhat isolated from mainstream teachers. Typically, they are located in an enclave-like environment in which they can develop a specific culture to support and nurture their existing occupational identity. It is here that Gleeson's (1991, 1990) work - noted later in this section - provides further insights.

Mealyea's work goes further than mere description of the essential attributes of the identity of tradeworkers at a pre-teaching level. He followed the tradeworkers through their teacher training program and on into the schools. Here, Mealyea's work reveals some other highly salient outcomes. In particular, Mealyea finds that tradeworkers who become teachers retain significant elements of their identity as tradeworkers. That is, despite the resocialisation processes of teacher education and schools, tradeworkers take with them into their practices as teachers, and into their teaching ideologies, a coherent set of attitudes, views and practices that

derive directly from their industry background. Indeed, the extent to which the identity of 'tradeworker' is maintained by trade teachers leads Mealyea to suggest that it defies both common sense and the established descriptions of the effects of socialisation:

Identity, it has been argued, is constructed in interaction with others ... it would seem only natural that one modifies one's behaviour into a more acceptable pattern. The finding of this study seems to contradict this particular description of the socialisation process.

(Mealyea 1989a: 53)

In support of this position, Mealyea describes the ways in which trainee trade teachers comply with the dominant school and teacher education practices and cultures in ways that are quite superficial but which allow them to 'get through'. They retain deep-seated commitment to ways of viewing the world that derive from their occupational identity as tradeworkers (Mealyea 1992). He describes also the techniques and strategies used by trainee trade teachers to cope¹¹ with the pressures they face to adopt the dominant culture of the teacher education program and the schools. As noted above, Gleeson describes how the 'tech department' of the school maintains the trade teachers' culture. It would seem Mealyea's claim that trade teachers resist resocialisation as mainstream teachers can be explained in terms of Gleeson's finding that trade teachers maintain their identity as tradeworkers by establishing a trade teachers' culture within their - somewhat isolated - school department.

¹¹ This aspect of the research outcomes remains a continuing focus in Mealyea's work (Mealyea 1992).

To the extent that Mealyea's findings can be generalised to tradeworkers who become trade instructors in vocational education and training, there are some significant implications for the study at hand. Trade instructors in vocational education and training may well place similar value on their occupational identity as tradeworkers. Factors such as autonomy and control - in the sense noted above - the nature of skilled work, and the apprenticeship process may be influential in the formation of views that trade instructors hold about knowledge and knowing¹².

Mealyea's work is of value also for the methodological approach it uses. It makes few *a priori* assumptions about the views that tradeworkers hold - it does not assume that tradeworkers and trade teachers will be predisposed to particular values and attitudes. Rather, it searches to uncover the essential elements of trade teachers' identity by working from in-depth study of the trade teachers themselves. In large part, Mealyea's methodology reflects the situation faced by all current researchers in the area - there is no dominant approach that contains an established and coherent set of assumptions and accepted practices. Thus, Mealyea used his observations of phenomena as a starting point for the identification of research questions. The leads he took to inform his approach were crafted from approaches in other, but related, areas of research. For example, Mealyea drew on precedents set in works such as that of Becker (1961) and Olesen and Whittaker (1968) which also started with no established hypotheses. He used perspectives and methods in works such as those of Geertz (1988, 1983, 1973) and Dale (1974) that emphasise the centrality of the personal views of the informants and the importance of 'thick description' (Geertz' term). He supported his approach with the grounded

¹² These factors are pursued in greater depth in Chapter Three.

theory notions of Glaser and Strauss (1967). That is, Mealyea's methodological approach emerged from the confluence of several streams within the existing theories, research and literature, and it involved a process of exploration and discovery of the views of tradeworkers. Thus, like the intentions of the present study, Mealyea's work tends to be hypothesis generating rather than hypothesis testing.

In research that is closely connected with that of Mealyea, Gleeson (1991, 1990) sought to describe aspects of the culture of trade teachers in secondary schools, and to uncover the factors that establish and maintain this culture. Perhaps the first point to note is that Gleeson was able to identify that such a culture exists within the secondary school. That is, he was able to describe for trade teachers in secondary schools, a system of tangible symbols, social behaviours and philosophical orientations that characterise trade teachers as a group, and which can be used as the basis for comparison with other groups within the school and, perhaps, beyond. Further, Gleeson argues that trade teachers in schools are able to adhere to a system of practices only to the extent that there exists within the school a community of trade teachers that maintains the trade teachers' culture.

To illustrate the ways in which this mechanism works, Gleeson notes that trade teachers, as a group, portray themselves in terms of a contradistinction with mainstream teachers. Further, he notes the tenacity with which they adhere to this distinction:

The trade teachers are always quick to make a distinction between themselves and the 'wakademics' to identify a gap between two systems of meanings; a gap surrounded by a type of no-man's-land that no individual would, or should, dare to venture into.

(Gleeson 1991: 23)

According to Gleeson, trade teachers perceive that there is a barrier to their entry to the mainstream teacher culture, particularly by virtue of the distinction between the 'practical' nature of their work and the 'academic' nature of the work of the mainstream teacher. Such perceptions, it is argued, help to establish a degree of isolation for trade teachers and their work. It is within such a context of separateness that trade teachers can establish and maintain the trade teachers' culture. This conclusion supports an element in Mealyea's model of occupational transition in which the school - more particularly, here, the cohort of trade teachers within the school - supports the occupational identity of trade teachers as tradeworkers.

Like Mealyea, Gleeson also shows that, prior to becoming teachers in secondary schools, trade teachers have established their identities as adults. In no small part, such identity grows from the practice of their trades - 'through the labour, skills, tool use, and social relations of an industrial workplace' (Gleeson 1991: 3) - and Gleeson describes it in terms of the trade as a 'mother figure'. The position put by Gleeson is that, beyond the factors that establish and maintain it, trade teachers' culture has several distinguishing characteristics. For example, although there exists within the schools a view that trade teachers are 'unmovingly authoritarian' (Gleeson's term) - a view promoted by trade teachers themselves. However, Gleeson presents sound argument that the behaviour of trade teachers is more akin to the role of mentor:

The form of student/teacher relationship ... would be more accurately described as a mentor relationship where the teacher provides an authority for the student to emulate. This is a form of 'significant other' relationship similar to when the trade teachers themselves experienced the acquisition of manual skills during

apprenticeship. In such circumstances age or status are not the principal determinants of equality, but rather, a level of competence in manual skills.

(Gleeson 1991: 6)

This, clearly, is related to Mealyea's notion that the teacher/student relationship is modelled on the 'mentor/mentoree' (Mealyea's term) aspect - the master/apprentice aspect - of apprenticeship. The links Gleeson makes to the notion of 'significant other', and the references by both researchers to the connection with apprenticeship as the model for teacher/student relationship, suggests a deep-seated commitment by trade teachers to a form of mentoring that has elements in common with the kinship apprenticeships of earlier years - including pre-industrial times. In those earlier models of skills training, even when the apprentice was from outside the family group, they assumed what amounted to a filial status. The tradeworker presumed responsibility for the development of the apprentice not only in the skills and knowledge of the trade but also in the social and personal aspects of development through adolescence. The point to be made here is that the 'manually skilled culture' (Gleeson's term) to which trade teachers appear to be committed is not as focused on the instrumental and the vocational as is portrayed so frequently and commonly in relation to skilled workers¹³. Rather, in its concern with educational and social development of the young school students, it retains vestiges of a quasi-kin relationship. As Gleeson (1991) notes:

¹³ Other scholars have pointed to the inadequacy of the portrayal of 'manual' workers as instrumentally or vocationally oriented. See, for example, Loscocco (1989), Luttrell (1989), Hedley (1984), Hammond and Hammond (1979), Beynon and Blackburn (1972).

... their practices indicate a deep commitment to work cultural mores that they had brought from industry and the social and educational needs of their students.

(Gleeson 1991: 11)

In similar vein, Gleeson provides data that suggests that another characteristic of the trade teachers' culture is exhibited in their insistence that students use skills and tools 'correctly'. As is the case with most of his work, Gleeson probes below this external indicator in search of the attitudes and beliefs that underpin such behaviours. In this case, Gleeson argues that a characteristic of trade teachers' culture is strong commitment to 'institutionalised rituals of skill application and tool use' (Gleeson 1991: 6) and that this derives from the experiences of trade teachers in the socialisation processes through which they became tradeworkers. That is, the process of apprenticeship leads tradeworkers to value skills and knowledge which have been internalised and which can be brought into action 'at will'. Although not specifically identified by Gleeson, it would appear that what his work suggests is the significance to tradeworkers of knowledge that is characterised by routine and certainty rather than that which is open-ended and uncertain. Whereas problems, quandaries, exploration and discovery may be valued by, say, a scientist, tradeworkers may perceive these as the antithesis of that which they value. Such a possibility is supported by the 'head work - hand work' (Gleeson's terms) dichotomy by which trade teachers - and others - separate their knowledge from that of mainstream teachers.

In looking to these works to inform the study at hand, it should be noted that there are some important differences between the roles and functions of trade teachers in secondary schools in Victoria and those of the trade

instructors of this study - in TAFE institutions in New South Wales and the Australian Capital Territory. For example, the former are governed more by the goals of general education; the latter are governed more by the goals of formal preparation for the skilled trades and of apprenticeship. Also, whilst the links between TAFE and secondary education are strengthening - particularly at the postcompulsory level - TAFE institutions are non-secondary, postcompulsory education institutions that cater primarily for those who have left secondary school. In large part, the students of TAFE are adults; TAFE perceives its role as serving the skilled labour needs of industry to a very much greater extent than do secondary schools; TAFE has ongoing and firmly established links with industry; and TAFE recruits the vast majority of its instructional staff from industry rather than from university teacher education courses. Thus, a point that separates the works of Gleeson and Mealyea from the study at hand is that their work is located within the secondary school context.

At the same time, there are many aspects of the works of Mealyea and Gleeson that make them significant amongst the theories, research and literature that inform this study. The most prominent aspect is that they focus on tradeworkers who have moved from the practice of a trade to an instructional role in an educational setting. Beyond this, however, and in a manner similar in nature to that which triggered this present study, the work of both researchers emerged from their unfashioned observations of a form of conflict between trade teachers and the dominant or mainstream setting in which they work - in their case, the secondary school. Both researchers note the discomfort trade teachers feel with those aspects of schooling that might be described as 'academic' in relation to their own work. Another factor that the works of both researchers have in common

with the study at hand is that they emerged at a time when broad structural and policy changes were occurring in the respective educational settings. In the case of Mealyea and Gleeson, the changes related to the abolition of the long-standing division between technical schools and high schools, and the subsequent pressure for trade teachers in secondary schools to make a substantial shift in the focus of their teaching. In general terms, this shift involved moving from the teaching of highly specific manual skills to more generic forms of skills education, and the imposition of more overtly academic criteria against which to judge the work of trade teachers and to select the content of their curriculum. In the case of the present study, the major challenge to the work of trade instructors is that of the so-called Training Reform Agenda. Here, there is a clear move to supplant apprenticeship and other long-standing features of training for the skilled trades with forms of training that are more accessible and which are governed by criteria and standards that are determined externally. A third point of commonality is that both Mealyea and Gleeson point to the scarcity of research that might inform their studies of trade teachers in clear and direct ways. Thus, both sought to explore, uncover and discover rather than make assumptions or inferences from other studies or theories. Both researchers worked from a grounded base, relied heavily on ethnographic method to generate data, and sought to work towards theory development. This is not to suggest that they did not give due consideration to other theoretical positions, for in order to create an informed basis upon which to conduct their research, each worked within existing broad theoretical positions, and drew on combinations of theories and propositions. Both researchers were cutting open new ground, in an area of research for which no significant and established theoretical framework existed.

The highly significant works of Mealyea and Gleeson give rise to several important directions for the present study. They give good support to the emergence of the questions posed in Chapter One. For example, the insights they give about the notion of trade teachers' identity and culture support the speculation that trade instructors are likely to use frameworks that are characterised by perceptions of reality deriving from an occupational identity as tradeworkers. They point to the likely significance of apprenticeship - and other characteristics of work in the skilled trades - in the formation of such occupational identity. And, by the extent to which trade instructors carry these occupational identities into their roles as instructors, they underscore the importance that such occupational identity is likely to hold in the formation of trade instructors' views of knowledge and knowing. Thus, Mealyea and Gleeson create an imperative to explore in greater detail the nature of the skilled trades and the sorts of world views that it generates for trade instructors. That is the focus of Chapter Three of this thesis.

The works of Mealyea and Gleeson also point to the need not only to clarify the nature of the views that trade instructors hold, but to place them within a broader context of perceptions of what counts as knowledge for different social groups, and how knowledge is organised. This remains the focus of this chapter.

The third major direction that arises from the works of Mealyea and Gleeson relates to the research approach. They point to the importance of exploring and discovering the views of trade instructors 'from the ground up', rather than assuming that they will be of a particular kind.

Consideration of the methods appropriate to such an approach are pursued in greater depth in Chapter Four of this thesis.

Though not referenced by either researcher, elements of the work of Mealyea and Gleeson work echo the earlier theoretical position¹⁴ posed by Bensman and Lilienfeld (1991, 1973, 1970, 1969). Their theory focuses on the role played by occupations as specific determinants of world views. Whilst a primary thrust of their work is directed towards examining the extent to which the culture of a society is influenced by, absorbs, and makes use of the highly articulated systems of thought created by people practising in the professions, it includes, also, consideration of the effects of the experience of occupational practice upon the views held by practitioners. It is this latter aspect of their work that is of most significance to this study:

There is no doubt in our minds that such occupations as medicine, architecture, teaching, law, steamfitting, cobbling, taxicab driving, and ragpicking produce unique and peculiar combinations of attitudes, appropriate to the craft as well as to the societal and social position, ideological and material interests, and commitment to the society at large.

(Bensman and Lilienfeld 1973: 337)

Bensman and Lilienfeld present occupational experience as an independent source of socially relevant world views, distinguishable from class and religious or ethnic experience. They use Schutz' (1964) distinction between the attitude of everyday life and the scientific attitude as a point of departure, and expand into notions of 'critical', 'artistic' and 'planning' attitudes - located somewhere between the two positions posed by Schutz.

¹⁴ The analysis presented by Bensman and Lilienfeld (1991, 1973) appears also to be based on assumptions largely consistent with a phenomenological approach.

Their work¹⁵ draws on analyses of professions that have primary focuses in music, art, sport, religion, philosophy, history, economics, sociology and psychology.

An aspect of their theory that is of particular relevance to this study of tradeworkers is the proposition that, by using particular methods of work, by handling specific materials with suitable techniques, and by participating in particular social arrangements, workers develop specific 'habits of thought' (Veblen's term¹⁶) that may be described in terms of essential 'craft attitudes' (Bensman and Lilienfeld's term)¹⁷. The elements of an occupation that give rise to craft attitudes are labelled collectively the 'craft' of an occupation. That is, the 'craft' of an occupation is used as a term inclusive of those aspects of occupations that are the source of, and decisive in the craft attitude. For example, one of the occupations used in the development of this theory was that of the artist. Starting with Schutz' basic ideas of the 'natural attitude' and the 'scientific attitude', Bensman and Lilienfeld constructed a model of the 'artistic attitude'. They argue that the work of the artist requires the individual to create an image of the world in such a way that it can be experienced 'directly, intuitively, emotionally and naively'; it must be a representation of a 'total and complete world, a province of meaning complete in itself' (Bensman and Lilienfeld 1973: 19). This necessitates the artist's working in ways that are highly complex, involved and sinuous, and which are underpinned by sensitivity and an

15 The work reported here represents a synthesis of, and development from a considerable number of earlier research efforts, many of which targeted specific occupational groups. As example, see Lilienfeld (1962), Bensman and Gerver (1972, 1958, 1954), Bensman and Rosenberg (1963), and Bensman and Lilienfeld (1970, 1969).

16 As used by Bensman and Lilienfeld, the notion of 'habits of thought' occurs in the earlier works of Veblen (1964, 1953). Bensman and Lilienfeld appear to have used this as a point of departure for their own work.

17 As noted above, this is echoed in the later work of Mealyea (1989a, 1988) and Gleeson (1991, 1990).

acute consciousness of self. It requires also that, at the same time as being highly conscious of the nature of substances, techniques and implements, the artist must conceal them from the public - they must not protrude through the work of art into the consciousness of the art observer or critic. This is a form of contrivance that must be merged with the spontaneity expected of art. Such characteristics, it is argued, constitute the craft of the occupation and foster within practitioners a specific craft attitude that Bensman and Lilienfeld call the 'artistic attitude'.

According to Bensman and Lilienfeld, craft attitudes have autonomous and internal dynamics that are deducible not from the analysis of the external relationship of the occupation to society as much as they derive from within the occupation:

There is an autonomy in the development of craft technique, attitudes towards materials and media, and the development of skill and virtuosity, which are indigenous to an occupation. They give it distinct and peculiar characteristics of its own. They create a sense of pride, loyalty and attitudes of virtuosity and craftsmanship which isolate occupations ...

(Bensman and Lilienfeld 1973: 3).

The craft attitude of an occupation, as an influence on the development of world views, is used by Bensman and Lilienfeld in contradistinction to class and particular social and economic positions, and those particular occupational interests that emerge also from participation in an occupation but which are positioned essentially external to the occupation. These latter aspects of occupations clearly exist and contribute to world views and attitudes. The craft attitude is located together with and inseparable from occupational interests, in that such interests are claims for prestige, power,

and income in the Marxian sense. Craft attitudes are also separate from, but coexist with world views that derive from the selected social experience that the practice of any occupation necessarily entails. Whilst it can be argued, with Marx - and as noted earlier in this chapter - that an individual's social experience determines their consciousness, a major component of that social experience is the specific things that an individual does in their occupational and professional practice. The position taken by Bensman and Lilienfeld remains essentially within the Marxian intellectual tradition in that it is concerned with relating forms and content of knowledge to the position of the knower in the social, economic and class structure of society, and thence back to the evolution and character of that economic structure. Where it appears to separate from the strict Marxian interpretation is in its assumptions that occupational perspectives do not necessarily lead to class perspectives, and occupational perspectives are based, at least in part, upon the specific craft of the occupation¹⁸.

The theoretical perspective of Bensman and Lilienfeld - and other, related research - directs attention clearly towards the nature of work in occupations as a determinant of world views. Not only are the well recognised aspects of occupations involved - such as class, power and related social concepts - but also dimensions of the occupation that reflect the nature of the work undertaken by practitioners. For the present study of trade instructors' views of knowledge and knowing, this means that it is important to pursue in depth the nature of the skilled trades - a primary source of the occupational experience of trade instructors. Whilst there is much in common across the several trade areas, the work of Bensman and

¹⁸ It is reasonable to assume that Marx was aware of these factors, particularly through his descriptions of the feudal guild occupations, but it appears he did not give them emphasis in his major theoretical focus.

Lilienfeld suggests that differences in the nature of the work in individual trades could generate differently characterised views of knowledge. However, the remoteness of the skilled trades from any significant scholarly literature and research requires that any approach to this aspect be fashioned carefully and somewhat tentatively. Chapter Three of this thesis is devoted to a more specific exploration of the skilled trades as occupations and the ways in which they may influence the perspectives held by practitioners of the trades.

2.5 Teachers' Views of Knowledge and Knowing

Two research efforts related closely to the exploration of teachers' views of knowledge and knowing are those of Benson (1989, 1984) and Young (1981, 1980). Whilst their works are not about tradeworkers or their occupations, they do focus on the ideologies that justify the views that people hold - in these cases, the informants are teachers in secondary schools. Benson sought to uncover the ways in which science teachers in secondary school make sense of knowledge - 'establishing criteria by which knowledge claims are assessed' (Benson 1989: 330) - and how they influence what is provided to students as science curriculum. Perhaps the first point to be noted is Benson's comment that such a question could only be asked under the assumption that knowledge formation is a 'complex, social activity in which individuals construct understanding' (Benson 1989: 330). That is, Benson acknowledges that his work is set within a selected theoretical frame similar in nature to that of the present study. Beyond this, however, there are several other ideas that may be gleaned from Benson's work.

Benson's study establishes that science teachers do hold views of knowledge and knowing and that these views influence their approach to curriculum and instruction. Further, he shows that it is possible to describe and explain these views in a discourse on types - a typology¹⁹. The essence of the typology presented by Benson is a vision of science in which all aspects of science exist in the 'real' world. The teachers involved perceive that truth is the degree to which observed natural phenomena correspond to explanations, and that truth is established by applying the hypothetico-deductive method and the systematic testing of hypotheses. Using the weight of evidence obtained by taking several slices of data, Benson was able to categorise these as 'realist' views²⁰. That is, the science teachers use criteria for establishing truth and what constitutes valid knowledge that suggest that, taken collectively, they understand the world in a way that resembles what Benson calls 'scientific realists'²¹. These perceptions, it is argued, are carried by the teachers into their instructional practices and into the curriculum formulations of the schools. In interviews established to validate his empirical observations, Benson shows that not only are the teachers aware of these positions but they can provide justification for their classroom practices in terms of these positions and an array of situational constraints inherent in the school setting - such as externally set examinations. In a sense, these situational constraints act as qualifiers to what teachers might profess as their 'ideal philosophy of education' (Benson's term), and have the effect of producing the 'realist' position that Benson describes. As Benson put it:

19 The notion of dominant typologies was raised in the theory, research and literature attended in Chapter One and earlier in this chapter.

20 *The importance for teachers who are realists is not that they view the world as "real" but the degree to which they project what the world is like prior to any empirical investigation and what it must be like in order that such investigations are possible.*
(Benson 1989: 339)

21 Bhaskar (1984) expounds a theory of scientific realism upon which Benson appears to have based this descriptor.

... teachers reduce curriculum to a common level in which objective knowledge is reified and the presentation of it is justified externally.

(Benson 1989: 343)

It is interesting to note that there appears to be some discrepancy between the views professed by the teachers as practitioners and the position held by theorists in the area - including Churchland and Hooker (1985), Mulkay (1984, 1979, 1972), Mulkay and Gilbert (1984), and Van Fraassen (1980). These theorists portray an image of science and goals of science, that stress the processes of thinking rather than the acquisition of theoretical knowledge. They regard science as but one way of knowing the world, and regard scientific knowledge as culturally and socially based. This is very much a constructivist position. However, the views expressed by the science teachers - such as, the emphasis on science method as the epitome of process, and their view of the 'objectivity' of scientific knowledge - are in significant contrast to a constructivist epistemology.

To the extent that this discrepancy can be generalised, such an observation underscores the naivety of merely assuming that the views of teachers, in Benson's case - or trade instructors, in the study at hand - are of a certain kind or that they will be in accord with the views of well-established theorists. It stresses the importance of exploring and discovering the constructs that trade instructors use. This is particularly so when it is considered that a factor that separates the present study from both the existing empirical research efforts and the positions put by prominent theorists is the background of the informants and their relationship with their discipline. Like so many of the empirical studies in the area, the informants in Benson's study are teachers who trained at university in the

disciplines of the sciences and then moved directly into teaching within secondary schools. In general, their understanding of science developed within a university department, uncontaminated by the experience of science as it is used in industry, commerce and business settings. Their first experience of science in an occupational setting was as a teacher of science. In contrast, trade instructors have significant experience of the occupational practice of their trade area - their 'discipline' - before they move to an instructional position. A significant component of their initial training is in an occupational setting, the primary focus of which is production and productive service. The views they have about their 'discipline' derive from - and have been tested against - their experience²² of the trade in 'action'.

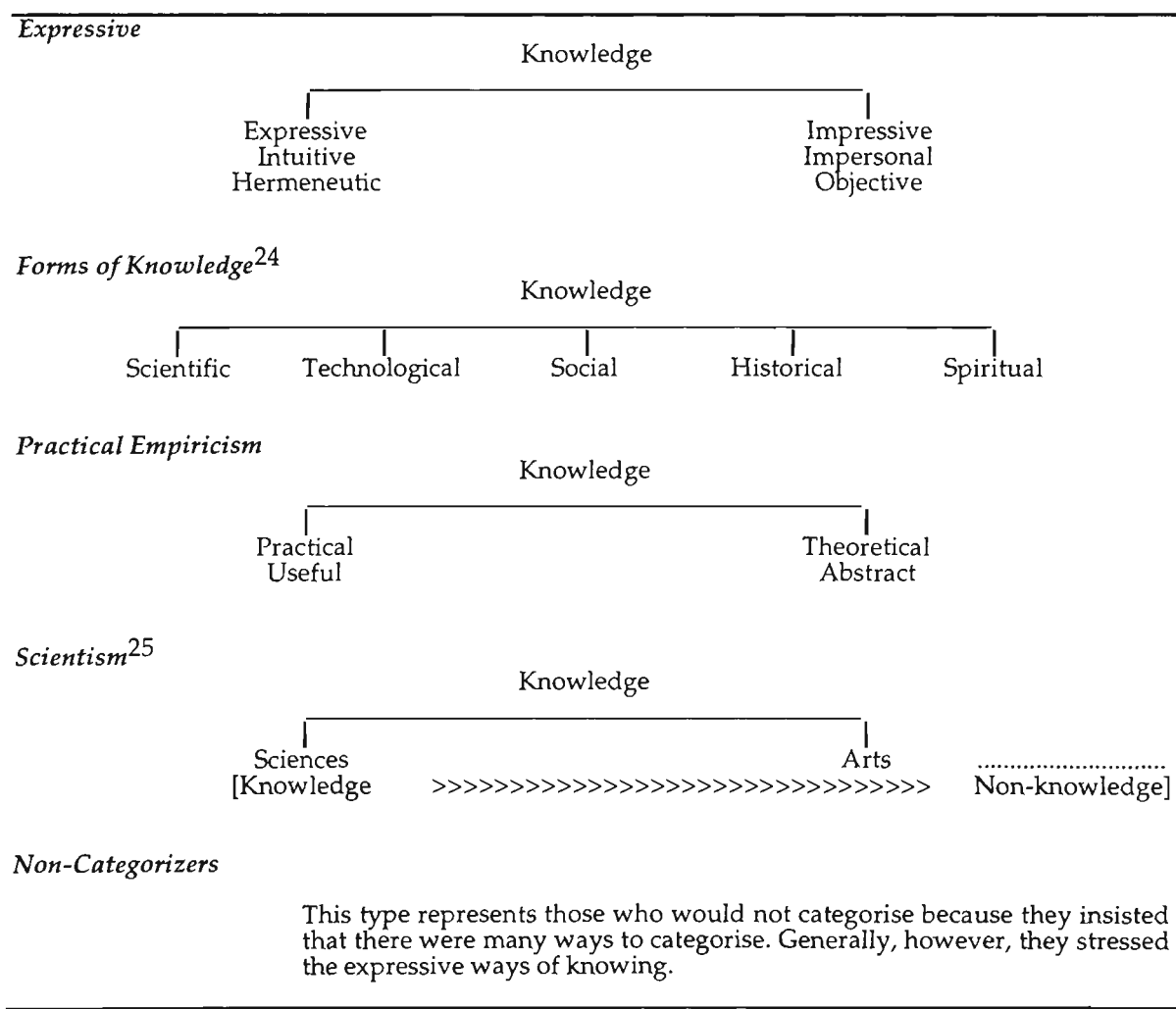
Benson used a case study approach, choosing to base his work on the detailed study of a few informants rather than a mass survey of teachers. The advantage he gained through this approach was that he derived very 'rich' data; a disadvantage he faced was that it remained difficult to form generalised views. A study that attempted to overcome this difficulty was that of Young (1981, 1980). He conducted research that falls within a genre similar to that of Benson's studies but which, in some ways, is more closely connected with the present study. He sought to develop a technique for identifying 'the nature of epistemological beliefs, values and attitudes' (Young 1981: 196) of teachers in secondary schools. His research was multi-staged in that the early efforts were directed at identifying and describing the epistemologies²³ of a small group of teachers, and later efforts sought to

²² The evidence that emerges from Chapters One and Two suggests that experience of the trade is critical to an understanding of the perceptions trade instructors hold about knowledge and knowing. Thus, further exploration of the nature of the skilled trades is taken up in Chapter Three.

²³ Young's (1981, 1980) use of the term 'epistemologies' corresponds with that used in the study at hand and as described in Section 1.1, rather than in the sense of 'philosophical epistemologies'.

construct an instrument for testing the extent to which the epistemologies so identified were generalisable to a broader population of teachers. The result of the ethnographic stage of the study indicated that the responses could be arranged under five main typologies, which Young labelled and presented as given in Figure 2.01.

Figure 2.01
Diagrammatic representation of the main typologies within teachers' epistemologies, as described by Young (1981).



Young notes that a single major issue dominated teachers' consciousness and divided teachers views:

Teachers either accepted a logical/empiricist view of the physical sciences as an epitome of knowledge, or adopted a view which gave epistemic priority to more 'subjective' or 'intuitive' ways of knowing (called here 'hermeneutic'), or, in the case of a small minority, adopted a dualistic system in which both types were recognized, called here the 'forms of knowledge' approach because of its resemblance to the view of Hirst.

(Young 1981: 197)

Young's explanation of this situation was that, if a particular view of knowledge is important within the broader social setting of which the teachers' work is part, a form of curriculum organisation consonant with it will be more likely to be viewed as legitimate and of natural consequence²⁶. This is a position largely in accord with the broader intellectual tradition espoused by Durkheim (1977) and Habermas (1968) that relate modern, technological society to the role of educational institutions through the influence of what Habermas calls 'scientism'. Thus, Young was able to explain the dominance in teachers' views of the logical/empiricist position, arguing that it helps teachers to establish curriculum and instructional regimes that conform with the expectations of the broader social setting. The parallel in the situation faced by trade instructors might be that views of knowledge and knowing engendered through experience of the trade provide the backdrop against which trade instructors judge the adequacy and legitimacy of the curriculum and instructional formulations of the educational institutions. Under this interpretation, the dissonance symptoms, noted earlier, arise where the primary values and perspectives

²⁶ This is the form of argument which Bernstein (1977, 1973a, 1973b) might extend in his notion of 'dominant cultural code'.

developed by trade instructors within the occupational setting of their trades are not translated into the curriculum and instructional formulations that govern their work in educational institutions.

Young's finding is echoed also in Benson's studies where teachers' professed 'scientific realism' was engendered by the moderating effects of a variety of situational constraints on their 'ideal philosophy of education'. The point to be made here is that teachers' epistemologies - as described by Young - are related to curriculum codes at least in part because they have wide societal support. Young's work takes what might otherwise be Bernstein's (1977, 1973a, 1973b) position on transmission within educational agencies and makes connections with factors beyond the classroom - societal ideologies and institutions. Thus, the works of both Benson and Young, together with Mealyea and Gleeson, support the early postulation in this study that trade instructors may hold views about knowledge and knowing that derive from dominant settings beyond the classroom and rest on assumptions that arise from their experience of their trade - an operational knowledge.

2.6 Institutional and Operational Knowledge

The notion of operational knowledge - *vis a vis* institutional knowledge - in the sense portrayed in Sections 2.4 and 2.5, is reflected in the works of Luttrell (1989, 1984) and Bishop (1979, 1977). Luttrell (1989, 1984) focused on the perceptions held by groups of women about what counts as valid knowledge. In the same sense that the study here came to focus on tradeworkers, so Luttrell's research emerged from a concern for an apparent dissonance between the dominant curriculum and instructional

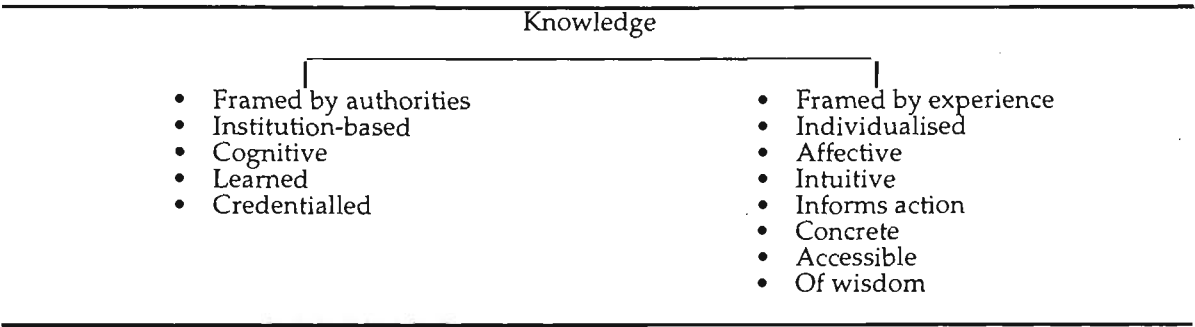
approaches of educational institutions and groups of people involved with those institutions. In this case, the research was concerned with the 'dilemmas and double-binds that working-class women face as they pursue an education' (Luttrell 1989: 34), and the specific setting was adult education.

Whilst one of the primary thrusts of Luttrell's research relates to gender and power issues - a thrust entirely consistent with the broader theoretical perspective within which it is framed - the focus on perceptions about what counts as valid knowledge generates several ideas that may be drawn from that research and directed towards the present study. Luttrell focuses on how 'working-class women define and claim knowledge' (Luttrell 1989: 33). The population on which the research was conducted includes two subgroups - black working-class women and white working-class women in the United States of America. Luttrell shows that differences exist between the subgroups and that these differences in perceptions about what constitutes valid knowledge derive from variations in the lives and the life experiences of the women involved. For example, black women place greater emphasis on knowledge derived from 'kin networking' (Luttrell's term), and from mutual support - salient features of their life experiences as women with family and community responsibilities. That is, in the perceptions of these women, the sources of valid knowledge derive from personal, lived experiences, and what counts as valued and valid knowledge is characterised by particular attributes that can be traced to these sources. White women adopt a very similar stance towards what counts as valued and valid knowledge. However, the nature of their experiences - as sources of valid knowledge - differ from those of the black women, and this gives rise to perceptions of what counts as valid

knowledge that are differently characterised. Because the salient features of their roles in family and community settings are influenced more by the 'manual work' (Luttrell's term) in which they, and significant others in their lives, were engaged, the characteristics of what counts as valid knowledge are expressed more clearly in terms of what Luttrell called 'manual ways of knowing' (Luttrell 1989: 41). That is, sources of valid knowledge are located still within the notion of lived experience, but characterised more by features derived from manual work and distinguished from 'mental ways of knowing' (Luttrell 1989: 41). In her notion of 'manual work', Luttrell is referring to the greater connection white women make with the skilled trades. She notes, particularly, that the husbands - 'significant others' - of white women are more likely to be involved in skilled work than those of the black women and this supports the centrality of the skilled trades to the experiences of white women. Conversely, the work with which the husbands - 'significant others' - of black women are engaged is more likely to derive from kinship connections, and this supports the greater emphasis on 'kin networking' (Luttrell's term) in the views of the black women.

Luttrell shows that, despite their individual and group differences, there is a level of analysis at which the women involved share significant ideas about knowledge and a common framework for evaluating their claims about knowledge. In particular, both groups distinguish between knowledge produced 'in school' or in textbooks and knowledge produced through experience. That is, both groups subscribe to a basic typology that consist of a dichotomy between knowledge framed by authorities - and, thus, perceived as 'fabricated' - and that framed in a more personal sense. This dichotomy is presented in Figure 2.02.

Figure 2.02
Diagrammatic representation of the major typology in the perceptions of working class women about knowledge and knowing, as described by Luttrell (1989, 1984)



The notion of 'authorities' in the typology gives particular support to the power and gender thrust of Luttrell's work; the notion of 'experience' contained in the typology relates to the community, family and work experiences of the informants. This typology is of fundamental importance as an organisational element in Luttrell's portrayal of the perceptions of the women involved. Valid knowledge derives from lived experience; that which is from other sources is 'fabricated' and 'false'. That is, there is a denial of the validity of knowledge that does not derive from lived experience and which does not inform action and decision making. The women in both subgroups perceive that knowledge that derives from people's lived experiences is characterised as concrete knowledge that informs action²⁷. Such knowledge is 'accessible', and 'requires no ... credentials' (Luttrell 1989: 37). It is founded on ways of assessing or judging the truth that affirm and validate the working-class experiences of the women and their working-class solutions to problems. It is characterised as 'affective not cognitive; as intuitive not learned; as feelings not thoughts' (Luttrell 1989: 40). It includes a notion of wisdom derived from the experience of the social setting. Thus, Luttrell shows that these perceptions

²⁷ It might be noted here that such an interpretation is congruent with the framework portrayed by Geertz (1983).

differ in significant ways from those seen as underpinning the curriculum and instructional formulations of the adult education institutions, and the difference is encapsulated in the basic typology that contrasts the two perspectives. The women struggle with the curriculum formulations of the educational institutions because their perceptions of the knowledge embraced by these formulations is of knowledge that is fabricated, removed from reality, and which cannot inform action.

Another outcome of Luttrell's work, important for its contribution to this study, is that the informants - working-class women - distinguish between their knowledge and that of working-class men not on the basis of the typology noted above but on the basis of the nature of the experiences of the men and the women. That is, what counts as knowledge and sources of valid knowledge for the men and the women are equivalent in the sense that both derive from lived experience rather than being 'fabricated externally' (Luttrell's term). The differences emerge through differences in the collective experiences of the men *vis a vis* the women. For women, knowledge derives more from the relational activities that are embedded in the care of and affiliation with others; for men knowledge derives more from participation in apprenticeships, as employees, or as participants in work. Thus, men's knowledge may be characterised as deriving from experience of the workplace, 'belongs to the work group; it is not individualised and cannot be learned from books' (Luttrell 1989: 39). In contrast with women's knowledge, men gain knowledge not through instinct and nature but through more public and collective experiences associated with their work.

According to Luttrell's findings, both working-class men and women have what Johnson (1979) earlier had called 'really useful knowledge'. Luttrell describes this as 'craft knowledge'. It is interesting to note that the emergence of differences in perspective between Luttrell's subgroups actually gives emphasis and centrality to the notion of 'experience' - in the sense used above - as the source of valid knowledge. That is, 'experience' gives rise to characteristic ways of knowing that embody identifiable knowledge sources and criteria by which the validity of knowledge claims may be judged.

The earlier parts of this thesis contained some initial speculation about the ways in which tradeworkers perceive knowledge and knowing. It was suggested that such perceptions may include emphasis on a more personal sense of knowing, on experience as the source of valid knowledge, on concreteness, and on the concept of knowledge informing action. Though the informant groups clearly are different, Luttrell's work provides some support for that speculation. It would seem that what the women in Luttrell's research classified as lived experiences, might be interpreted for tradeworkers in this study as the experience of working in their trade. It would seem also that the trade instructors of this study have experiences akin to those of the working-class men of Luttrell's study. Luttrell's work supports the notion that differences in perspective about what counts as knowledge emerge from variations in the dominant experiences of people as individuals and in groups.

Luttrell was able to use the accumulated experience and directions established by the work of a number of earlier researchers²⁸. This signalled

²⁸ See, for example, Rockhill (1987), Belenky et al (1986), McLaren (1985).

to Luttrell to be cautious about assuming that the perspectives of the informants would be of a particular kind. Thus, she adopted an exploratory and grounded approach that relied heavily on observation and interview, and which was directed towards uncovering those perspectives. This is a clear signpost for the study of trade instructors' epistemologies. In particular, it shows that the study must embody a genuine search for what trade instructors themselves perceive as valid knowledge, its characteristics and the criteria by which it is tested. It is not sufficient merely to assume that trade instructors hold currently dominant views - such as those of the educational institutions. Whilst Luttrell's work supports the suggestion that differences may emerge in the views of tradeworkers deriving from the experiences inherent in participation in different trades, Luttrell's work suggests, also, the possibility that there may be a level at which tradeworkers - taken collectively rather than separated by trade area - share similar ideas about knowledge and knowing. This gives weight to the earlier notion that it may be possible to identify major typologies that might potentially guide tradeworkers in their approach to knowledge and knowing.

In work of an essentially theoretical nature Bishop (1979, 1977) developed what he calls a 'sensitizing framework' for considering what counts as knowledge, and for identifying sources of valid knowledge for workers. He argues that, within the realm of work, it is possible to distinguish between institutionalised knowledge and operational knowledge. In his interpretation, institutionalised knowledge consists, at least in large part, of that formal body of knowledge upon which an occupation is deemed to be based. He cites, as an example of this knowledge base, 'physiology, anatomy, disease theory in medicine' (Bishop 1979: 331). Bishop's theory

has some similarity with, but does not take the same line as, that of Hirst (1974) who argues that in respect of any serious human activity in which there are claims about knowledge and knowing, the kinds of statements and the procedures for testing their truth can, under appropriate analysis, be reduced to six or so different kinds of statements with corresponding tests for truth. That is, the limitless number of subjects and topics that appear in curricula across the several education sectors, or practices that occur in industrial technology or design, presuppose one or more of these limited number of forms of knowledge. For example, from Hirst's argument it could be seen that Engineering might presuppose empirical and mathematical forms and, with Economics as an accompaniment, the historical-sociological form; with Design Technology it may presuppose the aesthetic form. Subjects like Physics and Chemistry, though substantively different, share the empirical and mathematical forms. Whilst Bishop theorises that there exists institutionalised knowledge that underpins knowledge in occupations, he does not enter the kind of discussion about fundamental forms of knowledge as proposed by Hirst and other scholars who subscribe to a 'logical division of knowledge' approach.

Bishop does argue, however, that where institutionalised knowledge can be brought to bear on a work situation in clear and direct ways, it passes as valid knowledge for the practitioner of the occupation. Further, he suggests, in the professions this is likely to be significantly and clearly the case. But where institutionalised knowledge does not inform decision making and action in work settings in clear and direct ways, its claim as valid knowledge is weakened. It is here that Bishop establishes a position for what he terms operational knowledge.

Bishop argues that views of valid knowledge rest on the conviction that phenomena, events and objects are real, and that operational knowledge is the knowledge that allows work to be undertaken with facility. In this sense, operational knowledge is perceived by practitioners as valued and valid knowledge. A relationship between operational knowledge and institutionalised knowledge emerges only to the extent that the latter is able to inform the former. That is, institutionalised knowledge becomes a source for operational knowledge when it can engender a sense of certainty concerning the work at hand:

Institutionalized knowledge in occupations is usefully conceived as varying along a continuum of adequacy. This refers to the objective ability of the institutionalized knowledge to provide practitioners with effective grounds for meeting normal demands in typical work situations.

(Bishop 1979: 332)

Bishop argues that operational knowledge derives from not only institutionalised knowledge - to a greater or lesser extent - but also from a range of other factors which, in combination, form a 'universe of possibilities and resources from which the operational knowledge ... is developed' (Bishop 1979: 347). For example, Bishop identifies as one such contributing factor the nature of the socialisation process through which workers gain their qualifications and associated status. Here, he suggests, what counts as valid knowledge depends on the extent to which it is acquired in a context that corresponds to conditions of work practice. That is, certainty is enhanced by the ease with which such knowledge can inform directly the performance of work. It is related also to the extent to which there is a collectively shared - rather than an individually experienced -

process of socialisation²⁹. Here, the potential for certainty is enhanced because the collegial nature of the cohort promotes internalisation of norms. Knowledge from such a collective source has a sense of being standard, part of a pattern and of a certain type.

A second contributing factor suggested by Bishop is the conditions of work, including the autonomy afforded workers. Here he argues that autonomy of practice is associated with certainty - autonomy is afforded the worker in situations where they have certainty about the performance of work. Thus, what counts as valid knowledge is that which the practitioner may exercise with a degree of autonomy.

It is interesting to note that Bishop argues that the operational knowledge applied by practitioners is not, typically, the result of a systematic or deliberate search of the 'universe of possibilities' (Bishop's term) for answers to encountered problems. Rather applications of operational knowledge are routinised as aspects of 'recipe knowledge' (Bishop's term) and the establishment of certainty. That is, Bishop argues that solutions that work become recipes in the practitioner's stock of operational knowledge. Operational knowledge is, thus, knowledge that informs action in clear and direct ways and which is characterised by a high degree of certainty³⁰.

The position taken by Bishop clearly is based on assumptions about the nature of knowledge. In particular, there are strong echoes of the broader theoretical position espoused by the noted Berger and Luckmann (1966) that knowledge, in general, is 'the certainty that phenomena are real and

²⁹ Reference is made to this also in Luttrell's (1989, 1984) work.

³⁰ Such a position was proposed in Section 2.4 in relation to the work of Gleeson (1991, 1990).

that they possess specific characteristics' (Berger and Luckmann 1966: 1). That is, Bishop's work assumes that the certainty or comprehensibility that surrounds phenomena, objects and events makes possible directed and fitting responses in particular contexts, and that what counts as valid knowledge is that which supports such certainty.

Operational knowledge is the knowledge that informs action and decision making in the work setting. As described by Bishop, operational knowledge appears to be somewhat akin to the knowledge 'framed by experience' noted earlier in Luttrell's work, the 'practical' knowledge noted in the works of Mealyea and Gleeson, the 'practical, problem-oriented and experiential' knowledge noted by Butterworth and Gonczi (1984), and the 'contextual and particular' knowledge noted by Tennant (1988, 1983).

The certainty that phenomena, events and objects are real underpins Bishop's theory of knowledge in the workplace, and his argument is that institutionalised knowledge is valued and valid knowledge only to the extent that it is a source of operational knowledge. There is both theoretical and empirical support for this notion in the sense that scholars such as Mealyea(1989a, 1988), Gleeson (1991, 1990), Tennant (1983) and McIntyre (1981) argue that tradeworkers bring to the instructional setting views in which valued knowledge is that which informs action. Bishop (1979) also points to the notion of a 'universe of possibilities' created by a range of factors that also support operational knowledge - including processes of socialisation into the occupation, notions of autonomy-control, and the routinisation of solutions derived from operational knowledge. Again, there is support for such a position, particularly from the works of Mealyea (1989a, 1988) and Gleeson (1991, 1990) in relation to tradeworkers, and

Bensman and Lilienfeld (1991) in more general terms. Bishop's notion of operational knowledge connects with Luttrell's (1989, 1984) notion that valued knowledge is that which informs decision making and action in particular work or social settings. Luttrell's work supports the notion that what counts as knowledge may differ between groups - they may perceive knowledge and ways of knowing in different ways. It points also to the importance of personal, lived experience as a source of valid knowledge. Luttrell's work reinforces the emerging notion of a typology based on the distinction between knowledge framed by these experiences and that deriving from some externalised authority - that is, institutionalised authorities that sit outside apprenticeship and its inherent social relationships.

One of the significant aspects to emerge from the main studies explored so far in this chapter, and of a theoretical perspective that enables a question such as What counts as knowledge? to be posed, lies in the assertion that knowledge may be assessed and constructed differently by different groups; what counts as knowledge for one social group may be different from what counts as knowledge for others. The essential point being portrayed is that the experience and the interests of these groups differ and, subsequently, the knowledge that is of most importance to them also differs. Further, the criteria by which valid knowledge is judged by different groups may differ. Where some may regard knowledge as equivalent to an independent reality, others may regard assertions as knowledge if they fit in with what is previously known and accepted, and still others may say that knowledge is what works or is useful in a given situation. The works of Benson (1989, 1984), Luttrell (1989, 1984) and Young (1981) suggest that these differing views of groups may be described in

terms of a discourse on types. It is in this sense that the notion of a typology was proposed in the questions posed in Chapter One.

From the works of Luttrell, Benson and Young it might be postulated also that trade instructors will hold specific views of knowledge and knowing and, in keeping with Luttrell, and Bensman and Lilienfeld, these views will derive in large part from the experience of their trade. That is, what counts as knowledge derives from the experience of the trade. The importance of these views is, following Benson and Young, that they may have a direct influence on the ways in which trade instructors perceive curriculum and instruction. Whilst the precise nature of these views is not yet exposed, the research and literature here suggests that two avenues might be pursued. First, and to the extent that it exists, there is a need to examine closely the research and literature on the nature of work in the skilled trades and to establish a theoretical understanding of the collective experiences that tradeworkers have prior to becoming trade instructors. This is the subject of Chapter Three. Second, the leads provided by Luttrell, Benson and Young suggest that it is unwise to assume that the views held by trade instructors will be of a particular kind or will be those held by theorists whose work has not been based on inquiry specific to the area. Thus, in the trail of Benson and Young, it would be appropriate to undertake exploratory work with a small number of trade instructors to establish clearer directions before attempting to move towards any large scale communication with trade instructors or any form of generalisation.

2.7 Emerging Directions

The exploration of the theories, research and literature undertaken in the first two chapters exposes the development towards a theory of trade

instructors' epistemologies. One of the emerging features for the framework is the speculation that tradeworkers who take on an instructional role may carry into their new work world views that are shaped in substantial part by their experiences of the skilled trades. The evidence supporting this position emerges from the pursuit of theories, research and literature from three general directions. First, the literature on vocational education and training in Australia, reported in Chapter One, gives rise to the observation that trade instructors face difficulties in engaging the curriculum and instructional formulations of the educational institutions, and the proposition that these difficulties might be explained - at least in part - in terms of differences in perspective about what counts as valid knowledge and ways of knowing. It is proposed that part of the explanation may be that trade instructors perceive a significant difference between their 'practical' ways of knowing and the 'theoretical' complexion of both the curriculum formulations of the institutions and the knowledge base of the instructor training programs that prepare them for their professional work as trade instructors. Second, studies of parallel situations for tradeworkers who become trade teachers in secondary schools suggest the possibility that trade instructors may carry into their instructional roles a firm notion of identity, based on their status as skilled tradeworkers and their experiences of work in the skilled trades. In the maintenance of this identity, it is proposed that trade instructors are likely to favour educational practices that derive from - or, at least, are sympathetic with - industry practices, norms and values with which they are familiar. Further, it is suggested that there is some likelihood that these practices may conflict with institutional expectations, especially where those expectations are based on what appear to be 'academic' criteria. Third, there is evidence from research into the ways in which other social groups - for example, working-class men and

women, and school teachers - perceive knowledge and ways of knowing that suggests that the views trade instructors hold about knowledge and knowing may be characterised by specific typologies, perhaps based on some form of contrast between knowledge framed by their own experience of work in the skilled trades and knowledge framed by some perceived authority structure. In this instance, the 'authority' may be the given curriculum formulations of the TAFE institutions.

In addition, there is evidence to suggest that the approach to trade curriculum formulation within the TAFE institutions reflects, at least in part, the 'general principles' approach of general education, particularly in its emphasis on 'cognitive' objectives and 'theoretical knowledge'. To the extent that this argument can be sustained, it suggests that there may be a fundamental conflict between the knowledge formulations of the trade training curriculum and the assumptions about what constitutes valid knowledge and ways of knowing deriving from experience of the skilled trades. It is clear, therefore, that insights into the skilled trades - in terms of both the nature of the work involved, and as occupations - are pivotal in the development of any understanding of the views that trade instructors may hold about knowledge and knowing. These notions are, at this point, highly speculative, and further exploration is essential.

In respect of methodological development, this chapter has pointed to the importance of a grounded approach that works from empirical evidence to discover the constructs used by trade instructors, rather than assuming that they are of a certain kind.

Chapter Three

Theoretical Considerations: The Skilled Trades

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Chapter Three

Theoretical Considerations: The Skilled Trades

You may scold a carpenter who has made you a bad table, though you cannot make a table. It is not your trade to make tables.

(Samuel Johnson¹)

3.1 Introduction to the Chapter

For most adults, work is the dominant activity and the major setting in their lives, outside of the family. It is where much of their time is spent - an arena for the development and expression of competence and a sense of worth. Work defines for people a wide range of social conditions and experiences, provides a source of identity, and shapes the views and perspectives they develop. For tradeworkers, it is the skilled trades that form the work setting. Both the knowledge base upon which they make their claims for the status of 'expert', and the pathway to the occupational position of skilled and qualified tradeworker, are provided by the skilled trades.

Trade instructors are skilled tradeworkers who have made a transition to an instructional role. But this is a role which itself has the skilled trades as its focus, at least in the sense that a primary goal is the formal preparation of apprentices. One of the major imperatives generated so

¹ Quoted by Boswell (1791: I)

far by the systemisation of existing theories, research and literature - begun in Chapter One and continued through Chapter Two - is to explore in greater detail the potential of the skilled trades to influence the views that trade instructors hold about knowledge and knowing. This is one of the purposes of this chapter. More specifically, this chapter seeks to expose core structural features of the skilled trades, extending to both the nature of work in the skilled trades and the skilled trades as a work or occupational setting, and to portray the potential these have to predispose trade instructors to particular views about knowledge and knowing.

One of the major difficulties facing directed and systematic inquiry in the area of the skilled trades is that they have received such meagre attention in the existing literature. As noted earlier, despite the emergence of valuable research in the area, there exists no significant theoretical model that might meaningfully be adopted in, or adapted for this study. Thus, a second purpose for this chapter is to use a variety of theories, research and literature to germinate understandings rather than to exfoliate an established and coherent corpus of theoretical understanding. Here, the concepts and features that characterise the skilled trades, including the apprenticeship system and the processes by which the status of skilled tradeworker is attained, are used to direct attention, to suggest patterns, and to portray factors likely to be influential in shaping the beliefs, values, attitudes and feelings held by trade instructors about knowledge and knowing. The tentativeness with which this is expressed reflects the situation that, at this point, these understandings have not been exposed to the countervail of grounded empirical evidence. This does not mean, however, that it is not

reasonable or possible to further the development of theory on the basis of the evidence that derives from analysis of the structural features of the skilled trades. Blumer (1956) describes this as the analysis of 'sensitizing concepts'. That is, salient concepts relating to the skilled trades are explored and analysed for the contribution they can make to understanding the views that trade instructors hold about knowledge and knowing. Once opportunities are opened up by such theoretical analysis, it is possible to explore relationships between the range of factors and the views held by trade instructors, and to move the focus of inquiry to more empirical considerations that seek to test these ideas. This approach is compatible with a process of inductive theory building (Glaser and Strauss 1967) than deductive theory testing.

3.2 The Structure of the Chapter

This chapter is one of three chapters that present the researcher's effort to enhance theory development through the systemisation of existing theories, research and literature. It follows the suggestions given in Chapter One and Chapter Two that trade instructors may hold views that are shaped in large part by their previous occupational experience as tradeworkers. This chapter is an element in Phase A of the study, as depicted in Section 1.6.

Beyond the two introductory sections (Section 3.1 and Section 3.2), the chapter begins by identifying major dimensions that underpin work in the skilled trades, and establishing a nexus between the nature of work and the formation of world views (Section 3.3). Then, the chapter moves to consideration of a range of structural features of the skilled

trades, organised into three groups. In the first group (Section 3.4) are concepts such as 'skill' and 'specialisation' that help to describe the nature of work in the skilled trades. In the second group (Section 3.5) are characteristics that relate to the status of skilled tradeworker, including notions of 'power' and 'autonomy'. The final main group (Section 3.6) focuses on the process of becoming a skilled tradeworker, primarily within the apprenticeship system. This includes aspects of socialisation, the filial status of apprentices, and the nature of training in a production setting. The final section of the chapter (Section 3.7) describes the emerging directions for the study, including links to Chapter Four.

3.3 The Conditions of Work and the Formation of World Views

In the existing research and literature about work and its influences, there is widespread acceptance of a functional relationship between the conditions experienced on the job and the ways in which people view the world. Gecas (1981), for example, in reviewing the effects of a number of social contexts, argues strongly that the nature of work and its settings influences the 'norms, values, beliefs and behaviour patterns' (Gecas 1981: 195) of individuals. Similarly, Loscocco (1989), Oldham and Hackman (1981) and Kalleberg (1977) argue that it is reasonable to assume that the world view an individual displays is a function of work structures and conditions. Spenner (1990, 1988a, 1988b, 1985, 1983), who has contributed significantly to the research and literature dealing more specifically with skilled work, suggests that the existence of a direct relationship between the conditions of work and the world views that workers develop is unquestionable.

As in Chapter Two, this chapter takes as given established theoretical positions on the functional relationship between world views and occupational experience, and uses them as a point of departure for the more specific exploration of those dimensions of skilled work likely to predispose trade instructors to particular points of view. However, the basis for the identification, selection and analysis of these dimensions needs to be demonstrated. Here, the works of two prominent scholars, Kohn (1991, 1980, 1977) and Kanter (1989, 1977, 1976), and the recent works of Spenner (1990, 1988a, 1988b, 1985, 1983) provide good direction. They serve to illustrate not only the strength of the relationships between the nature of work, the work setting and the sorts of influences that might emerge, but also the relevance of this kind of analysis to the study, and the dimensions of skilled work that need to be addressed.

Spenner proposes that there are two core dimensions that underpin the theoretical and conceptual approaches to the relationship between people and jobs or, more specifically, the skills involved in jobs. One core dimension is the substantive complexity of the work. This includes the level, scope and integration of the tasks involved in the work being performed, and also 'mental', 'manipulative' and 'interpersonal' (Spenner's terms) sub-dimensions of the interface between a person and the job. The second core dimension proposed by Spenner is autonomy-control. This refers to the 'discretion or leeway available in a job to control the content, manner, and speed' (Spenner 1990: 403) with which the work is accomplished. That is, autonomy-control refers not to the formal notion of authority but rather to the discretion that can be exercised within a job. Authority, as portrayed in the notion of supervision, may place some limits on autonomy-control, but it is not

synonymous with it. There are strong connections here with the notion of autonomy in the works of Mealyea, Gleeson and Bensman and Lilienfeld, as portrayed in Chapter Two.

According to Spenner substantive complexity and autonomy-control provide a two-dimensional organising scheme for the wide range of factors and sub-dimensions that have emerged from the empirical and theoretical research of many other scholars. For example, the work of Miller et al (1980) highlights a range of additional factors or sub-dimensions, including physical abilities, forms of dexterity and coordination. But in Spenner's (1990) analysis, such factors are portrayed as problematic and simple aggregations of the features of jobs, and are relatively narrow in nature. In general, they are subsumable within a broader framework, and the focus of Spenner's work is to establish the core dimensions that can subsume this array of sub-dimensions and other related factors.

Spenner's is a meta-level analysis that has developed from more fundamental positions established in the works of other significant scholars such as Kohn. From work of considerable depth, and conducted over a long period of time, Kohn illuminates the background for Spenner's analysis and provides support for the position he adopts. Kohn's work gives particular prominence to the substantive complexity of work and autonomy as key dimensions affecting the relationship between the nature of work and what Kohn (1991) calls the 'intellectual flexibility' of the worker. Here, Kohn (1991) argues that the capacity of workers to execute their knowledge, understandings and reasoning in expedient and varied ways is affected directly by these structural

imperatives of the workplace. In turn, this gives rise to the development of values associated with factors such as autonomy and self-determination. For example, Kohn (1980, 1977) has shown quite convincingly that the attitude of the workplace to structural features such as degree of supervision and the extent to which work is routinised, affects the value that workers place on consequent factors, including self-direction, conformity and order. The greater the freedom that workers experience on the job, and the more complex and challenging is the work in which they are engaged, the more likely they are to place value on self-direction and the personal liberty afforded the individual to make workplace decisions. Conversely, where people are engaged in work that is characterised by simplicity of procedures, routine, and the imposition of rules that are highly constraining, the more likely they are to value obedience, order, discipline and other indicators of conformity and custom.

One of the significant outcomes of Kohn's research is the proposition that individuals tend to generalise such work-generated values, carrying them beyond the boundaries of the workplace into other aspects of their lives. For example, one of the focuses of Kohn's (1977) work is the extent to which parental values are a reflection of work-generated values and give rise to parenting behaviours that are direct extensions of those behaviours that the parents find appropriate in their work setting. Kohn's argument is supported, convincingly, by empirical evidence. According to House (1981), 'Kohn's work leaves no doubt that specific structural imperatives of work have profound and pervasive influences on values and behaviour' (House 1981: 551) and that the primary dimensions of substantive complexity and autonomy-control are highly

significant. Kohn's work focuses heavily on the notion of class and social structures. In doing so, Kohn establishes the extent to which work-generated values underpin beliefs, attitudes and behaviours in areas that extend beyond the work setting - a generalisation of work-generated attitudes. In the present study, this is taken as a point of departure for theoretical exploration of the work-generated values of the skilled trades and the potential they hold for shaping the views held by trade instructors about knowledge and knowing.

The work of Kanter (1989, 1977, 1976) also relates to occupational conditions and their effects on the values, attitudes and beliefs held by workers. There is a difference in emphasis between the works of Kanter and Kohn. Whereas Kohn's emphasis tends towards the structural features of the job and the workplace, Kanter is more concerned with those of the career and the place of the job within a broader setting. Kanter has shown the importance of structural features of the work situation, such as the opportunity structure, the power structure, and the social composition of the peer cluster. According to Kanter (1989), the ways in which individuals adapt to the conditions of their work setting and the extent to which they become committed to, or alienated from their work is largely a function of these factors. For example, people who work in situations that provide little opportunity for promotion and mobility tend to limit their goals and aspirations, and tend to develop loyalties to a localised and smaller unit rather than to the broader host organisation. Similarly, people who have little power become more authoritarian and use subordinates as their primary frame of reference. They tend to 'lay down the law' rather than follow more negotiated and persuasive pathways. Kanter's (1989, 1976) work argues

that beliefs, values, attitudes and self-conceptions of individuals are a product of, and an adaptation to, the experience of the work situation, and that this consciousness has behavioural consequences. In a broad and generalised sense, this suggests that these structural features of work and the work setting influence beliefs, values, and attitudes about valid knowledge and the ways in which valid knowledge is derived and transmitted. But it does not address it in any specific sense.

A strong point of contact between the works of Kohn, Kanter and Spenner, is the extent to which they affirm the position that consciousness is fixed in experience - a connection with the essentially Marxian position noted in Chapter Two (see Section 2.3). That is, these scholars agree that beliefs, values, attitudes and conceptions of self are, in considerable part, a product of the experiences of the workplace. Within this school of thought, there exist differences of opinion about what should be emphasised. One focus is the larger system of structural and organisational relations within which a person's job is located. Here, dimensions such as power, opportunity, social composition and social history are important. Another focus is the nature of the work that an individual does and the substantive complexity inherent within the work. In this position, prominent factors include the 'texture' of the work, the amount of freedom that one has in doing it and in making decisions about the work.

In combination, however, this range of adaptive and developmental factors proposed by Kohn, Kanter and Spenner establish clear connection between the world views people hold, the nature of their work and the work setting in which they are situated. Such factors

establish a point of departure for the exploration of the work of the skilled trades, particularly in terms of the core dimensions of substantive complexity and autonomy-control, and the sub-dimensions of which they are composed. Further, they provide the basis for progressing beyond the connections - established tentatively in Chapter One and Chapter Two - between the views that trade instructors hold about knowledge and knowing and their experiences of the skilled trades. What appears, now, in Sections 3.4, 3.5 and 3.6 is a detailed exploration of the attributes of the skilled trades that relate to these core dimensions. Then Section 3.7 distils the essence of what has been uncovered by this exploration.

3.4 The Nature of the Skilled Trades

It appears that the skilled trades provide a formative work setting for tradeworkers. Further, they may remain the focus for those who make the transition to the instructional role (Mealyea 1989a, 1989b, 1988; Gleeson 1991, 1990). Thus, there is a need to examine the ways in which the skilled trades can provide the setting from which trade instructors form generalised beliefs, values, and attitude - in the sense proposed by scholars such as Kohn, Spenner and Kanter - and the potential nature of that influence.

The work performed by tradeworkers is complex and, often, physical. It requires the application of a body of trade-specific technical knowledge, initiative, a high degree of manual dexterity, and other practical skills. Typical of the descriptions of the skilled trades is that provided by Marsh (1979):

... manual occupations requiring extensive training and a high degree of skill, as possessed by a craftsman, and usually judged by his having served an apprenticeship. The precise amount of skill and competence required of a craftsman has never been easy to define with precision, and this has frequently been associated with his training ... and also with his capacity, within his own trade, to handle a variety of jobs and materials with a minimum of direction and supervision.

(Marsh 1979: 74)

Across the range of descriptions and definitions that relate to the skilled trades, two elements emerge most prominently and tend to characterise the skilled trades. These are 'skill' and 'specialisation'. They are two of the sub-dimensions encapsulated by the organisational scheme that uses the substantive complexity and the autonomy-control as major dimensions of the work undertaken by tradeworkers.

3.4.1 Skill

The concept of 'skill' is an attribute that dominates the popular perceptions of the skilled trades. In Australia, 'skills' and 'skills training' are associated with only a narrow range of occupations, 'restricted primarily to the skilled trades' (AEC 1991: 5). A common interpretation of the notion of 'skill' *per se* focuses on the perceptual-motor attributes of performance:

... the ability to coordinate muscular contractions in tune with the prevailing situation such that some deliberate change is brought about.

(Legge and Barber 1976: 11)

The interpretation of this physical realm of ability is often alluded to using terms such as 'deft', 'knack' and 'adroit' rather than described with any degree of precision or detail (Attewell 1990). The development of skill in this form typically requires training and practice, the primary components of which are guidance and feedback. For example, using a reciprocating wire-stripping machine to prepare cable ends is a skill in these terms and requires guidance, feedback and practice in order to achieve production levels of proficiency. Steering a motorised dinghy in a river also is a skill. It requires appropriate reaction times, tracking ability, and spatial accuracy. Practice, if not training, is important. But the 'skills' of the skilled trades differ considerably from these interpretations. Smith (1987) describes skilled performance in the following terms:

Watching a skilled carpenter, I am struck by his patience and persistence, his sympathy with his material and his passion for a kind of accuracy, for doing the job really well without falling into the trap of fussy perfectionism. His carpentry does tell me a certain amount about him as a person. It tells me something about the way he relates to the world around him.

(Smith R 1987: 198)

Thus, 'skill' in the skilled trades is not simply the physical manipulations required in motor tasks, nor is it simply the practised abilities to perform with facility. Rather, it is a concept that has much greater breadth and complexity. It involves physical proficiency, physical dexterity, and significant intellectual and, perhaps sentient, dimensions. It includes the notion of performance underpinned by knowledge and understandings, and the ability to perform across a variety of settings

(Ducker 1993c). In this sense, skills are not automated, trained behaviour but thoughtful and determined capabilities that require the development of concepts that support technical applications².

Labels such as 'craftsman' (Marsh 1979), 'artisan' (Herman 1976) and 'journeyman' (Coy 1989a) traditionally have been used to capture the complexity of the skilled performance involved in the trades:

Skilled work is assumed to combine skills of the hand and brain and to resemble the traditional artisan's craftsmanship.

(Wood 1985: 86)

That is, the notion of 'skill' evokes images of expertise, mastery and excellence, for at the core of all the descriptions of 'skill' are the ideas of competence and proficiency - the ability to do something well (Attewell 1990; More 1982). For example, the skilled tradeworker must hold a stock or repertoire of related skills, and must be able to select, organise and apply them in functional units of performance, usually determined by the demands of the job at hand. Skilled performance involves working across different physical settings and with a variety of materials and equipment. Also, there is an expectation that skilled work is highly refined. This involves making the fine distinctions in action and reasoning required for accomplished and efficient performance within a particular trade, and for that performance to produce outcomes that are consistently well expressed. Expertise in the skilled trades requires that these aspects of skill be invoked at will and with complete facility. Thus,

² 'Common talk' amongst the trade instructors in this study was that 'the skills involved in the trades are not about monkey see, monkey do', a reference to a perception of trade skills as involving something more than the trained physical manipulation of tools and materials.

skilled work is characterised by fluency, imagination and competence - the art of skilled work - and the capacity to enact the criteria by which 'good work' is judged. It involves what Manwaring and Wood (1984) describe as the notion of 'tacit skills' - the kind of 'knowledgeability' that enables the tradeworker to heighten specific awareness or focus in order to resolve a problem or issue, being able to adapt one's approach to a job in order to fit into an established workflow process, and being able to work in an unfamiliar physical setting. This involves perceiving the way in which the elements of a situation come together, and requires that the skilled tradeworker be able to form generalised notions about the use of materials, techniques, processes, and equipment, and about the settings in which work is performed. This requires a degree of conceptualisation and knowledge of the way in which the elements of the trade interact (Wood 1985: 86). According to Rueschemeyer (1986), this involves not only the technical knowledge required to provide the service or make the product, but also 'common sense, knowledge of precedents and established practices, command of inherited wisdom (as well as inherited prejudices)' (Rueschemeyer 1986: 111).

Hall (1975) suggests that there is at least the possibility that some distinction can be made between the kind of knowledge base that underpins the practice of skilled trades and that upon which, say, the professions rely:

The craftsman is trained in techniques without the theoretical background ... Theoretical knowledge allows operation in situations that have not previously been experienced, but for the craftsman such knowledge is unavailable. This is not to suggest that the craftsman is unable to adjust to new problems and situations. He does so on the basis of his experience and by trial and error.

(Hall 1975: 196)

As noted by Bishop (1979) (see Section 2.6), in the professions there is a tendency to rely more heavily on knowledge that is theoretical in the sense that it includes abstract and speculative thought, supposition and principles. Practitioners contribute to the knowledge base and apply the knowledge that is available. The knowledge and understandings that underpin the skilled trades, however, include a greater focus on the notions of practical knowledge as expressed above by Rueschemeyer and Hall, and derive from experience with techniques, materials, services and products. This connects strongly with the position put by Bishop (1979) - and reported in Section 2.6 - in which it was argued that 'institutionalised knowledge' provides the underpinning or foundational knowledge for the professions, but is unable to provide the foundations of operational knowledge for the skilled trades.

An essential aspect of the notion of skill is that skilled work is highly grounded or situated in the specific trade contexts³ in which it is enacted:

The terms grounded and situated imply that the features of the context in which the work is done play a very important role in how the work is done, such a large role that it is meaningless to talk of a particular skill outside of the situation and practices in which it is used.

(Attewell 1990: 425)

That is, skills are distinctly formulated within the trade (Steinberg 1990, Vallas 1990). They are specialised in that they evolve within a specific

³ It should be noted that a distinction is being drawn between the physical settings in which tradeworkers perform their work and the trade context within which trade knowledge is acquired and displayed. The former refers to sites and locations; the latter refers to the social setting of the trade.

trade domain and derive their attributes from the situational features of that domain. There is support for this in Bishop's related notion that knowledge is more likely to inform action if it is acquired within the domain in which it is used and, thus, is likely to be regarded as valid and valued knowledge by skilled tradeworkers. It was reported earlier that Luttrell had drawn similar conclusions about the extent to which working class men derive knowledge within a collective setting associated with employment - perhaps, apprenticeship - and that such knowledge was associated more with the collective than with the individual (see Section 2.6). Similarly, Singley and Anderson argue that 'abstraction from this context destroys crucial features' (Singley and Anderson 1989: 29). In this interpretation, 'skill is quintessentially social' (Attewell 1990: 425), and there are connections here with the notion of 'craft attitude' proposed by Bensman and Lilienfeld - and reported in Section 2.4. What emerges from this context-dependence is the notion that in performing skilled work, a proficient tradeworker must bring to bear not only the technical skills and knowledge but also an understanding of the full context within which the knowledge and skills are applied. This does not mean that the applications of the skills is limited to the physical setting in which they are developed, for the skills must be applied in thoughtful and knowledgeable ways across a range of such settings. Rather, it means that the skills are developed and understood within the context of the trade. Thus, although the popular perception of skilled work is that it progresses with facility, it is a kind of routineness that disguises the depth of understanding upon which it depends.

The central themes that underpin these interpretations of the concept of 'skill' suggest that tradeworkers might place significant value on knowledge that is applicable to competent performance - doing something well and with facility. Here, the notions of 'competence' and 'performance' extend beyond narrow, mechanistic interpretations to encapsulate the web of understandings deriving from the technical processes and what Rueschemeyer (1986) calls the 'inherited wisdom' of the context in which the knowledge is applied. It would seem that tradeworkers also would place significant value on knowledge that is able to be judged against established criteria. That is, knowledge that can be checked against what is acceptable within the community of tradeworkers, which is domain-specific and somewhat routine. The combination of these factors suggests that the model of knowledge most likely to be valued by tradeworkers would be mastery of context-bound knowledge. Thus, a truly knowledgeable person would be able to recognise most situations as belonging to a class, governed by routine and rules. There would be few exceptions. A less knowledgeable person would face many more problem-solving situations, much more uncertainty and many more unique settings. Problem-solving and uncertainty would characterise the realm of the less knowledgeable novice. Eventually, these would give way to greater certainty as the novice develops the 'wisdom of the trade'. The source of the knowledge is not the theoretical sciences from which a professional or an academic might be able to formulate substantial support for practice. Rather, it is established practice, technique, tangible products and services, and inherited wisdom that act as sources. In some part, the argument presented here supports and explains some of what Gleeson (1991, 1990) - see Section 2.4 - had observed about the value that trade teachers place

on the routine application of skills, knowledge that informs action in a clear and direct sense, and on the distancing of such knowledge from the more abstract knowledge associated with the mainstream 'academic teachers'.

3.4.2 Specialisation

In order that the tradeworker can 'manipulate the craft' (Coy 1989b: 124) with such facility and at such a high level of proficiency, the domain of the trade must be restricted. The tendency of the skilled trades to operate within defined boundaries is a structural feature of skilled work, and is reflected in the descriptions and definitions of the skilled trades. It is captured by the notion of 'specialisation'. Here, two forms of specialisation are discernible. The first form of specialisation relates to the field of knowledge with which the occupations deal; the second form relates to specialisation determined by the level of skill involved. Each of these has the potential to contribute to the shaping of trade instructors views about knowledge and knowing. They also establish a basis for describing attributes of the work of skilled tradeworkers by distinguishing between the several skilled trades, and distinguishing skilled trades from other occupational groups.

The notion of specialisation by field of knowledge relates to the kind of work with which a trade deals. For example, plumbing, welding, electronics, panel beating, gardening, bookbinding, cooking, fitting and carpentry are recognised and clearly identified individual trades, each with its own jurisdiction. Indeed, for trades such as plumbing and electrical, authority over the field of knowledge is enhanced through systems of legislation and licensing. Further, trades often are perceived

or managed in clusters. For example, 'the building trades' encompasses construction trades such as carpentry, bricklaying, plumbing and plastering, but clearly exclude trades such as fitting, machining, turning and toolmaking, that are clustered under the banner of the 'metal fitting and machining trades'. Other major clusters include the printing trades, food trades, vehicle trades and electrical and electronic trades. Perhaps the most significant current Australian example of the use of this clustering is the system of Competency Standards Bodies (CSB). Here, the National Training Board (NTB) registers selected organisations to establish the industry competency standards for groups of trades. These standards are used to inform training and industrial decision making (NTB 1992).

It is assumed that the basis for distinguishing between trades in the instances just noted, derives from the general competencies needed by practitioners in the performance of the duties of the occupation. The major variables that underpin this form of classification include the goods or services produced, the materials that are used or acted upon, the tools and equipment involved, and the nature of the work site and work conditions. In combination, these variables describe the kind of work or the field of knowledge of each trade. For example, carpentry is a trade that deals with construction from wood. It requires extensive use of a selection of hand tools and hand power tools, focuses on the rough and solid forms of construction associated with residential and non-residential building, and frequently is conducted outdoors. Cabinetmaking also deals with construction from wood, but is clearly distinguished from carpentry. It utilises a different subset of woodworking tools and equipment, it uses a different range of

techniques, work is generally conducted inside, and the products manufactured and the services provided generally are of a finer and more precise nature. It is specialisation in these terms that connects with the notion of the 'craft' of an occupation as depicted earlier in the commentary on the works of Bensman and Lilienfeld (1991) (see Section 2.4).

In his paper on the organisation of knowledge in vocational education, Copa notes 'the great importance placed on this basis of classifying knowledge' (Copa 1984: 2) by practitioners in the trade, industrial and technical vocations, including those who have moved into vocational education and training. Similarly, Lansbury (1978) suggests that the logical basis of the personal stance of tradeworkers (and other technologists) derives from the 'technique' rather than the 'abstract science'. That is, trade instructors are likely to place importance on distinguishing between fields of knowledge in terms of the functions performed and the competencies required of the skilled practitioner. Again there are echoes here of the position adopted by Bensman and Lilienfeld (see Section 2.4).

Copa also notes that specialisation established on this basis differs from that 'which makes use of subject matter as a basis for classification' (Copa 1984: 2). The contrast is illustrated by the ASCO classification of the professions (DEIR/ABS 1987) that contains a group entitled Natural Scientists. This includes Physicists, Chemists, Life Scientists and Geologists. The basis for the classification of these occupations clearly relates to the recognisable subjects of Physics, Chemistry, Biology and Geology more than the functions performed or the competencies

necessary for effective performance in occupations for which qualifications in these areas are appropriate. Thus, as Copa argues, the bases for the identification of a field of knowledge within the skilled trades are not the traditional disciplines. Earlier, it was noted that Bishop's (1979, 1977) theoretical argument on institutionalised and operational knowledge had developed to an equivalent position (see Section 2.6). To the extent that this basis for describing the field of knowledge influences the views held by trade instructors about knowledge and knowing, it seems reasonable to posit that value would be placed on knowledge that derives from, and is organised by technical processes, materials and equipment, and goods and services. That is, the traditional use of subjects as primary organising agents - as exemplified in the curriculum and instructional formulations of schools and universities - would assume less significance in the selection and organisation of knowledge for those who practice the skilled trades.

The second form of specialisation relates to skill 'level'. It provides a basis for distinguishing skilled trades from other occupational classifications and derives from the range and complexity of the set of duties involved in occupations. Three major systems of classification by skill level are of significance to the skilled trades. In combination, these serve to identify aspects of the trades important in locating them in relation to other occupational groups, and in establishing features of the skilled trades that have the potential to shape trade instructors' views.

The International Standard Classification of Occupations (ISCO) delineates and aggregates occupations on the basis of:

... skill - defined as the ability to carry out the tasks and duties of a given job - [including the dimension of] skill level - which is a function of the complexity and range of the tasks and duties involved.

(ILO 1990: 2)

The ISCO skill levels are 'given operational definitions in terms of the educational categories and levels in the International Standard Classification of Education' (ILO 1990: 2). Thus, the classification of occupations by this scheme is influenced by the amount of formal education required⁴. In Australia, formal education refers to programs provided in recognised education institutions such as schools, universities and colleges of Technical and Further Education. In contrast, on-the-job-training refers to the training given to a worker in the course of employment. It is usually supervised by the employer or employer's representative rather than by a recognised educational institution. Under such an approach to classification, on-the-job training receives little recognition - though this is changing under the recently established Recognition of Prior Learning (RPL) processes and the National Framework for the Recognition of Training (NFROT) agreement.

The professions generally are regarded as having the most extensive requirements for formal preparation and thus are located at the highest skill levels. Typically, it begins at the age of about eighteen and lasts at least three years, leading to a university or postgraduate university degree. In contrast, the formal preparation requirements for occupations

⁴ Mincer and Polachek (1974) note the tendency for skill to be measured by the level of education and experience that an individual brings to a job rather than by the characteristics of job requirements.

regarded as elementary occupations or unskilled occupations, combine on-the-job training with the equivalent of a primary to early secondary education (DEIR/ABS 1987: 449; ILO 1990: 3, 7). Thus, in this scheme they are located at the lowest skill levels. The skilled trades are set between these extremes. In Australia, they require formal secondary education that begins at the age of about twelve and lasts for at least four years, together with a formal vocational preparation that begins at the age of about sixteen and is commensurate with a four-year trade certificate. This latter component is usually obtained by apprenticeship, and thus includes a strong component of on-the-job training. Despite the highly institutionalised nature of this form of training, it is regarded as somewhat less than full-time formal training and the skilled trades are located at a relatively low level in this scheme. Yet, to the extent that the speculation presented so far can hold, it is precisely this form of training that is the primary source of knowledge in the skilled trades and that is likely to be valued by tradeworkers, including those who become trade instructors. Whilst it may not be an intended outcome, it is clear that the ISCO classification - and similar classification processes - reinforces the perception that 'institutionalised knowledge' is to be more highly valued than 'operational knowledge' (Bishop's terms).

The Australian Standard Classification of Occupations (ASCO) also uses the term 'skill level'. It is a development from and a refinement of the ISCO system in that it determines 'level' in terms of a combination of formal education, on-the-job training and previous experience (DEIR/ABS 1987). The determination of skill level on this basis necessarily involves some subjective judgment, especially in respect of the amount of on-the-job training and previous experience necessary to

perform the duties of the occupation satisfactorily. To the extent that it may be assumed that the views of tradeworkers about what constitutes valid and valued knowledge relate to knowledge gained through experience of the skilled trades, this scheme gives some recognition to the operational knowledge of tradeworkers. Thus, in this scheme, the trades are located at a mid-range skill level. In practice, this basis for classification is tempered by 'the labour market requirements for entry into an occupation' (DEIR/ABS 1987: x).

The Australian Standards Framework (ASF) is the third major classification system of significance to the skilled trades. It uses 'level of competence' in its scheme and draws on the identification and organisation of sets of industry competency standards. Here, competence is defined in terms of 'what is expected of an employee in the workplace ... and embodies the ability to transfer and apply skills and knowledge to new situations and environments' (NTB 1992: 29). The 'level of competence' (NTB term) derives from the range of skills and knowledge required and the amount of formal vocational training involved. Thus, occupations at the upper end of the ASF describe a wider range of skills and knowledge and a greater amount of formal vocational training than those at the lower end.

From Figure 3.01 it can be seen that the criteria used to classify occupations by skill level place the skilled trades in a position clearly differentiated from, say, the professions. In part, this reflects a lack of emphasis on formal education in the skilled trades. This attribute of the skilled trades is illustrated in Dufty's comment that 'education is not highly placed by employers in their assessment of desirable

characteristics of apprentices' (Dufty 1988: 27). Similarly, Kriegler and Sloan (1984) report that, amongst the employers and skilled tradeworkers in their survey, numeracy, completion of the final year of secondary school, and even completion of pre-apprenticeship courses in a TAFE college were not important as indicators of suitability for entry to an apprenticeship for a skilled trade. In contrast, social behaviours such as punctuality were highly valued.⁵ Such a position reinforces the theoretical propositions presented by Bishop (see Section 2.6) that institutionalised knowledge is less likely to inform the work of the skilled trades.

Figure 3.01
Major occupational groups in the ASF, ASCO and ISCO classification schemes.

ASF Competency Level	ASCO Major Group	ISCO Major Group
8 Senior professional	1 Manager	1 Manager
7 Professional	2 Professional	2 Professional
6 Senior paraprofessional	3 Paraprofessional	3 Associate professional
5 Paraprofessional	4 Tradesperson	4 Clerk
4 Advanced skilled autonomous worker	5 Clerk	5 Service worker
3 Skilled autonomous worker	6 Personal service worker	6 Skilled agriculture worker
2 Advanced operative	7 Plant operator	7 Craft and related worker
1 Operative	8 Labourers and related workers	8 Plant operator
		9 Elementary occupation

Figure 3.01 illustrates also the extent to which the skilled trades depend on knowledge acquired through experience of the workplace and, in relative terms, the way in which the skilled trades are narrowly defined in respect of the range and complexity of the knowledge and skill base. In order to achieve and maintain such levels of specialisation and skill, the sphere of influence must become highly bounded and focused. To the extent that this is influential in shaping views about knowledge and knowing, it seems reasonable to posit that such attributes would

⁵ Exploration of both the technical knowledge and skills and the codes of behaviour which apply within apprenticeship are pursued later in this chapter.

engender a relatively focused approach that places greater value on knowledge acquired through experience of the task and the work site than on knowledge acquired through formal educative processes. The basis for identifying valid knowledge would derive more from the techniques and procedures involved in practising the trade than from more abstract sources such as the traditional subjects or disciplines. Again, this is in accord with the notions presented by Bishop (see Section 2.6) that the skilled trades are likely to draw more heavily on knowledge derived from experience of the workplace, and the argument of Chapter Two that tradeworkers are likely to recognise this as the most valued source of valid knowledge.

It would seem that there is some tendency to portray occupations that rely heavily on what Bishop calls 'institutionalised knowledge' as occupying a position elevated in relation to those occupations that rely more heavily on 'operational knowledge' (also Bishop's term) - for example, the skilled trades, typically, occupy a lower classification than the professions. In the sense argued by Young (1981, 1980), there is at least the possibility that this has the effect of projecting onto 'institutionalised knowledge' an image of deserving of greater value than 'operational knowledge' - and, perhaps, the terms greater prestige and status also may be applicable here. Further, and in accord with the trends noted in Section 1.1, it might be speculated that such a projection may influence vocational education and training institutions to reflect similar 'value' in the ways in which they establish their curriculum and instructional formulations. This would lead to the possibility that trade training curricula might be formulated on the assumption that a form of the traditional disciplines model of organisation - a foundation of the

notion of 'institutionalised knowledge' - should underpin the approach⁶.

3.5 The Autonomy of the Skilled Tradeworker

The notion of autonomy is identified in much of the theoretical and empirical research relating to work⁷. In one sense of its use it is identified in Marsh's (1979) phrase 'minimum of direction and supervision', but, in relation to the skilled trades, is most strongly marked by the phrase 'competent skilled autonomous worker' in the following description:

The person has a work orientation, and the knowledge, skills and demonstrated capacity for self-directed application (including the selection and use of appropriate techniques and equipment) required to perform tasks of some complexity involving the use of applied theoretical knowledge and motor skills. This level corresponds to a competent skilled autonomous worker.

(NTB 1991:12)

This use of the term 'autonomy' relates primarily to the interaction between the tradeworker and the job at hand, and to the right to work at the substance of tradework without immediate supervision. It refers to the discretion or leeway available within a job to control the content, manner and speed with which tasks are done. It is an autonomy afforded tradeworkers in respect of freedom to carry out their work

⁶ This is raised again in Chapter Eight when it is possible to compare the views of trade instructors - generated over the seven chapters of the thesis - with the dominant curriculum and instructional formulations of the TAFE institutions.

⁷ See, for example, Spenner (1990, 1988), Wood (1989), Stewart and Cantor (1974), and Caplow (1954).

activity according to their own collective and, ultimately, individual judgment. This is the notion of autonomy portrayed by Mealyea and by Gleeson and described in Section 2.4 as 'independent', 'unsupervised', 'licensed' or 'franchised'.

Blauner's (1964) analysis of skilled work in the printing industry identifies this as the form of autonomy afforded tradeworkers. According to Blauner, such autonomy leads tradeworkers to identify strongly with a completed service or product. That is, the completed product or service allows tradeworkers a physical demonstration of what they have done. It is identifiable as their contribution and is valued by them for its uniqueness in this sense. This provides a feeling of intrinsic satisfaction and a sense of control:

The freedom to determine techniques of work, to choose one's tools, and to vary the sequence of operations ... give the worker a feeling of control over his environment.

(Blauner 1964: 43)

Brewer (1974), too, provides an example of the relationship between this form of occupational autonomy and the nature of work in the skilled trades. In his research on the work of 'wiremen' - electrical construction workers - he demonstrates that, in contrast to their perceptions of other forms of work to which they could turn, 'wiremen themselves reveal that a major attraction of the role is the greater control over work and work relationships which wiring gives them' (Brewer 1974: 217). A consequence of this form of autonomy is that the skilled tradeworker is expected to display commensurate independence in action and reasoning in performing a service or creating a product. In combination,

these rights and responsibilities 'provide a lack of feeling of powerlessness' (Hall 1975: 188) among skilled tradeworkers, in a context which, otherwise, might afford them little autonomy.

The notion of autonomy for tradeworkers separates somewhat from the social quality of self-determination afforded some occupations, and as exemplified particularly by the professions (see Section 2.6). For example, those who practice law are afforded high levels of self-determination and work within a system that is substantially self-regulatory (Mackay 1980). Similarly, those who practice medicine enjoy the professional adjunct of self-regulation. Autonomy for such groups often includes freedoms such as recruitment of members into the occupation, determination of and protection of standards of excellence, and evaluation of occupational role performance, primarily by peers. It is not that 'self-determination' is a right afforded all professions, for the work of teachers and social workers is tempered by outside control and regulation (Howie 1965). For example, recruitment into the ranks and the development of requirements for entry in these professions are subject to considerable control outside the occupational group. At the end of the spectrum, those who work in the 'secondary labour market' and in 'low-skilled work' are afforded little, if any, 'self-determination' (Gilmour and Lansbury 1978: 98).

In respect of the skilled trades, control by codes, standards, regulations, licenses, inspections and legislation afford minimal autonomy of this form (Daniel 1983). However, as Montgomery (1980), Hall (1975) and Caplow (1954) argue, there is significant strength in the work culture that exists amongst skilled tradeworkers. It provides the motivation and

the capacity to maintain some resistance to external control and rationalisation, and to retain some small degree of this form of autonomy. For example, there is an economic subdimension - 'of great, and underestimated, potency' (Daniel 1983: 31). That is, there is a sense in which specialised skills can be viewed as human capital and, like material property, these skills can be possessed and transferred. Thus, the form of autonomy afforded tradeworkers is complemented by the power that derives from owning and controlling the knowledge and skills of the trade. There is some reference to this aspect of autonomy in Coy's description of 'craftsmanship', given earlier, but it is more striking in a later comment:

Craftsmanship ... might engender "ownership of specialized skills" (perhaps there exists no more private a form of property).

(Coy 1989a: 5)

Where the skills and secrets can be 'owned' they have many of the characteristics of real property. Safeguarding this 'property' is a necessary requisite of maintaining its value. If specialised knowledge is proliferated to the a point where it becomes difficult to practice the trade profitably and with the sense of self-satisfaction that emerges from providing a service or creating a product, then the value of the trade as property can diminish, even disappear (Rorabaugh 1986).

The autonomy of tradeworkers is linked also to the dimension of status and prestige. That is, experts who possess skills, understandings and knowledge that other people need can exert a price, 'and that price may well be much more than a good fee; it nearly always includes honour

and esteem and often influence and power' (Rueschemeyer 1986: 104). For tradeworkers, the status and prestige often derives from client dependency. That is, the customers of the expert services of skilled tradeworkers lack knowledge of the trade and cannot control or supervise the skilled work because they do not know enough to define what the problem is or to monitor its solution. This dependency and vulnerability is further increased to the extent that the intervention of an expert 'requires faith and trust in order to succeed' (Rueschemeyer 1986: 109).

To the extent that it is afforded them, tradeworkers value their autonomy. The maintenance of this autonomy depends, first, on there being relevant knowledge to sustain the occupation and, second, on the ability of tradeworkers to keep the knowledge upon which the trade rests as privileged and important. It is not necessarily knowledge *per se* that creates this position but the way in which knowledge is managed, organised and acquired. As knowledge proliferates, 'the practitioner can only remain in command if the intellectual exercises of selection, criticism, synthesis and application are completely carried through' (Daniel 1983: 24). Thus, the tradeworker needs to have authority over the sources and the principles of the knowledge pertinent to the trade.

Once obtained, monopolistic powers enable an occupation to control those aspects that affect the status and prestige of the occupation and the value of the skills. For example, it may place restrictions on the number of people who enter the occupation and, hence, manipulate the prices of its services. This brings not only economic rewards but also assists the claims to high skill and status. For example, requiring lengthy periods of

apprenticeship or training helps to build public perception that the work requires exceptional knowledge and preparation. From medieval guilds to modern day credentialism, occupations have sought to restrict entry, to limit competition, and discipline members whose actions are perceived to interfere with the monopoly that the occupation holds. More specific to the skilled trades is the use of closed shops, control over apprenticeship and mandated educational credentialism (Jackson 1984; Turner 1962).

Skilled tradeworkers remain able to exercise autonomy, but primarily within the bounds of their trade area and in the form of autonomy commanded by 'experts'. It is, perhaps best described in the terms noted above in the works of Mealyea, Gleeson, Marsh, Hall, Brewer and Blauner. As Argyle reports:

A craftsman has complete control over the speed and method of working, there is a very varied product, he is highly skilled and responsible for doing the job.

(Argyle 1979: 35)

In a sense, their freedom, Kohn's 'intellectual flexibility' and opportunity structure are focused to the area in which they can exercise reasonable autonomy. To the extent that this influences the views trade instructors might hold about knowledge and knowing, it is likely to lead to an approach in which valid knowledge derives from, and exists within, a relatively protected or isolated field, but which requires a high level of mastery of the knowledge within that field. In turn, this provides the opportunity for a form of protective indulgence, in which tradeworkers perceive the knowledge that they value as divorced from

other knowledge - if, indeed, other knowledge is perceived as valid knowledge. There is some connection here with the findings of Gleeson that trade teachers tend to distance themselves and their knowledge from mainstream teachers and the knowledge that trade teachers describe as 'academic' (see Section 2.4). It is related to what Gleeson denoted as the 'trade teachers culture', established and maintained by trade teachers within the school setting. Further, the sources of this valid knowledge often derive from custom and practice, and from a complete and focused whole - deriving from their experience of working with products or services - rather than speculation, hypothesis and abstract conceptualisation.

3.6 The Route to the Status of Skilled Tradeworker

People come to be regarded, remunerated and allowed to practice as tradeworkers on a number of grounds. In the great majority of cases the route to the status of skilled tradeworker is the satisfactory completion of an apprenticeship. That is, a period of training with an employer which, in Australia, usually includes obtaining an educational certificate of proficiency from a college of Technical and Further Education. In a small number of cases employers recognise trade skills gained over a longer period of working in the trade but without undertaking formal apprenticeship or similar training⁸. Apprentices represent the new generation of practitioners, and apprenticeship is the means by which the specialised knowledge and skills of the trades are transferred to the new generation.

⁸ Trade skills obtained by this and other means can be recognised through the provisions of the Commonwealth Tradesman's Rights Regulation Act 1946 or, in some instances, under State legislation.

For trade instructors, there are several senses in which apprenticeship is likely to be important. First, trade instructors are recruited from the ranks of qualified and experienced tradeworkers. Thus, apprenticeship is the means through which trade instructors gain the prerequisite occupational qualifications and experience essential for their recruitment into an instructional position in TAFE. Second, the focus of the trade instructors' instructional role is apprenticeship. The students are apprentices, and the courses in which trade instructors work are developed within an organisational scheme based on apprenticeship. That is, apprenticeship generates the substance of their work. Third, the evidence generated in the first two chapters of this thesis, and the works of Mealyea and Gleeson in particular, suggests that the 'presenting culture' (Mealyea's term) of tradeworkers, generated by their status as skilled tradeworkers, is likely to be carried through to their instructional role. Thus, it would appear that much of what is important to understand about trade instructors and the perceptions they hold about knowledge and knowing may derive from their experiences of apprenticeship.

Apprenticeship itself is a complex and multi-faceted concept. It involves at least two people in a relationship that, at one level, is described in terms of a legal agreement. It is an agreement between a skilled person and an unskilled person, whereby the unskilled person learns a specialisation and how to practice in it. In Australia it is an officially and legally defined relationship between an employer and an apprentice. Typical of the current formal descriptions of apprenticeship is that provided by McLaughlin (1990):

A form of training, usually in the trade area. The apprentice signs a contract or indenture to learn a trade for a period of time, commonly three or four years. The apprentice usually undertakes additional training at a technical college during that time.

(McLaughlin 1990: 7)

The precision and formality with which the term 'apprenticeship' is described reflects both that it has been established long enough to be considered a traditional system of training, and the extent to which it has become institutionalised.

But, as will be argued in the rest of this chapter, apprenticeship has a range of other important structural features. For example, although it is a legal agreement, at another level it rests on a significant social relationship. Also, it involves a learning process that is presented in formal terms, but which is underpinned by a range of informal attributes. It has an economic dimension based on the value of the skills involved, and it is intricately enmeshed in 'an ideology of life and work associated with a specialised role' (Coy 1989c: 1).

3.6.1 Apprenticeship and Indenture

In its most common form within the Australian context, the concept of apprenticeship hinges on indenture. That is, it rests on a covenant that binds a novice to a qualified tradeworker for a fixed period of time. Both apprenticeship and indenture are recognised measures in the route to the status of skilled tradeworker. Indenture, however, has become such an integral aspect of apprenticeship that, typically, it is not distinguished from apprenticeship.

It might be noted that, in some States and in some trade areas, indentured apprentices sit in their respective TAFE classes alongside non-indentured apprentices and other students, learning the same material and sitting for the same examinations - in trades such as horticulture and welding. Beyond the classrooms, the work experiences of the two groups also may be quite similar. That is, in practice the difference between the two groups of learners is, literally, that the members of one group are - as Scherer (1981) says - 'bound to serve'. Thus, even in situations where it is possible to attain the technical skills and knowledge of the trade by non-indentured pathways, not only does indentured apprenticeship persist but it remains the most prominent form of training for the skilled trades.

There are several forces that appear to maintain the place of indenture and, indeed, apprenticeship. One of these relates to the economic value of skills and to perceptions about the control required to maintain that value. As noted earlier, controlling the supply of skilled labour is seen as a most important aspect of maintaining value, especially in the context of capitalism where a market for skills exists. Thrupp (1963) argues that the skilled trades are as adept at this as any of the professions. For example, one of the primary purposes of trade-related organisations, such as guilds and trade unions, is to respond to this imperative for control. That is, the organisations enact a kind of superintendence. Dufty (1988) supports this position by observing that the major actors in the skilled trades, particularly the trade unions, have used indenture as a device to restrict numbers in a trade and thereby to raise or maintain wages. An illustration of the use of apprenticeship and indenture as an economic lever is evident in a comparison of the cost of

training an apprentice over a four or five year period and the actual time required for the apprentice to acquire the skills of the trade. Scherer, for example, makes the point that the term of the indenture is not closely linked to the time needed to produce a competent worker, but is more concerned with ensuring that the apprentice is 'bound to serve for a period greater than necessary for basic instruction' (Scherer 1981: 5.7) so that the employer is compensated for the cost of the first two years of training. Further support for this position is found in the outcomes of a Victorian study of the cost of apprenticeship (LMRB 1987). Here, apprenticeship was shown to yield a return to the employing organisation in all but the first year. Thus, it would appear that the indenture system plays a significant role in maintaining a net return to the employer in the process of training apprentices.

Dufty argues that, under such conditions, apprenticeships become structured less in terms of optimising the learning opportunities for the novice and more in accord with practices that are concerned with controlling the pool of skilled labour in response to the ways in which the labour market is organised. That is, the structure of apprenticeship, especially through its reliance on indenture, serves to protect the skilled trades and to dampen any movement to create change. In turn, apprenticeship reflects some of the more conservative elements of work practices and labour market structures. Thrupp describes this as a regime that in character is quite tenacious in its adherence to existing institutions and ways of performing. He argues that apprenticeship is used to maintain 'standardisation in technique and process and discourages inventiveness and creativity' (Thrupp 1963: 271).

In this sense, it appears that indenture is a way of placing a check on changes that may impact on the value of skilled work, and it provides an opportunity to ensure that the novice is apprised of the mutual benefit that is to be drawn from maintaining a *status quo*. A consequence of such a condition is that it is likely to engender in trade instructors a perception of valid knowledge and ways of knowing dominated not by abstract conceptualisation, open-endedness and theorising, but by knowledge that is highly bounded, supports a high degree of certainty, and converges to an agreed position because it derives from accepted practice. Support for this speculation can be found in Gleeson's findings about the central concerns of trade teachers in secondary schools (see Section 2.4). But it also is supported by the finding of Mealyea's work that the ways in which the teacher-student relationship is modelled on the 'mentor/mentoree' relationship of apprenticeship (see Section 2.4).

Apprentices are productive during their period of training, an important and dominant feature of the current institutionalised notion of apprenticeship (Goshen 1962). That is, although apprenticeship is a mode of training, it is distinguished by the image of the apprentice not as a student - as perceived in schools and in universities - but as an employed worker:

He learns on the job. He produces during his training and his production is sold. The apprentice is given instruction and experience both on and off the job in all the practical and theoretical aspects of the work in a skilled trade. As he progresses in this training he acquires new skills and masters the application of those already learned. That is why he can be productive during his entire period of apprenticeship.

(Goshen 1962: 3)

Thus, within the skilled trades the common experience of training and learning is inextricably linked with production. The novice learns within a setting that is productive, and the skilled tradeworker - to whom the apprentice is indentured - works within a setting that is productive. To the extent that this helps to shape the views that trade instructors might hold about knowledge and knowing, it is likely to support not only the notion that valid knowledge derives from experiences of the workplace - as noted by Luttrell in Section 2.6 - and the products and services of the trade - as noted by Bensman and Lilienfeld in Section 2.4 - but also the notion that the 'operational knowledge' - as proposed by Bishop in Section 2.6 - valued by workers in the skilled trades derives from learning in a production setting and is characterised by its ability to inform action. Thus, classroom settings, which lack any production function, are likely to be perceived as the antithesis of the setting within which valued learning occurs.

In a sense somewhat related to maintaining the economic value of trade knowledge and skills, groups in control of a certain body of knowledge have far-reaching influence on public perceptions of the route to the status of skilled tradeworker. They can define the situation for the untutored, suggest priorities, and establish standards for judgment in the different areas of expertise. Also, within the trade, such groups can shape members outlooks on their lives and the world. Thus, a further reason for maintaining indenture is to provide a process that is publicly convincing as a route for skill acquisition - one that satiates public, personal and group needs for assurance of 'craftsmanship'. As Coy says:

Proprietary expectations of craftsmen by other craftsmen must be fulfilled ... the clients of craftsmen must know what to expect when seeking their services or products.

(Coy 1989c: 2)

That is, whilst apprenticeship and indenture help to close off access to knowledge about the trade, they also serve to establish within the novice the code of behaviour expected of those who practice the trade. These expectations derive from both the collectivity of tradeworkers and the community, more generally. Coy goes on to say that what is required of a tradeworker involves more than merely the possession of specialised skills of the trade:

Craftsmanship also refers to the code of normative behaviour, often unwritten, that is expected of craftsmen. This code is essential if a craft or a skill is to be practiced properly, safely and profitably.

(Coy 1989c: 2)

Thus, the reasons for the persistence of apprenticeship, including its reliance upon indenture, relate not only to its ability to control the supply of skilled labour and to maintain the economic value of the skills, but also to its ability to provide membership of a community. According to Haas (1989, 1974, 1972) there has developed a pattern within apprenticeship that is sufficiently well defined that now it may be described as a *rite de passage*. This nurtures not only the institutionalisation of apprenticeship but also the code of behaviour that members affirm and practice. Both Mealyea and Gleeson (see Section 2.4) have reflected aspects of this in their portrayal of the identity and culture of trade teachers in secondary schools, and of the influence of

the 'mentor/mentoree' relationship on the trade teacher-student relationship in schools.

Haas focused his research on 'high-steel' tradeworkers. He argues that amongst the most notable features of work in the skilled trades is what he calls its 'ritual ordeal character'. That is, apprentices are subjected to a range of tests and initiations, survival in which is a prerequisite for acceptance. For example, apprentices experience ambiguity and uncertainty about their role. But these are not characteristics valued by tradeworkers, and in order to gain acceptance apprentices must strive to gain control. They must act competently and safely even though they have few skills and limited experience. At the same time, Haas argues, apprentices are expected to show due deference and submission towards those who have gained the status of skilled tradeworker. This somewhat ritualistic management of demeanour is captured by Haas' term a 'cloak of competence'. He goes on to say that as apprentices move closer to the status of skilled tradeworker their adoption of a cloak of competence becomes a 'taken for granted' way of dealing with the core tasks of their work. Such a stance supports the earlier assertions that tradeworkers must display not only high levels of knowledge and skills of the trade but also must exude a confidence of approach that derives from familiarity with standardised techniques and processes. But it supports also earlier speculation that trade instructors might value knowledge that informs action, particularly in the sense that the certainty gained by such knowledge permits the presentation of an image of competence.

3.6.2 Apprenticeship and Social Control

Groups that create and maintain the idea that they have and share special knowledge, skills and responsibilities must communicate to what Riemer (1979) calls the 'legitimizing audiences' and themselves that entry to the group involves processes that will assure the development of a worthy and competent member. For the skilled trades, it appears there are at least two main criteria that must be applied in judging the outcomes of such entry processes - the mastery of technical skills and knowledge defined in relation to the work at hand, and the adoption of a related set of qualities - perhaps, attitudes - that the novice is expected to display. Thus, the training that occurs during apprenticeship involves learning not only specialised knowledge and physical skills but also ways of managing the social relations of craftsmanship. The presentation of apprenticeship as a rigorous process of preparation helps to sustain the image that the aspirant tradeworker is undergoing important changes and demonstrating these special qualities (Riemer 1979, Kamens 1977).

Apprentices are in a somewhat marginal position for, essentially, they are outsiders until they attain full occupational status. The apprentice's ignorance of technical procedures, together with the fact that many of the work norms are subtle and implicit, creates the potential for significant disruption (Graves 1989, 1958). According to Graves:

In one way or another, the novice often poses a threat by becoming an unwitting disrupter of existing social arrangements and patterns. Consequently, we should expect to find fairly well patterned ways that disruption by the new person is neutralised or blunted.

(Graves 1989: 52)

It is imperative, therefore, that within the process of apprenticeship there are patterns of social control that respond to the potential for disruption that apprentices pose. As used here, social control is well described by Berndt:

Social control thus covers all the processes and procedures which regulate behaviour, in that they exert pressure on persons and groups to conform to the norms.

(Berndt 1962: 11)

As noted earlier, within apprenticeship there exists a number of practices that may be described as ritualistic and that serve primarily the purposes of social control. Practices such as the signing of an indenture and the completion of indenture are highly formalised. Others are less so. For example, labels such as 'first year', 'second year' and 'final year' are applied frequently and overtly in places such as the industrial awards, the TAFE programs, and on the job to describe the relative position of the apprentice within the organisation. These serve to remind the apprentice, and others, that there exists a recognised and controlled process for entry to the trade.

Gamst (1989, 1980, 1977, 1974) provides valuable insights into some other aspects of the social control processes that govern the entry of apprentices to the culture of the trades. His work derives from intensive study of railway apprentices and 'operating railroaders, or "rails" as they call themselves' (Gamst 1989: 65). There are two related and salient points to be extracted from Gamst's work. First, he argues that the 'social structure and subcultural content' (Gamst 1977: 4) of the trades is almost entirely unknown to people not working within or alongside the

occupations. That is, the sociocultural realities of a trade are remote to all but those who are members of the trade's community. This reinforces the emerging vision of the trades as engaging in a form of protective isolation, and supports the conclusions of Gleeson that trade teachers form an enclave-like environment within schools in order to isolate and distance themselves from mainstream teachers (see Section 2.4). The second point is inextricably entwined with this notion. Gamst argues that what makes railway operational work unknown is not only the esoteric technical skills and knowledge of the job, but also what apprentices are introduced to as the 'rules' (Gamst's term). From the evidence provided by Gamst and a range of other scholars⁹ such 'rules' take the form of what Dunlop (1958) calls 'practices', 'customs', 'decrees', and 'codes' - a foundation upon which the dominant ways of operating and interacting are justified and explained. Often, they are informal in nature and, together with the procedures and policies that guide action in a more formal sense, form a complex 'action-channelling web' (Gamst's term):

These rules and practices constitute a heuristic means of depicting some of the essence of railroading, as learned by the apprentice "rail". Values, attitudes and behaviors on the job are shaped to a considerable extent by the numerous complex and interrelated rules. The rules even affect activities off the job ... Railroaders, through their myriad rules, are prime examples of the bearers of such societally critical, occupational/subcultural information.

(Gamst 1980: 3)

⁹ See, for example, Berg (1979), Perrow (1979), Dunlop (1958), Kerr and Siegel (1955).

That is, the 'rules' reflect basic assumptions that underpin practice in the trades. In large part they are taken by the community of tradeworkers as *a priori* and immutable. According to Gamst, the 'rules' are 'the all-consuming focus of the attention of the apprentice' (Gamst 1989: 65) because the practices and work ideals of the trades are explained in terms of these fundamental assumptions. The following are examples of 'rules' extracted from Gamst's descriptions:

A 'rail' is a self-assured and reliable man, who does not resort to an alibi for not performing properly on the job or for unsociable job behaviour.

(Gamst 1989: 72)

Becoming a 'rail' means being accepted as a team player.

(Gamst 1989: 73)

These examples of 'rules' depict truths and axioms that govern behavioural interactions, including between an apprentice and qualified tradeworkers.

Gamst's work is valuable for its insights into what shapes the values, attitudes and beliefs of tradeworkers. Thus, it is valuable for exposing the existence and influence of 'rules'. In large part, the strong focus on the social interactions involved in apprenticeship means that the particular 'rules' identified by Gamst and others relate more to the processes of social control than to what is taken as valid knowledge, valid sources of knowledge and valid ways of knowing in the skilled trades. However, whilst not identifying them specifically, there is sufficient evidence to suggest the existence of 'rules' relating to

knowledge and ways of knowing. For example, Gamst identifies the following as a 'rule':

A 'student' is taught by veteran 'rails' through their words and deeds.

(Gamst 1989: 84)

This has clear reference to the value that railway tradeworkers place on knowledge derived within the workplace and transmitted through the master-apprentice mode within the workplace. It reinforces the earlier notion that tradeworkers generally are likely to place significant value on knowledge deriving from experience of the workplace. The clear implication of this example is, however, that some form of empirical study could identify 'rules' that relate to knowledge and knowing. A possible scenario is that the sorts of directions emerging from the analysis of the dimensions of autonomy-control and substantive complexity of work in the skilled trades are situated in a framework of such 'rules'. The task of empirical inquiry would be to uncover these 'rules' and the sorts of implications they have for the views that trade instructors hold about knowledge and knowing.

It is interesting to note that the term used most commonly to describe the one who trains an apprentice and to whom the apprentice relates most directly is 'master'. The origin of this usage is in the European guilds where an apprentice learned in a production setting in which the 'teacher' was, indeed, the 'master' - expert and owner, and recognised accordingly by the guilds. Consistent with this, the procedures governing recruitment in an apprenticeship and certification of apprentices were controlled in quite a formal sense. However, beyond

this, responsibility was vested in the 'master' for the development of the apprentice towards the status of skilled tradeworker. To a large extent this has remained substantially the case through to the present day. Although there are any number of 'breakouts' from this dominant position, it is the case that modern apprenticeship still relies heavily on the authority of the direct relationship between master and apprentice. That is, it is the 'master' - in an individual or in a collective sense - who is the source of the 'rules'. Both Mealyea and Gleeson noted the extent to which trade teachers in secondary schools use this relationship as the model for their approach to the teacher-student relationship. Given that the work of trade instructors is more overtly connected with apprenticeship, and to the extent that it is reasonable to generalise from the secondary school situation to the TAFE setting, it is likely that the approach of trade instructors also would be informed by this model.

This has some important effects on the way in which the learning of the apprentice is viewed. From the point of view of the 'master', the reason the apprentice is there relates as much to work as to learning. The apprentice learns by participation in the daily routine. Typically, this means that the apprentice, as the least skilled member, does the least interesting and 'dirtiest' jobs.¹⁰ Not only do apprentices lack the skills necessary for more complex tasks, they also lack an understanding of the basic premises that frame the ways in which the work is performed and the skills are integrated. These include the 'rules' that cannot be taught - they are often implicit, understandable only in the context of gradual discovery through participation (Reeve 1981). According to Goody, this

¹⁰ The researcher recalls vividly that, as the least skilled, he was delegated tasks such as cleaning out the trucks, disposing of waste materials, and chasing walls.

period of low-skill work sets down a basic framework of implicit meanings and premises:

There are things which only 'make sense' when they have already been mastered. The task of the master, in scaffolding this sort of learning, has to be managed through the way in which tasks are assigned and monitored.

(Goody 1989: 247).

It would seem that, to the extent that such factors are able to shape the ways in which trade instructors perceive knowledge and knowing, there are at least two implications that emerge from these theoretical considerations. First, it is possible that the views of trade instructors would encapsulate aspects of the master/apprentice model within the relationship between instructors and apprentices-as-students. This would suggest that the process of learning that might be valued is one that involves passing knowledge down from expert to novice in a form of lineal descent. Further, the importance of implicit rules of 'craftsmanship' and rules for social interaction suggest that trade instructors are likely to perceive the learning process from a quasi-cultural perspective in which they - as instructors - assume responsibility for the development of the apprentice in ways that amount to more than the imparting of the technical information and skills of the trade. Second, to the extent that parallels may be drawn from the notion of rules within the views about the performance of skilled tradework, it would appear that there might emerge rules about knowledge and knowing within the views about the performance of the instructional role. That is, the perceptions held by trade instructors

about knowledge and knowing may include expressions of similar forms of *a priori* or immutable rules about knowledge and knowing.

3.6.3 The Filial Status of Apprentices

One aspect of modern day apprenticeship is the tendency of children of tradeworkers to become tradeworkers themselves. For example, in a recent Australian study, Davis (1987) shows clearly that apprentices are more likely than members of the workforce generally to come from homes where the father is a skilled worker. He showed that some 34% of apprentices had fathers who were skilled workers, compared with 21% for the workforce as a whole (Davis 1987: 463). In another study, Sloan and Hudson (1985) established a similar pattern, where some 33% of skilled tradeworkers had fathers who were skilled workers, compared with 21% for the workforce in general (Sloan and Hudson 1985: 35). Without attempting to address the complexities that underpin this situation, there is some explanation of this in the ways in which apprenticeship has developed, and in the traditions that it has developed over time.

Despite its familiarity in many modern industrialised settings, apprenticeship pre-dates industrialisation. It reaches back through the eighteenth and nineteenth century journeymen systems of Western and Northern Europe, the Guild systems of medieval Europe, and the artisan systems of ancient Greece and Rome, to the Babylonian Code of Hammurabi which commanded that masters should teach their craft to the youth of the community. It has figured significantly in the ways in which work has evolved into its current form, and in the social dimensions upon which labour has come to be divided and organised.

The current complexion of apprenticeship owes much to its passage through time.

Although it has adapted to changing conditions and now presents as a highly institutionalised form of vocational preparation, the roots of apprenticeship are anchored in notions that derive from pre-industrial settings. For example, one of the most salient features of apprenticeship relates to the filial status of apprentices, particularly in terms of their rights, conditions and duties. That is, the current social structural position of apprentices in relation to those with whom they work and learn derives its modern character, at least in part, from the evolutionary processes that have given rise to the institutionalised nature of modern work in the skilled trades.

There are at least two primary ways in which skills - including specialised skills - are transferred from one generation to the next within a pre-industrial society. The first is in a domestic mode of production, where there is little distinction between economic roles and kinship roles - they are merged. The work that people perform is geared to the 'natural relations' with the local community and with the land (Giddens 1981). The economic roles enacted by a husband-and-wife, or a parent-and-child, effectively account for the economic structure of the society. There is a sense in which the children are apprenticed to their parents in that they learn subsistence economic roles from their parents. A result of this form of organisation is that the specialised skills are restricted primarily to the kin group.

The second way in which specialised skills may be transferred from one generation to the next in a pre-industrial society is through a system of occupational castes. Here, occupational identity is based on birth status as a member of a kin group. Thus, the division of labour - as it is expressed by the several occupational specialisations - represents the structure of the society itself. The classic instance of this mode is the system of Hindu occupational sub-castes.

Societies that have a more complex division of labour - that is, socially distinguished specialisation of work roles - do not have endogamous occupational castes. Nor do they have pre-emptive rights to particular occupational skills. What distinguishes them is precisely the absence of the identification of rights to occupational skills with identity-bearing kin groups. Young people are not restricted to the occupations of their parents. Thus, as a more complex division of labour develops, there must be available some mechanism or process for transmitting the specialised skills of occupations from one generation to another. A common way of achieving this is to expand the essentially domestic mode of production by bringing in young people from outside the family (Chayanov 1966). The position to which they come amounts to a filial position in terms of the young person's rights and duties in relation to the people with whom they work and learn (Singleton 1989, Hajnal 1982, Morgan 1980). These introduced workers are apprentices who occupy quasi-kin roles and do whatever work needs to be done, whether or not it is related directly to the production of goods and services. Over time, they develop the ability to participate more directly in production. Eventually they can become full-time workers in the industry.

Inasmuch as it provides a means of divorcing production from kin-based domestic relations - though the relationship that develops is a quasi-kin relationship - this notion of apprenticeship figures significantly in the rationalisation of labour. Whilst labour based on a kinship relationship inevitably involves long-term obligations that are non-conditional, with non-kin labour it becomes permissible to check on efficiency, to monitor the quality and quantity of output, and to regulate hours of work (Hosbaum 1968). Thus, simply by introducing non-kin labour - apprentices - customary labour processes are opened to rationalisation, and a more explicit division of labour is permitted. Where apprenticeship is linked to an expanding market, this potential for rationalisation is reinforced by pressure for increased output and increased quality. Although it has emerged with an order and an established pattern that is neither sporadic nor unintentional, apprenticeship maintains traces of these kin-based origins. Goody describes the development of apprenticeship as:

... the extension of father-son training within the domestic unit to include other kin, and finally non-kin; and the objectification of labour, first in exchange for subsistence and training and finally in exchange for wages.

(Goody 1989: 225)

The social structural conditions for apprenticeship - increasing complexity of the division of labour and entry of domestic production into the market - lead youths to seek to learn occupations different from those of their parents. That is, it is not accidental that apprentices are not learning from their parents. In the sense of working with and learning from an expert outside the natal family, apprenticeship emerges as an

institution through the learning of occupational skills in a domestic mode of production within an expanding division of labour. Work becomes separated from other social activities. Work practices develop in terms of organisation, structure and control (Berg 1985, Littler 1982, Giddens 1981). That is, apprenticeships tend to appear first in economies in which products - but not labour - are commoditised, and the master-apprentice relationship is explicitly modelled on that between parent and child (Hart 1982, Meillassoux 1981, Gluckman 1962).

The portrayal of apprenticeship in these terms lends support to some of the speculation posited earlier. For example, the quasi-kin notion noted here reinforces the observation that trade teachers model the teacher/student relationship on the 'mentor/mentoree' or master/apprentice relationship of apprenticeship - and that it includes aspects such as fostering, tending and inducting. Further, it reinforces the notion that the processes by which valid knowledge is acquired and transmitted involve not only a production setting but also the passing of valued knowledge and skills from person to person within that setting.

3.7 Emerging Directions

In large part, this chapter was a response to the imperative created in Chapter One and Chapter Two to explore in greater detail the nature of work in the skilled trades and the nature of the skilled trades as an occupational setting. The process of exploration involved the systemisation of theories, research and literature from a variety of sources and, as might be expected, numerous connections were made with the theoretical considerations of the first two chapters. What is

required now is to identify the main directions to emerge from this chapter, and to begin to consolidate the array of tenuously connected theoretical considerations from the first three chapters into a summary statement of the theoretical platform for the study.

As portrayed in Chapter One, a major goal of this study is to move towards an empirically-supported theory of trade instructors epistemologies - the term epistemologies was presented in terms of the beliefs, values, attitudes and feelings held by trade instructors about what constitutes valid knowledge and ways of knowing. The explorations of this chapter provide strong foundation for the speculation that tradeworkers who become trade instructors are likely to hold systems of beliefs about knowledge and knowing. There emerged elements of an argument that these views are framed by the nature of work in the skilled trades and the social processes of entering and working in the skilled trades. For example, Gleeson and Mealyea identified the notion of 'trade teachers' culture' and the trade as the 'source of identity' and, even, the 'mother figure'. They argued that these are sufficiently sophisticated and established that they inform, sanction and guide practice in an instructional setting. Bensman and Lilienfeld argued for the notion of 'differently characterised views' and 'habits of mind' that may be described as 'craft attitudes' and which emerge from the practice of the skilled trades. Linked with these are notions of what counts as appropriate ways in which knowledge is transmitted, how access to knowledge is determined, and what is the process of control. For example, several scholars suggest that there is a propensity for tradeworkers to value the acquisition of knowledge by the quasi-cultural process of handing knowledge, skills and attitudes from

person to person within the work setting, and this is transferred to the instructional setting when the tradeworker becomes a trade teacher.

It would appear that the work of the skilled trades is characterised not simply by skilled performance alone, but by skilled performance underpinned by knowledge and understandings - a notion of skilled performance that has considerable breadth and complexity. It involves both competent performance of the work - in the technical sense - across a variety of settings but within a specialisation, and an understanding of the (often implicit) 'rules' that guide action within the trades. The essence of this is captured in Coy's notion of 'craftsmanship'. It appears also that the knowledge base for this work derives not from formal disciplines but from the techniques, materials, products and services with which the trade deals. The value placed by tradeworkers on learning within a production or service setting, and the context-dependency of knowledge within the skilled trades suggests that trade instructors may perceive that the conceptual basis for the organisation of knowledge relates closely to the activity of the workplace. That is, the work of the skilled trades is underpinned by Bishop's (1979) 'operational knowledge' that is 'practical' and that informs action, rather than any notion of theoretical knowledge or formal disciplines. In this sense, it is likely that fields would be distinguished on the basis of the functions performed and the competencies required for skilled practice in the field, rather than on the basis of disciplines or subjects that occupy such an important position in formal educational settings.

A potential typology is represented in the tentative dichotomy between knowledge perceived as 'practical' and 'deriving from experience' and

that perceived as 'theoretical' and 'abstract'. That is, it would appear that central to the views that trade instructors are likely to hold are particular characterisations of what constitutes valid knowledge, and there are several possible descriptors that may be applied. For example, both Mealyea and Gleeson use the term 'practical'; Bishop portrays a notion of 'operational knowledge'; McIntyre presents it as 'contextual and particular' and as 'deriving from experience'; and Butterworth and Gonczi use terms such as 'practical, problem-oriented and experiential'. Several researchers - see, for example, Butterworth and Gonczi, Gleeson, Mealyea, McIntyre, Tennant - place it in contradistinction with that which is 'abstract' and 'theoretical'; and Luttrell contrasts her notion of such valid and valued knowledge with that which is 'fabricated by authorities'. Also of considerable importance to the views held by tradeworkers appear to be perceptions about the ways in which valid knowledge is acquired. For example, there emerged the notions of 'experience as the source of knowledge' (Butterworth and Gonczi, Luttrell, McIntyre); and 'defining knowledge with respect to the dominant social setting- in this case, the trades - Gleeson, Mealyea, Young.

It appears that skilled tradeworkers might perceive certainty, routineness, and lack of ambiguity as of a higher order than open-endedness, inquiry and a multiplicity of perspectives and solutions. Further, it appears that the qualification of skilled tradeworker, and the status and prestige that it attracts, are due recognition of the ability to perceive new work situations as belonging to a particular class and to utilise selected and appropriate knowledge and skills in routine ways. In this situation, the mastery of such knowledge and skills is taken as

given, and this is related to the value placed on specialisation. It is related also to the form of autonomy that tradeworkers enjoy, autonomy related more to being licensed to practise in the trade and to work unsupervised within the trade, than to the notion of self-regulation enjoyed in many professions. It appears also that members of the skilled trades exercise a form of protective isolation. Here, apprenticeship and indenture are used to ensure that the new generation of practitioners maintains not only the technical knowledge base but also is inducted into the patterns of behaviours and values important within the trades - the 'rules' (Gamst' term). The training of apprentices is performed under a regime variously described as mentor/mentoree, master/apprentice or expert/novice. But it is not too egregious to suggest that this is characterised by a quasi-kin attitude, a commitment to passing knowledge through a form of lineal descent, and a 'cloak of competence' (Haas' term). The skills and knowledge of the trade are precious, to be handed to the next generation under ritualised conditions, culminating in the status of qualified tradeworker.

3.8 The Next Step

Across the first three chapters of this thesis, theoretical development has been driven by the systemisation of existing theories, research and literature. This has generated a constellation of concepts and ideas, and a sensitising framework that can inform the next phase of the study.

It is clear that further development must be anchored in an exploration of the constructs that trade instructors hold about knowledge and knowing, and the point has been reached where this must proceed

through grounded processes. The study cannot risk working with the assumption that trade instructors views are of a certain kind or that they conform to those established by eminent theorists.

The study, however, is well positioned to move to an empirically-based, grounded investigation of the substance of the current theoretical position, and this is the next phase of the study.

Before moving in this direction, it is timely to give consideration to method - the design of the study and the selection of research techniques. This is the focus of the next chapter - Chapter Four. When this is complete, the study moves to an intensive study with a small number of informants - Phase B - and then to communication with a large number of informants - Phase C. Thus, Chapter Four represents the transition from the theoretical emphasis of the first three chapters to the empirical emphasis of Chapters Five, Six and Seven.

Chapter Four

Method

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Chapter Four

Method

Research can only demonstrate that, within the context of a given set of basic assumptions, a stated proposition is tenable in the light of the interpretation given the facts known at that time.

(George Mouly¹)

4.1 Introduction to the Chapter

One of the most prominent characteristics of educational research is its methodological and theoretical diversity. The selection of an approach to a research effort rarely is reduced to the simple calculus of choosing between research paradigm X and research paradigm Y, or conforming to research paradigm Z. As Hammersley suggests:

What is involved is not a cross-roads where we have to go left or right. A better analogy is a complex maze where we are repeatedly faced with decisions, and where paths wind back on one another.

(Hammersley 1992: 172)

Although the present study was influenced by developments in the so-called 'new sociology of education', and shaped by the assumptions of an essentially interpretive perspective, it does not conform to the conventions of a single, clearly defined research paradigm. It is not like a

¹ Mouly (1978: 246)

laboratory study in science that can be undertaken within an established research envelope. Typically, such laboratory research is guided by widely agreed research rules, tools and methods set within a strong methodological and theoretical framework. Not only does this guide the research rather firmly but it provides criteria by which to judge the appropriateness of the research design, in general, and the methods, in particular - there exists a pattern of prevailing methodological assumptions that are agreed and shared (Burns 1994, Lewins 1993, Howard and Sharp 1983). Rather, the research reported here took place without the benefit of established and widely accepted 'rules of the discipline' - except in a broad and general sense.

Research approaches in Education often need to be fashioned to suit the fabric and exigencies of the situation at hand when, as in the present case, the research is more a process of argument than a demonstration that proceeds by the 'scientific' theory of the discipline. This is not to suggest that such educational research proceeds in an undisciplined or freewheeling manner, for there are major referents that guide decision-making - 'the intercepts made by the plane of the study with the axes of the research crystal' (Clough 1994). The major purpose of this chapter, therefore, is to describe the referents that guide the research design for this study, and the ways in which the study is crafted in response to these referents. This involves exposing methods and assumptions for scrutiny, providing explanation and justification as appropriate, and establishing that the research approach is consistent with the underlying warrant.

4.2 The Structure of the Chapter

In the first three chapters theoretical development progressed through the systematisation of existing theories, research and literature; in Chapter Five, Six and Seven it progresses, in large part, through empirical investigation. Thus, Chapter Four is a transitional chapter in the sense that it provides the link between these two major aspects of the study.

Beyond its introductory sections - Sections 4.1 and 4.2 - this chapter contains two major components. The first component focuses on a range of major points of reference influential in the design of the research effort, and is presented across two sections: Section 4.3 considers those referents that derive, essentially, from the goals and assumptions of the research; Section 4.4 begins consideration of those referents that derive from the context within which the study was located and the fieldwork occurred. This latter element is discussed in greater detail in Chapter Five.

The second major component of the chapter again is presented across two sections: Section 4.5 seeks to describe a research design that takes into account the referents identified in the earlier sections of the chapter, the theoretical considerations of Chapters One, Two and Three, and the empirical aspects of the study to follow; Section 4.6 presents the specific research methods used within the study, but with a focus on the factors that influenced the selection of the methods and their development for use in this study. The more procedural aspects of the research methods are presented in the appendices.

The chapter concludes with Section 4.7 which provides links to the ensuing phases of the study and chapters of the thesis.

4.3 A Qualitative Study

The goals of the present study, and the assumptions that underpin the study are the first and, perhaps, the most conspicuous points of reference for the development of a research approach. This study seeks to explore the views that trade instructors hold about knowledge and knowing. The intention is to move towards an empirically-grounded theory of trade instructors' 'epistemologies' - the term being used here to refer to the general area of beliefs, values, attitudes and feelings concerning what constitutes valid knowledge and ways of knowing. The notion of theoretical development presented here relates more to what Glaser and Strauss (1967) describe as 'substantive' theory than to 'formal theory'. That is, the study seeks to provide a basis for building up to formal theory by developing 'conceptual categories' and 'conceptual properties' of those categories, 'sensitising concepts', 'meaningful pictures', and 'apt illustrations' (Glaser and Strauss 1967: 39). Early evidence of this is presented across the first three chapters of this thesis. The process of development is cumulative in that it brings into confluence a range of data, working hypotheses, research and theories - both substantive and formal - and involves not only the development of theory but also some testing of that theory such that what emerges is 'likely to be more productive and provide a better fit with the empirical world than theory produced in other ways' (Glaser and Strauss 1967: 38).

In earlier chapters, this goal of theoretical development was translated into operational terms, resulting in the identification of three main research questions that influence the scope and shape of the research effort:

- *Do trade instructors use frameworks (that is, do they hold systems of beliefs, values, attitudes and feelings) that might, potentially, guide their approach to knowledge and knowing?*
- *What are the main typologies involved in the views held by trade instructors about the nature of knowledge and knowing?*
- *To what extent do these views embody characteristic ways of presenting or perceiving reality - perhaps canons or rules?*

Whilst these goals and questions represent intentions and direction, the character of the study is shaped, in considerable part, by its underpinning assumptions. Here, the study rests on the proposition that reality is socially constructed, and that what counts as valid knowledge is open to question. That is, it is assumed that human beings have consciousness and intentions that enable them to take an active, interpretive role in the construction of the worlds they inhabit, and give them a capacity to make sense of these worlds. The general design of this study, and the research methods used, attempt to capture what is occurring within these worlds, to see the world as its members see it, to gain access to the meanings they attach to events and objects in the world, and to watch and document how they go about assigning meaning and order to the course of everyday life - the 'interactive practices through which people construct and display the meaning and orderliness of their worlds' (Baker 1986: 5).

Together, these goals and assumptions set the attitude of the study as, essentially, a qualitative study. It might be noted that, frequently, the term 'qualitative' generates connotations that do not apply to the present study. Some scholars portray qualitative research as wedded to a particular epistemological position. For example, Smith (1989, 1984) depicts qualitative research as a reflection of an 'idealist' epistemological position and, conversely, quantitative research as the process for investigation within a 'realist' paradigm. Other scholars portray qualitative research in contradistinction to quantitative research. For example, Miles and Huberman (1984) establish a distinction between qualitative and quantitative research in terms of the use of words rather than numbers. This distinction appears to sustain a popular and long-standing dichotomy, as indicated by Lundberg:

*The idea seems to be that ... if one uses numerical symbols, especially Arabic notation, one is using quantitative methods. If, however, one discusses masses of data with concepts of 'more' or 'less' instead of formal numbers, and if one indulges in the most complicated correlations but without algebraic symbols, then one is **not** using quantitative methods.*

(Lundberg 1968: 59)

However, this study is qualitative not in the sense that it rejects quantification, or that it is the opposite of quantitative, or that it is faithful to a specific epistemological position. Rather, it is qualitative in the forms of representation that are emphasised in presenting the body of the work. There is an emphasis on interpretation and on getting below the surface of manifest behaviour to the meaning events have for those who experience them. This requires methods that produce what

Geertz (1988, 1973) calls 'thick description' and what Eisner (1991) calls 'the presence of voice' in the representation of the outcomes of the research, and it is in this sense that the study may be described as qualitative.

The goals and assumptions of the study indicate that what it seeks to develop is rather interpretive and hermeneutic in character. As such, the study moves beyond a simple account of the views that informants hold. It involves analysing the structure and the production of these views - perhaps in ways that are new to the people with whom the study is working - and exploring the meanings that informants attach to events, issues and situations. In sum, the study seeks to portray and interpret what are, essentially, cultural patterns that involve meaning and behaviour. Hammersley suggests that this requires a research approach that is inductive rather than deductive:

... and, unlike theory testing, it requires flexibility on the part of the researcher; the structure of the research - what groups and settings are investigated and by what methods, in order to find out what, and so on - cannot be specified at the start, but must be worked out as the research proceeds.

(Hammersley 1989: 173)

That is, in order that the patterns can be constructed, the research approach must be characterised by a degree of reflexivity. Whilst conventional research methods, techniques and language are employed - even if in some reformed or reconceptualised way - the study is strengthened by the extent to which there is scope for its shape and direction to alter in response to the outcomes that emerge during the

study - the action of the study upon itself. Such reflexivity can lead to the maintenance of a healthy self-consciousness throughout the research process.

The study is a field-focused study of people, their views and their situations. That is, its emphasis is not upon phenomena that have been created by the researcher but on phenomena that are naturally occurring. It does not seek to control extraneous variables in the way that a laboratory or clinical experiment might do and, in this sense, the study is non-manipulative. It is concerned less with 'objective' truth and more with the truth as perceived by the informants. Burns notes that, in a study such as this the informants are not the subjects - they are the experts on what the study is trying to explore (Burns 1994: 245). This is not to suggest that, necessarily, they are experts in the researcher's academic specialisation. In relation to the research goals, research outcomes and the advancement of knowledge within that academic specialisation, informants are more likely to be 'non-specialist' knowers. Thus, there is a difference or gap between the ways in which the informant can provide information and those in which the researcher seeks to work in pursuit of scholarly research. The researcher must establish a process of data interpretation, for the study is not, simply, a process of describing participants' perceptions, and the gap cannot be bridged by posing questions that bear little relation to the ways in which the informants' knowledge of their social world is organised. Further, the researcher cannot run the risk of assuming that informants' constructs are of a certain kind or that they are of the kind that theorists and prominent thinkers promote. Even more than may be the case elsewhere, this study needs to be grounded in an understanding of

participants' constructs gained from qualitative and exploratory method. The researcher must negotiate pathways to information and gather information in ways that preserve its integrity.

Once information is obtained from informants, it may be treated to meet the requirements of the research objectives and the academic specialisation. This involves forming concepts from the information in a process that remains under theoretical control. It involves aggregating many separate items of information into an account of the world as whole, and a process of inference by which the information is used to construct a conceptual understanding of that world. It involves what Bateson calls 'the superplus of knowledge over and above that of the informant' (Bateson 1984: 76). That is, the researcher provides a data-interpretation function that adds to the information provided by the informants and which must be carried out in ways that are clear and open to scrutiny. It is a process described by Jax (1984) as 'wide spectrum inference' in which the researcher uses the information in the context of a 'higher level network' (Jax 1984: 17). In this process:

... the concept of representation should not be interpreted ... to mean the creation of an image isomorphic with the perceived world. The process of re-representation is a process of construal, a reconstruction, and as such it reconstitutes the experience from which it originates. We have no mirror for nature.

(Eisner 1991: 40)

A consequence of the emphasis on qualitative and exploratory method and negotiation of pathways to meanings is that the study relies, at least on part, on the researcher as instrument. That is, the researcher must

have a sense for the significant and an understanding of the framework of the study that makes the search for the significant efficient. There must be a strong conceptual framework and a set of intentions that allow interpretations to be made and alternatives to be considered. In this study, these derive from three primary sources. First - as noted earlier in this section - the goals and assumptions of the study provide major points of reference. Second - and as noted in Chapter One and pursued in Section 5.3 - the researcher's own background provides a strong basis for understanding the context and what is likely to be significant in the data. And third - as presented across the first three chapters - the process of systemisation of the existing research, theories and literature provides a sensitising theoretical position and concepts.

In summary, the argument of this section is that, within the framework established by its goals and assumptions, this study focuses on the development of substantive theory. This involves capturing subjective meanings and the truth as perceived by the informants through both theoretical and grounded empirical investigation. It is a qualitative study in the sense that the forms of representation involve 'thick description' and a 'presence of voice', it is reflexive, it is non-manipulative, and it relies, in considerable part, upon the researcher as instrument.

4.4 Context

The naturalistic complexion of this study means that the context and climate within which it is set help to shape the design of the research. Whilst the climate is discussed in greater detail in Chapter Five, there are three points that might be noted here. First, in this study informants

are drawn from two regional TAFE institutions². Both institutions are large, complex social organisations; both have clearly delineated corporate goals that focus their efforts; and both institutions are formally organised and highly structured settings. If the research effort is to gain access to, and derive information from people whose work is governed by such institutions, it must meet the expectations of those institutions, particularly in respect of organisation, accountability and benefits.

The second point to note is that there is no provision within the corporate goals, the organisational structure or the strategic planning documentation of these two regional institutions for any form of research - by the institutions, for the institutions or on the institutions. Within each of the two institutions, there exists no infrastructure that might support a research effort. Further, there is no place for research in any aspect of the operation or development of the institutions. Indeed, there is a general suspicion of research. In a sense, this research effort is located within a discourdous environment.

The third point to note is, in large part, a consequence of the two previous points. The researcher had to expend considerable effort in negotiating access to the research data. This involved convincing a wide variety of individuals and groups that the research had the potential for 'tangible' benefits, and that it could be carried out with minimal disruption to the normal functioning of the institutions and their organisational units. As indicated later - in detail, in Chapter Five - access to the research data depended exclusively on the ability of the

² The Illawarra Urban TAFE Network in the State of New South Wales - now, the Illawarra Institute of Technology - and the ACT Institute of TAFE in the Australian Capital Territory - now, the Canberra Institute of Technology.

researcher, first, to establish credibility and, second, to accept full and personal responsibility for the management and conduct of all aspects of the research effort - including the administrative and the more routine aspects of the project. Here, personal contact, clarity of purpose, and preparedness to carry through obligations - both explicit and implicit - were very important. The research could not be carried out from a distance, and the researcher had to be willing to invest time to achieve a viable outcome. Thus, in order for the study to proceed, it had to include in its design the researcher not only as research manager and academic but also as research instrument.

Further consideration of the context and the climate of the research setting is incorporated into a number of sections of this thesis, but particularly in Chapter Five.

4.5 The Research Design

It would seem consistent with the argument presented above to suggest that the study might start with the systemisation of the existing research, theories and literature. Together with the researcher's own background, this provides a sensitising framework for the exploration of trade instructors' constructs through the intensive study of a small number of informants. When a reasonable understanding of these constructs has been achieved it is possible to move in other directions. Ways of generalising from a few intensively studied informants to a wider group can be explored, and informants' constructs can be related to areas that are affected directly by the particular views of knowledge so identified - such as instructional and curriculum practices. If it is possible to bridge

the gap between trade instructors' constructs and, say, instructional/curriculum practices, and if it is possible to communicate more widely with informants about this, it may be possible to move closer to an hypothesis-testing model of research.

Thus, the study consists of four main phases:

- Phase A (see Figure 4.01) of the study provides a theoretical frame of reference, consolidates a set of research questions, and gives some indication of an appropriate direction for grounded, empirical investigation. The outcomes of this process are presented across the first three chapters of the thesis;
- In order to provide some empirical evidence relating to the early ideas provided by the theoretical platform, to discover the primary constructs used by trade instructors, and to generate a basis for communicating with a large number of trade instructors, the next main phase of the study - Phase B (see Figure 4.01) - includes an intensive and exploratory study with a small number of informants. It involves two main stages, the first of which concentrates on data generation and selection and the second of which concentrates on clarification and verification. The primary research method for the first stage is the Semantic Taxonomy Interview and, as described in Section 4.6.3 and Section 6.7, this led to the development of the Classification Task protocol. The second stage uses a follow-up interview protocol - called here the Postnate Interview³. Together, these methods allow for significant

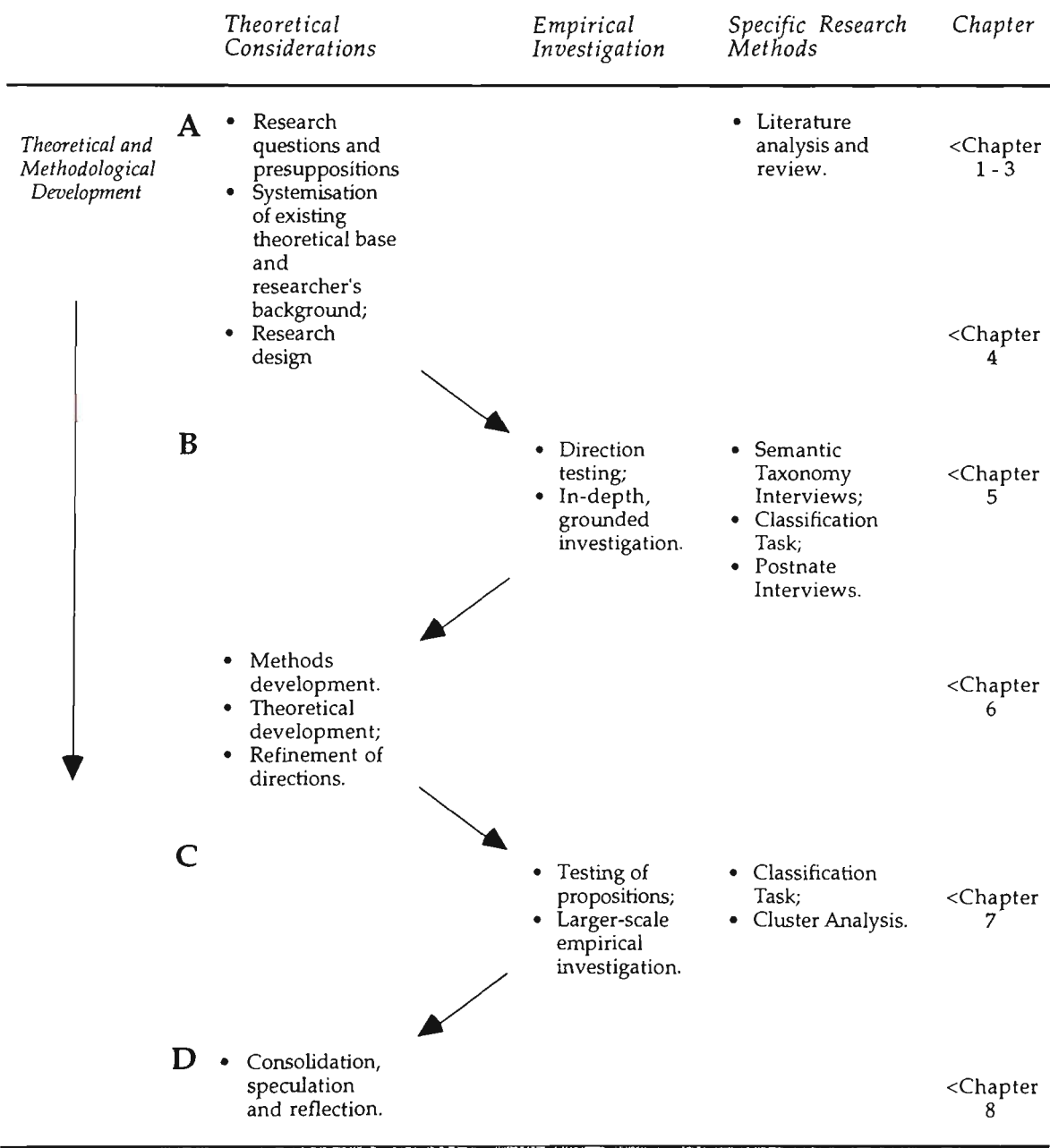
³ The term Postnate Interview was coined here to describe the process of taking back to informants the researcher's interpretations of the outcomes of the earlier data-gathering activities in which they had been involved. The process is described by Cambourne (1992) - in another context - as 'member checking'.

development of the theoretical considerations, further methodological development, and further clarification of the directions for the study. Chapter Five and Chapter Six report the outcomes of Phase B;

- Phase C (see Figure 4.01) of the study seeks to develop the theoretical position through communication with a larger group of informants. Here, the primary data-gathering instrument is the Classification Task, identified and developed earlier in Phase B and administered to the 215 trade instructors. The analysis of the data includes a form of Cluster Analysis adapted for the purposes of this study and described in Section 4.6.5. The outcomes of Phase C are reported in Chapter Seven;
- Theoretical development occurs across the entire study - from the early attempts to systematise the existing theories, research and literature in Chapter One through to the outcomes of work with a large number of trade instructors in Chapter Seven. That is, what might, typically, appear in a final chapter already has been unfolded and presented progressively through the study. Thus, the role of Phase D (see Figure 4.01) - is to identify some of the threads generated by the interplay between the several phases of theoretical and empirical investigation, to provide some informed speculation about the implications of the outcomes of the study for instruction and curriculum in training for the skilled trades, and to reflect on the method and limitations of the study. This is the focus of Chapter Eight.

In diagrammatic form, the basic research design of the current study is depicted in Figure 4.01.

Figure 4.01
Diagrammatic representation of the research approach



The central column of Figure 4.01 represents the essentially reflexive process of the study as it tacks its way from conception to completion. Here the theoretical considerations and empirical investigations act on each other, providing the study with the 'healthy self-consciousness' noted earlier.

4.6 Research Methods

Each phase of the study uses a range of research methods. To maintain a degree of clarity, the detail relating to the more procedural aspects of each of the methods has been placed in the appendices, and a primary purpose of this section is to expose the factors taken into account in selecting and preparing the specific research methods for use in Phase B and Phase C. In so doing, this section continues to unfold aspects of the argument of the study. That is, the section moves beyond a simple description of the research methods to expose the factors that influence the decisions and the ways in which they help to shape the study as a whole.

This section begins by considering the factors influencing the selection of informants for Phase B and Phase C of the study. It is followed by consideration of the Semantic Taxonomy Interviews from Phase B, the Classification Task developed in Phase B - but used more extensively in Phase C - the Postnate Interviews used in Phase B, and the Cluster Analysis of Phase C.

4.6.1 Sample Selection

Informants provided data in two phases of the study. As described in Section 4.5, a small number of informants was required in Phase B, and a large number of informants was required in Phase C.

Phase B

The selection of informants for Phase B of the study was guided by three major factors. The first factor was that the informants were, in all major respects, typical of the wider population of trade instructors to be

targeted in Phase C⁴. Thus, all had completed an apprenticeship, all had trade qualifications, all had technical teaching qualifications, all had significant industrial experience prior to entering the instructional role and all were experienced trade instructors. Figure 4.02 provides a summary of these attributes for the selected informants.

Figure 4.02
Attributes of informants in Phase B

Informant code	AP001	AP002	CC001	AE001	MF001	PB001	TM001	UH001
Trade qualification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Paraprofessional qualification	Yes	No	No	Yes	Yes	Yes	Yes	No
Professional qualification	No	No	Yes	No	No	Yes	Yes	No
Teaching qualification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Completed apprenticeship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period of apprenticeship	5	5	4	4	4	5	5	6
Industrial experience (years post apprenticeship)	12	15	15	12	7	17	18	22
Instructional experience (years)	14	10	6	8	8	18	12	9
Gender	Male	Male	Male	Male	Male	Male	Male	Male

The second factor that guided the selection of informants was that a range of trade areas be included. The eight informants selected for Phase B were drawn from seven trade areas as displayed in Figure 4.03 - and represented in the informant codes of Figure 4.02.

⁴ Details of the characteristics of the informants of Phase C are presented in Section 7.4.

Figure 4.03

Trade areas represented in Phase B

- Automotive Painting (AP)
 - Applied Electricity (AE)
 - Commercial Cookery (CC)
 - Welding (also known as Metal Fabrication) (MF)
 - Greenkeeping (also known as Turf Management) (TM)
 - Plumbing (PB)
 - Upholstery (UH).
-

The third main factor that influenced the selection of informants for Phase B was that they be selected in such a way that their participation would have minimal influence on the larger sample of trade instructors to be targeted in later parts of the study. The researcher identified trade instructors who, recently, had moved away from their instructional areas to assume new positions - mainly due to opportunities created by institutional restructuring - and, thus, who no longer had daily contact with the trade instructors from the larger sample. The eight trade instructors chosen were those whose move to other duties had occurred within the previous six months.

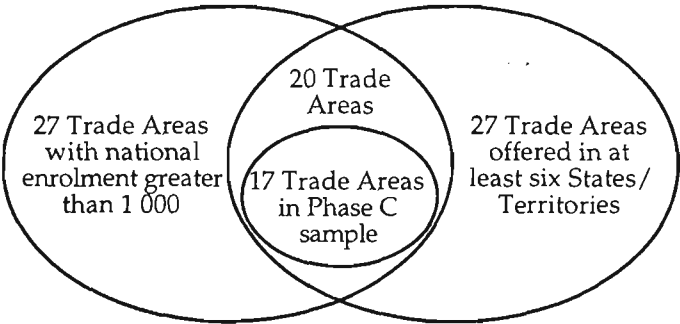
The original sample of eight trade instructors and seven trade areas was reduced to six and five respectively over the course of Phase B. One informant (AE001) withdrew because of the onset of a sudden serious health condition, and unanticipated technical difficulties rendered unusable a large portion of important data from another informant (CC001).

Phase C

As the intention was that this study be hypothesis generating - a contribution to the development of a platform from which later, hypothesis testing studies might depart - the selection of informants for Phase C was guided not by the need for a census of all trade instructors

but by the need for data that could provide insights into the sorts of views that trade instructors might hold and the nature of the constructs involved. Four major factors influenced the selection of informants for Phase C of the study. The first was that informants be selected such that an appropriate range of trade areas was represented in the sample. At the time of this study, a total of 124 trade areas was recognised formally and offered in TAFE institutions across Australia. Whilst national enrolments in these trade areas ranged from 12 385 (in Automotive Mechanics) to two (in Horse Care), a set of 27 Trade Areas held national enrolments in excess of 1 000 students and accounted for 67% of total national enrolments in the Recognised Trades Stream (DEET 1989). Similarly, whilst 58 trade areas were offered in only one or two of the States and Territories, another set of 27 was offered across at least six of the States and Territories (DEET 1989).

Figure 4.04
Selection of sample of trade areas for Phase C



The intersection of these two sets - represented in Figure 4.04 - contains twenty trade areas. By selecting appropriate TAFE regions, seventeen of these were able to be included in the sample for Phase C. In total the sample contained 215 trade instructors (see Figure 4.05) and nineteen

trade areas - including an additional two areas that do not have enrolments greater than 1 000.

Figure 4.05

Sample sizes for Phase C by region and by trade area.

Trade Area	ACT Region	Illawarra Region	Totals
Applied Electricity	7	14	21
Automotive Engineering	11	12	23
Automotive Painting	6	5	11
Bricklaying	2	6	8
Butchery	4	3	7
Cabinetmaking	3	0	3
Carpentry & Joinery	9	9	18
Commercial Cookery	5	5	10
Fitting & Machining	4	21	25
Foundry*	0	3	3
Greenkeeping	1	1	2
Graphic Arts	7	1	8
Hairdressing	10	5	15
Industrial Electronics	9	5	14
Metal Fabrication	5	12	17
Panel Beating	4	5	9
Plumbing	5	7	12
Refrigeration	3	5	8
Upholstery*	1	0	1
Totals	96	119	215

* These Trade Areas do not have national enrolments greater than 1 000.

Since Phase C was an attempt to communicate with a large number of trade instructors, the second major factor that guided the selection of informants was that sufficient responses be available to serve this purpose. The sample selected contained a total of 215 trade instructors - representing the total population of trade instructors within the two regional TAFE institutions involved - from which 132 useable responses were returned (see Section 7.4.1).

The third major factor that guided the selection of informants for Phase C contained two elements related to the process of administering the

survey instrument - the importance of personal contact as the primary method for administering the survey and the complexities of obtaining access to trade instructors in TAFE institutions - as detailed in Chapter Five. To maximise the former it was desirable that the trade instructors be geographically proximate, and to minimise the latter it was desirable that the trade areas be organisationally related. This was achieved by selecting trade instructors from two clearly identifiable TAFE regions - the Illawarra Urban TAFE Network of New South Wales and the Australian Capital Territory.

In relation to student enrolments, number of staff employed, number and types of courses offered, and size of the regional population base, the two TAFE regions selected are quite similar. However, they are located in areas with dissimilar industrial bases, and this provided the fourth factor guiding the selection of informants. The Illawarra region contains 'heavy' industries, primarily steel production, coal mining and shipping; the Australian Capital Territory contains 'white collar' industries, primarily public administration and service industries. This contrast provides an opportunity to uncover differences that might emerge as a result of the differing business and industry environments with which the trade courses and, thus, the trade instructors are linked - as suggested, for example, by Bensman and Lilienfeld (1991).

4.6.2 Semantic Taxonomy Interviews

The first attempt to generate empirical data for the study occurs in Phase B. It involves intensive study with a small number of informants, and begins with interviews using the Semantic Taxonomy Interview (STI)

protocol⁵. Details of the more procedural aspects of these interviews are presented in Appendix One.

The Semantic Taxonomy Interview is an open-ended and non-directive interview technique. Apart from the initial domain of reference - indicated by the word 'knowledge' in the question: 'How do you think about knowledge?' - the researcher provides as few clues to content as possible, pushing only towards structure by asking structural questions. That is, the researcher presents an introductory statement and the interview proceeds by a protocol based on structure-seeking questions. The full introductory statement about the domain of reference and the interview protocol are presented in Appendix One.

Following Spradley (1980, 1979), the results from each of the interviews are subjected to rigorous analysis in three main forms. One form is the systematic generation of categories and themes that might be used to represent the views of the informants. Categories and themes are created by the researcher from terms and ideas presented by the informants, that are perceived to be closely related and have such a degree of coherence that they form a useful unit of analysis.

A second form of analysis builds the internal structure of the targeted domain. This involves the formulation of a scheme representing the relationships between the units of analysis - the 'story' being portrayed by the informant. Verbatim extracts from the interview and the range of categories and themes elicited are used in a diagrammatic representation of the informant's views - the Domain Structure Diagram. It should be

⁵ This protocol emerges from the works of Spradley (1980, 1979) and Spradley and McCurdy (1972). Details are presented in Appendix One.

noted that this is not a transcription or a chronological account of the interview, for the interviews tend not to proceed as a simple unfolding of a clearly reckoned account of the informant's views. Rather, the Domain Structure Diagram is the researcher's representation of the internal structure of the informant's views, generated from analysis of the audio-taped interviews and the researcher's field notes. As part of the development, each Diagram was taken back to the informant for review and verification in the Postnate Interviews - see Section 4.6.4.

A third form of analysis elicits rule-like elements. These are principles, tacit or explicit, that the informant appears to take as true and valid, and which are used as justification for action. Such elements are reasonably large units of thought that are taken to have a degree of generality. An example of a rule-like principle emerging from one of the interviews is:

Sound basic knowledge is knowledge demonstrated in terms of practical things you can do.

These processes of analysis help to relate the data to the three research questions, and assist the researcher to translate the data to conceptual forms commensurate with the goals and nature of the study - as noted in Section 4.3 - in ways promoted by Bateson (1984), Jax (1984), Geertz (1988, 1973) and Eisner (1991).

4.6.3 The Classification Task

The Classification Task is used to capture data in two phases of the study. In Phase B it is used as a supplement to, and a consequence of the Semantic Taxonomy Interviews. After the process of gaining agreement

for trade instructors to participate in the study, and the Semantic Taxonomy Interviews, it is the third major contact with the informants in this phase of the study. In Phase C it is the primary data gathering instrument.

The Classification Task requires informants to organise into groups 26 'knowledge areas' selected by the researcher - such as Physics, Welding, and Sociology - and to describe the characteristic(s) that they perceive are shared by the areas in each of the groups they form. It is a relatively open task in the sense that informants choose the number of groups they wish to use, and they may allocate knowledge areas to more than one group. They do not have to use all the areas, and may add areas that are not in the initial list if it helps them to characterise the groups they form. Details of the more procedural aspects of the Classification Task are presented in Appendix Two.

The Classification Task was selected as a research method for two primary reasons. First, it articulates well with major outcomes of the Semantic Taxonomy Interviews. Whilst the Interviews seek to elicit from informants their views of knowledge, the perceptions they hold about ways of knowing, the bases upon which they justify their views of knowledge, and push informants to uncover their deeper reasoning, particularly the more 'taken-for-granted' reasoning, the Classification Task provides a different kind of data and level of response by requiring informants to construct categories. It draws upon the preference displayed by trade instructors throughout the Interviews to work with the concrete rather than the abstract. That is, the Classification Task allows informants to provide data through a process of construction and

manipulation, involving trial and error, and resembling a 'practical task'. It presents the informant with a tangible activity over which they can feel they have some control, and avoids the unfamiliar and potentially embarrassing situation of being asked to respond to seemingly abstract questions.

The second main reason for selecting the Classification Task is that previous research portrays the technique-in-action and gives some indication of the sorts of outcomes it can generate. For example, the classification process was used by Donald (1986, 1983) and Donald and Nagy (1985) in their work with university academics; in the work of Young (1981, 1980) - noted in Section 2.5 - a classification process is used to elicit the primary constructs used by school teachers; also, Biglan (1973a, 1973b), in seeking to uncover the characteristics of subject matter as presented within the university setting, used a classification process in which 200 academics sorted some 36 university subjects into categories on the basis of their similarity. Thus, the Classification Task is an established research method that has been applied in settings that parallel that of this study, and with characteristics compatible with the present research goals and setting.

It is important to note the place of the Classification Task in Phase B of the study. It was selected for consideration after the completion of the Semantic Taxonomy Interviews - the Interviews provided primary input to the development of the Classification Task. Its use in this Phase of the study served two purposes: it elicited data that complemented the Interviews data; and, its use in the intimate setting a small number of trade instructors enabled the researcher to establish its suitability for use in Phase C.

The Classification Task did not sit in 'research ready' form, and it was necessary to undertake some developmental work - particularly, establishing the knowledge areas to be classified. Here, the outcomes of the Semantic Taxonomy Interviews - as presented in Chapter Five - were of considerable importance. The Interviews provided insights into the major dimensions that appear to underpin the views of the informants and it was possible to distil 'knowledge areas' that typify these dimensions. For example, as will be shown in Chapter Five, the Semantic Taxonomy Interview with informant AP001 generated a view of knowledge and knowing based on a practical-theoretical dichotomy. The knowledge areas presented as typical of those dimensions are presented in Figure 4.06.

Figure 4.06

Practical-theoretical dichotomy and typical knowledge areas from Informant AP001.

(Taken from the data presented in Chapter Five)

<i>Practical knowledge</i>	<i>Theoretical knowledge</i>
<i>Typical Examples</i>	<i>Typical Examples</i>
The skilled trades	School subjects
Panel Beating	Physics
Automotive Painting	Chemistry
Painting and Decorating	Woodwork

By considering the outcomes from all informants in Phase B, a list of areas of knowledge was generated and refined for inclusion in the Classification Task. A summary of all the main dimensions established by these Semantic Taxonomy Interviews and examples of knowledge areas that typify each dimension, are presented in Figure 4.07.

Figure 4.07
Dimensions and typical examples of areas of knowledge derived from Semantic Taxonomy Interviews in Phase B.

Source	Dimension	Typical Examples
Semantic Taxonomy Interviews	Practical	Motor Maintenance Accounting The Skilled Trades Electronics First Aid
	The Skilled Trades	Greenkeeping Plumbing Automotive Painting Panel Beating Painting and Decorating Automotive Electrical Fitting and Machining
	Theoretical	Sociology Engineering Psychology Philosophy Medicine University subjects School subjects
	School/University subjects	English Mathematics History Physics Chemistry Woodwork
	Self	Interpersonal Communication Genealogy Counselling

In addition to the outcomes of the Semantic Taxonomy Interviews, a secondary source from which guidance was sought in selecting knowledge areas for the Classification Task was the set of research precedents noted in earlier chapters. A summary of the main dimensions⁶, including examples of knowledge areas that typify each dimension, is presented in Figure 4.08.

⁶ As noted, the Semantic Taxonomy Interviews provided the primary guidance in establishing the Classification Task and selecting the 'areas of knowledge'. Figure 4.07 and Figure 4.08 are simple listings of the totality of dimensions that influenced the selection of 'areas of knowledge'.

Figure 4.08

Dimensions and typical examples of areas of knowledge derived from research precedents.

Researchers	Dimension	Typical Examples
Bishop (1979, 1977) Goshen (1962) Rueschemeyer (1986) Hall (1975)	Institutionalised	Biology Mathematics
	Operational	First Aid Typing
Luttrell (1989, 1984) Attewell (1990) Gamst (1989) Rogoff and Lave (1984)	Framed by authorities	Medicine
	Framed by experience	Interpersonal Communication
Young (1981, 1980)	Expressive	Counselling
	Objective	Typing
	Forms of knowledge	Physics Electronics Geography History Counselling
	Practical	Nursing
	Theoretical abstract	Philosophy
Bensman and Lilienfeld (1991) Coy (1989c) Copa (1984) Gilmour and Lansbury (1978)	The craft attitude	Welding Electronics Commercial Cookery Greenkeeping
	Context dependence	Nursing Selling Genealogy First Aid
Donald (1986, 1983) Donald and Nagy (1985)	Discreteness of concepts	Physics Mathematics
	Familiarity of concepts	English Literature Art
	Abstractness of concepts	Sociology Philosophy
Mitroff (1982)	Systemic	Architecture Sociology
	Reductionist	Mathematics Economics
Biglan (1973a, 1973b)	Paradigmatic	Medicine Accounting
	Non-paradigmatic	History Architecture
	Traditional	Philosophy History
	Non-traditional	Sociology Accounting
	Related to life systems	Counselling Biology
Martin (1971)	Federated	Education Economics
	Cohesive	Genealogy Mathematics

From these dimensions and typical examples, the final list of knowledge areas to be included in the Classification Task was generated, and these are presented in Figure 4.09. These are the knowledge areas with which the trade instructors formed groups and described the bases for these groupings. Full details are presented in Appendix Two.

Figure 4.09

Knowledge Areas used in the Classification Task

Accounting	Greenkeeping
Architecture	History
Art	Interpersonal Communication
Automotive Painting	Mathematics
Biology	Medicine
Commercial Cookery	Nursing
Counselling	Philosophy
Economics	Physics
Electronics	Psychology
English	Selling
First Aid	Sociology
Genealogy	Typing
Geography	Welding

The outcomes of the Classification Task for Phase B are considered, first, on an informant-by-informant basis in Chapter Five; then, in Chapter Six, the outcomes are considered using the set of informants as the unit of analysis. For Phase C of the study, the results of administering the Classification Task to a large number of trade instructors are presented, analysed by Cluster Analysis on the basis of selected subsets of respondents. These are presented in Chapter Seven.

4.6.4 Postnate Interviews

Postnate Interviews are the third major contact with the informants in this phase of the study and provide the forum in which they can review and reflect upon the researcher's interpretations of the outcomes of the earlier data-gathering activities. That is, it is assumed that the validity of the outcomes of the Semantic Taxonomy Interviews and the Classification Task in Phase B are enhanced by the extent to which the

informants can recognise and confirm them as representing their views. The outcomes of this process are incorporated into Chapter Five.

The Postnate Interviews are structured by the issues and ideas that emerge from Semantic Taxonomy Interviews and the Classification Task - it is an issue-focused activity. In the first instance, the researcher and the informant interact over issues and ideas that emerge as the informant considers the material before him. Then, the researcher seeks clarification from the informant about issues and ideas generated by the researcher's interpretations of the information.

4.6.5 Cluster Analyses

The data generated by the Classification Task in Phase C of the research was subjected to statistical analysis by Cluster Analysis. This technique identifies the ways in which subsets of trade instructors tend to group the 'knowledge areas' from the Classification Task. That is, for each subset of trade instructors - for example, the subset containing all Plumbing trade instructors - the Cluster Analysis technique identifies the (typically) five or six relatively homogeneous clusters of knowledge areas that characterise the ways in which those trade instructors perceive the knowledge areas to be related. To illustrate this, Figure 4.10 presents an example of a set of such clusters. Details of the technique and the computerised output are presented in Appendix Four and in Section 7.5.

Figure 4.10

An example of a set of clusters generated by Cluster Analysis
(Taken from Appendix Four: Subset 4Q - Plumbing respondents.)

Automotive Painting	Typing	Nursing	Psychology	Philosophy
Welding	Selling	Biology	Counselling	History
Commercial Cookery	Accounting	Medicine	Interpersonal	Art
Electronics	Economics	Genealogy	Communication	Architecture
Greenkeeping	Mathematics	First Aid	Sociology	Geography
	Physics			
	English			

The Cluster Analysis technique was selected for several reasons⁷. First, a major purpose of this analysis is to search for the relatively homogeneous clusters of areas of knowledge that characterise a set of informants - it is not to identify those informants that are characterised by a predetermined cluster of areas of knowledge. Further, for this analysis, there are no known or given clusters that might be used as the basis for a classification 'rule' and the number of clusters that best represent the data is unknown. Whilst Cluster Analysis can achieve the desired outcomes under such conditions, many other techniques - such as Discriminant Analysis - are not viable (Norusis 1990; Russell 1990).

Second, in this research, informants provide responses to a single question or item rather than to a bank of questions. Other techniques that might be considered - such as Factor Analysis - seek to cluster the items to which informants have responded, and the clustering that is performed relates to the measurements that the informants provide - it determines which items are combined to generate a given factor and to simplify a large set of variables. Cluster Analysis, however, seeks to find similarities between informants that were measured instead of among the measures that were made (Dawson-Saunders and Trapp 1990; Meyer 1991; Russell 1990), and this was the objective of the analysis in the present study.

A third reason for selecting Cluster Analysis was that it provides as output the full set of steps in the hierarchical clustering solution. That is, the Cluster Analysis enables the researcher to make judgments about

⁷ The researcher gratefully acknowledges the advice and assistance provided by Dr K Russell, Statistical Adviser, Faculty of Informatics at the University of Wollongong, and Dr C Hales, Statistical Adviser, Faculty of Information Sciences and Engineering at the University of Canberra.

the formation of clusters and the level at which to accept cluster solutions as representing a given subset of informants without predetermining a seemingly arbitrary condition based upon what might be expected to emerge. For example, it can not be predicted that, say, a five cluster solution would represent an appropriate outcome for a given subset of informants until the data has been analysed. Judgements have to be made about the 'goodness of fit' of the five cluster solution relative to the four cluster and six cluster - or any other - solutions before it can be accepted (Russell 1990; Hales 1994). To this end, the Cluster Analysis provides output in two main forms. First, the Dendrogram provides a diagrammatic representation of the steps in a hierarchical clustering solution and, second, the Agglomeration Schedule summarises the results of the cluster analysis in numerical format. Section 7.5 and Appendix Four provides examples of these outputs, together with the process used by the researcher to convert the output into a form suitable for presentation in this thesis. The outcomes of the cluster analyses performed on the data generated in Phase C of the study are presented in Chapter Seven.

The details of the data management process required to undertake the statistical analyses of the data from Phase C are presented in Appendix Three.

4.7 The Next Step

This chapter presents the rationale for, and an explanation of the research design for the study as a whole. This involves identifying the major referents that help to shape the study, including those deriving from the goals and assumptions of the study, the systemisation of the

research, theories and literature that support the study, and the setting for the study. The chapter includes, also, consideration of the factors that influence the selection of research methods, and the development of those methods for use in this study.

As noted earlier, one of the purposes of this chapter is to provide a transition from the essentially theoretical considerations of the earlier chapters and the empirical work to follow. Whilst the first three chapters developed the theoretical position through systemisation of the existing research, theories and literature, the next three chapters progress through empirical investigation. Chapter Five focuses primarily on presenting the results of Phase B, and Chapter Six focuses on discussion and analysis of those results. The outcomes of Phase C of the study are presented in Chapter Seven.

Chapter Five

Grounded Investigation: Phase B Results

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Chapter Five

Grounded Investigation: Phase B Results

Why
Do we make so much of knowledge
Struggle so hard
To get some skill not worth the effort.

(Euripedes c425BC¹)

5.1 Introduction to the Chapter

The first three chapters of this thesis focus on theoretical development through the systemisation of existing theories, research and literature. Chapter Four focuses on the method of the research, and provides a transition between these essentially theoretical considerations and the empirically-based work of the next three chapters. Together, Chapters Five, Six and Seven report the empirical exploration of the constructs that underpin trade instructors views of knowledge and knowing.

Chapters Five and Six focus on Phase B - an intensive study with a small number of trade instructors, whilst Chapter Seven focuses on Phase C - communication with a large number of trade instructors. In the same sense that Chapter Four continues the development of the study whilst presenting the research design and methods, so these three chapters continue to unfold the argument of the study.

¹ Quoted in Collins (1991: 131)

For the sake of clarity of presentation, the outcomes of Phase B are presented across two complementary chapters. Chapter Five reports the results of the fieldwork on an informant-by-informant basis², and Chapter Six discusses these results, considering them as a whole and exploring the ways in which they shape the emerging theoretical position.

Throughout this chapter the results are presented not as raw and unrefined information, but as data that has been subjected to analysis and organisation. The immense amount of data, and the nature of the data generated in the field means that it is neither feasible nor appropriate to present it in full - in forms such as transcripts. Whilst considerable use is made of verbatim extracts from interviews and field notes, it is within the context of the need for the researcher - with intimate knowledge of the totality of data available, the theoretical concepts and considerations from the first three chapters, and the goals of the study - to select which data is to be reported and to present it as a coherent whole. As noted in Chapter Four, this process was guided by procedures chosen specifically for their ability to maintain appropriate rigour and theoretical control throughout this process.

As foreshadowed in Section 4.4, this chapter includes a portrayal of the context and climate in which the study is set. This provides not only insights into the way in which the setting influences the shape of the study but also helps in the interpretation of the data generated in both Phase B and Phase C of the study.

² To maintain confidentiality, the names of the informants have been changed.

5.2 The Structure of the Chapter

Chapter Five is a complementary chapter to Chapter Six and, together, they represent Phase B of the study.

After the two introductory sections - Section 5.1 and 5.2 - the chapter contains three main sections. As foreshadowed in Section 4.4, consideration is given to the context and the climate within which the study is located, and indicates the ways in which this helped to shape the study - Section 5.3.

Section 5.4 contains six subsections each of which presents the results of intensive investigation with one of the informants. In these subsections the outcomes of the data-generating Semantic Taxonomy Interviews and Classification Task are presented in the context of the validating processes of the Postnate Interviews.

The final section is Section 5.5 which provides the link to discussion of these results as a whole in Chapter Six.

5.3 Context and Climate

It was noted in Section 4.4 that a number of factors deriving from the context within which this present study is set hold influence over the shape of the study. For example, in the TAFE institutions on which this study focuses, research is seen as something of an imposition, and there is little, if any, history of research being carried out on, or within the institutions - particularly by 'outsiders'. Thus, in framing the study, the researcher had to remain mindful not only of the lack of research

infrastructure within the institutions but also of a lack of consciousness of a place for research in any aspect of the operation or development of the institutions. Beyond considerations of the research design, however, an understanding of the climate within which the researcher worked in exploring the views of trade instructors, and within which trade instructors work on a daily basis, adds context to the information provided by informants and fructifies interpretation. This is part of the process of 'pursuing the multiplicity of complex conceptual structures and shaping them into a systematic form of meaning' (Jax 1984: 11) that is a major concern of this study.

Perhaps the first point to note about the context is that the trade instructors work within TAFE institutions that are large organisations designed to produce educational services through the concerted efforts of their members. The public image of these institutions is portrayed by corporate goals characterised by terms such as 'relevant and cost effective programs', 'effective and supportive student learning environments', 'responsiveness to external environment', 'skilled management of resources', and 'education and training are vital ingredients for a successful economic future' (TAFECOM 1990; ACT Institute of TAFE 1990). The institutions are expected to provide services efficiently, within a budget and in accord with an organisational plan, and both institutions rely heavily on order, stability, continuity and predictability of behaviour.

The trade instructors of this study work within an authority structure that is distributed hierarchically. The authority they carry is both gained through and bounded by the position they occupy within the

organisation, and their status as qualified tradeworkers appears not to carry a great deal of significance beyond a prerequisite for employment in the first instance. Thus, their transition from practising tradeworkers to trade instructors appears to bring with it a significant shift in the level and status of the positions they hold within the respective settings, for it is reasonable to describe the position of the trade instructor as at the bottom of the authority hierarchy in TAFE. Further, the processes by which the institutions work are, essentially, bureaucratic³. It would seem reasonable to describe this as an impersonal approach. Whilst any number of employment settings are characterised by such an attitude, it stands in some contrast to the quasi-kin notions of work relationships noted by scholars such as Coy, Gamst, Haas and Goody in Section 3.6, and the status afforded to 'qualified tradeworkers' and as portrayed by the informants to this phase of the study - reported later in this chapter.

The combination of the distribution of authority with the lack of a culture of research was brought to bear most emphatically on the researcher's efforts to obtain approval to conduct the study in each of the institutions. To follow due process of approval for the research, the researcher was required to consult with, and obtain approval from forty-seven members across eleven campuses over four levels within the two institutions - as displayed in Figure 5.01.

³ This point is noted by Bradley and Jones: 'The work of the technical college is performed within a bureaucratic pattern which in every respect accords with the conditions for such a pattern laid down in the classic treatise on the subject by Max Weber' (Bradley and Jones 1973).

Figure 5.01

Distribution of consultations required to gain approval to conduct the study

Institutional Level	Illawarra Urban TAFE Network	ACT Institute of TAFE	Totals
Network Manager/ Director	1	1	2
College Principal/ Head of School	6	6	12
Head of Department	16	17	33
Totals	23	24	47

From this process it became evident that members at various levels of the hierarchy held differing concerns. For example, at the level of Network Manager and Director (including Associate Director), the dominant concerns appear to be reflected in questions such as Will the institution be exposed 'publicly' by the study? How much control over outcomes can the institution expect?

That is, the members at this level seemed to be concerned to ensure that the institutional image could not be affected adversely by either the research process or outcomes. Further, they were concerned to ensure that there were little or no non-staff resources implications for the institutions. Once these concerns were allayed their focus shifted to ensuring that the researcher carried the approval process down to the next level in the hierarchy, and to exploring ways in which the institution could benefit from the research effort. None of the members at this level sought to elicit from the researcher details such as the nature of the data-gathering instruments, the time-scale of the study, and the extent of demands to be placed on individual trade instructors participating in the study.

The concerns displayed by members at the level of College Principal/Head of School were slightly less strategic or global in nature. One dominant concern was the extent to which the study would place demands on them - personally - and a related concern was that no member be compelled to participate in the study. Each member at this level sought confirmation that the proposal to conduct the study within the institutions had been approved by the Network Manager/Director, and each directed the researcher to seek the approval of the Heads of Department under their control - the next level down in the hierarchy - before approaching any trade instructors. Once such concerns were allayed all members at this level agreed to the study being conducted within their units.

There appeared to be a significant change in the nature of the concerns displayed at the next two levels of the organisational hierarchy. For example, the initial reactions to the researcher's approach to the Heads of Department ranged from extreme caution to hostility. At the cautious end of the spectrum the researcher was asked to show why it was appropriate to conduct such research and why he was an appropriate person to conduct such a study; at the other end of the spectrum the researcher's first contact was met with:

I'm sick of you bastards wasting everyone's time ... You bloody academics think you know everything.

These reactions were not unexpected. In large part, they were surmounted by the researcher's ability to demonstrate the depth of his previous experience of TAFE - as a TAFE instructor and a TAFE administrator - and industry - as a 'worker'. The importance of this

credibility, once established, was illustrated by the extent to which these members made comments indicating that trust was being assumed on this basis - 'you're all right, we know you', and 'you've been there, you understand where we're coming from'. At levels above that of Head of Department the credibility of the researcher had been established primarily through his association with a reputable University and had not drawn any significant comment.

There were two other dominant concerns at this level. First, all were concerned to establish that the study had the potential to benefit both trade education and trade instructors in terms of 'tangible', 'realistic' outcomes. They were not prepared to allow the 'efforts of my blokes' to be consumed by 'airy fairy academics pursuing their useless research'. Thus the researcher was required to provide a strong rationale for the study in terms that were convincing not in an academic sense but as tangible, observable outcomes.

Second, Heads of Department sought to establish precisely what the study required of the participants - 'my blokes' - and they sought clarification of the study in greater detail than that required by any member in the higher levels of the institutions. For example, all Heads of Department examined the Classification Task instrument, sought clarification of how it was to be used and how it was to be interpreted; all Heads of Department sought timeline details, including dates by which the study would be completed and the results made available; all Heads of Department sought clarification of how the results of the study would be communicated and used. For this latter point, more than half of the Heads of Department wanted a communication process that went

beyond the preparation of a written report - they wanted the results to be exposed in public settings, using avenues such as seminars and conference presentations. The most prominent reason for this stand was that they believed the 'administrators' and the 'upper echelons' would not be able to ignore their argument if it was based on publicly declared findings. Here, members displayed not only an air of conflict and frustration directed towards higher levels within the institutions but also a vision that the study would establish that there was good reason for their frustration.

Unlike the members at higher levels, none of the members at the level of Head of Department attempted to formalise their approval for the study and, once credibility was established, most were willing to allow the researcher 'free reign' to approach the trade instructors within their Departments. Indeed, once credibility had been established most Heads of Department became extremely cooperative, making helpful suggestions and offering to facilitate the collection of the data.

At the bottom level of the hierarchy, that of trade instructor, the dominant concerns included that the researcher should establish that the study had the potential to benefit trade education in terms of 'tangible', 'realistic' outcomes - for example, will it inform the instructor training program and make it 'more relevant to tradies'? Further, trade instructors were concerned to receive assurances that the results would be made available to them. A common theme within their discourse was that often they are asked to undertake tasks but seldom are the recipients of information about the outcomes of their work. This is a source of irritation and heightens their resistance to tasks

emanating from beyond their own teaching department. Particular resentment was displayed towards members in the 'upper echelons' who generated tasks 'without giving a stuff about who's got to do the work'.

A point that generated considerable interest amongst a large number of the trade instructors was that the researcher - a former 'worker' - had become an 'academic' and, in a manner similar to that of the Heads of Department, trade instructors displayed concern for the researcher's credibility. Gaining agreement from trade instructors for their participation in the research, essentially, was a process of proving that the researcher was not an 'outsider'. Questions from the trade instructors to the researcher focused more frequently on this than on the research project itself. Trade instructors sought evidence of the researcher's knowledge of the trade, even to the level of seeking anecdotes of work experiences, posing 'insider' jokes, and identifying the companies for which the researcher had worked. The researcher's ability to 'talk their language' and to display genuine understanding of the contexts in which trade instructors are working were critical factors in gaining their support for the study. That support is evidenced by the good response rate for the Classification Task (an overall response rate of 62%), and the range of comments and notes of support that were incorporated with the responses. None of the trade instructors displayed any concern that the study had been approved by any member other than, perhaps, the Head of Department.

In the situation portrayed so far, there are several aspects that resonate with the theoretical platform generated across the first three chapters.

For example, the organisational setting of trade instructors appears to share the notion of 'separateness' attributed to the trade teachers in the school setting by both Mealyea and Gleeson (see Section 2.4). The concerns expressed by the Heads of Department can be interpreted as 'gatekeeping' and a concern for the well-being of the trade instructors for whom they accept responsibility. The concerns of the trade instructors can be interpreted as protecting and maintaining control over the substance of their work. They supported the 'gatekeeping' behaviour exhibited by Heads of Department, expressed mistrust of that which is academic and abstract, and were prepared to accept only that which could be explained and justified in terms of tangible and practical outcomes. There were symptoms of resentment, bordering on disdain, for those whose authority appeared to impinge on the autonomy of trade instructors. Further, the researcher and the project needed to have the credibility that arises from empathy with their situation.

5.4 Presentation of Phase B Results

It was within the climate described in Section 5.3 that the data from Phase B (and Phase C) of the study was eked out. The results for Phase B are presented in this chapter (and in Chapter Seven for Phase C). That is, the remainder of this chapter presents the results of intensive investigation with six trade instructors. These are organised on an informant-by-informant basis and, for each informant, the results are presented in four related parts:

- One part is information about the informant and the nature of the interviews. The purpose of this is to provide context and to aid in the interpretation of the detailed results that follow;

- A second part is the essence of the informant's views, represented in a Domain Structure Diagram as described in Section 4.6.2. That is, using verbatim extracts from the interviews, the researcher portrays the informant's views, presenting the categories discernible within the discourse, the major lines of process that link them, and the internal structure of the informant's views of the targeted domain;
- A third part is the major typology evident within the informant's views. This is presented in tabular form, supported by typical descriptors of the main elements of the typology and typical examples distilled from the informant's discourse;
- A fourth part is the set of rules or rule-like elements that the informant appears to take as true and valid - perhaps, axiomatic - and that are used by the informant as justification for action, particularly in their approach to teaching. Again, these are presented in tabular form using verbatim extracts from the interviews.

Whilst the results from each informant are presented in parts, an attempt is made to weave these parts into a coherent whole - the 'story' from each informant. It should be noted, also, that in order to preserve confidentiality, the names of the informants have been changed.

Details of the nature and use of the several data-capture techniques - Semantic Taxonomy Interviews, Classification Task and Postnate Interview - are presented in Chapter Four and in the Appendices.

5.4.1 Informant AP001 - Will

Like his late father before him, Will completed a five-year, automotive painting apprenticeship. He began with a small firm in Perth and, later, moved to a large paint manufacturing company. He undertook a Mechanical Engineering Certificate by part-time study. After 12 years as a qualified tradeworker, Will became a TAFE trade instructor in the New South Wales Department of TAFE and, during his early years, completed the compulsory part of the Diploma of Teaching (Technical). He has been a trade instructor for 14 years. Three months ago, Will - known as Wild Billy to his colleagues - moved away from teaching to take up a position in the Careers Unit.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

I met with Will in his office. He was enthusiastic about participating in the process. This was something of a reversal of the cautiousness with which I had been received when establishing initial contact. I felt that, at least in part, this had been achieved through my ability to display empathy with the trades and trade instructors. Will asked a few clarifying questions about the overall form of the study, and reflected on how this might benefit trade instructors generally⁴. After each of the interviews we spent some time talking about trade education and its future. The Domain Structure Diagram of Figure 5.02 is my representation of the essential features of Will's views about knowledge and knowing, as expressed by him in the interviews.

⁴ The details of the interviews - including the interview protocol and my opening statement - are given in Appendix One and in Section 4.6.2.

Figure 5.02

Domain Structure: Informant AP001

I think people know about things differently. There's differences like we're on about practical knowledge but I know people who only approach things in a theoretical way. They'd be the two basic kinds of knowledge.

Can you describe these differences?

You gain knowledge through direct experience. It's experienced-based knowledge. This would be the first and biggest by far - it's my *modus operandi*.

There's another bucket of knowledge and that's what you get from reading, thinking and writing. You learn it through communication processes.

How is experience important here?

Knowledge gained through high impact experiences.

Knowledge gained directly but through experience in general.

Experience shapes your responses and how you think about things, but at the time you don't really notice them but you accumulate them.

Can you give an example?

You've got a blister - you know what to do. It's an automatic response and you hardly even consider it. I know why that blister's there and I know what I've got to do with it. It's as simple and quick as that.

What if you hadn't come across a blister before?

That's like the high impact experience. You might look up a book or a manual to see if it tells you about it but you can usually work things out because you've been around. The manuals are no good unless you know something anyway. You have to be able to react intuitively.

You do something wrong and you've got to go back and do it again. You do something well and you get positive strokes from it.

Is that what you meant by knowledge gained from reading, thinking and writing?

No, this is different. That's sort of general knowledge. I'm talking about knowledge you get because you know your trade. If you go to a book it's because you have to know about it and the book is the only way to get it. Even then, I'd get on the blower to the rep if I need to know something like that.

If it hits you hard, you learn. And then it becomes part of what you know - part of your experience.

Most of the time, if you're stuck, your mates will help out. We help each other, you know.

Can you give an example?

By reading books or going to courses. I suppose a lot of what you do at school is like that.

What kind of books?

Manuals, technical books, specifications from the manufacturer. You know, the sort of stuff you have in the workshop.

Would you read a Chemistry book?

No. It's not the sort of thing you read. But you might if it's got a formula you need. If you want to know a specific answer like the kind of solvent being used in the workshop so you know what's going down the drain.

What about literature or history?

Only if you're into theoretical knowledge. That's the sort of stuff universities are into.

Figure 5.02 (continued)
 Domain Structure: Informant AP001

What makes trade knowledge different from general knowledge?
 It's narrow, technical. You know, it focuses on the environment you're working in. It's dealing with simple technical issues that are easily solved.

Can you give an example?
 Well, it comes from the materials you use, the practical processes you are using.

Does that mean there are different kinds of trade knowledge?
 Well yes - no. The trades are a lot alike but they're different. Panel Beating and Auto Paining look similar because they happen in the same place. The practical processes are closer to Painting and Decorating. It's got fairly similar skills whereas Panel Beating's got more complex tasks. If you've got major collision damage there's a lot to do, calculations and safety and so on. It depends what you compare it with. Like, the trades are all similar if you compare them with Chemistry or History but they're different between themselves.

Where does general knowledge come from?
 That's the thinking and reading bucket I mentioned earlier. General knowledge is broader. It's got complex and more demanding issues - not technical issues that are easily solved. There's no clear answer about these things and so they become really complex.

Can you give some examples?
 School subjects are general knowledge because they don't get you anywhere in terms of being able to do something. You can get to Uni if you're good at some subjects. All those subjects are really the same kind of thing. There's no real difference when you get down to it.

Is Physics the same as Woodwork?
 Well, yes. In school they are. They're both just general knowledge. The way they do woodwork it's the same as Physics. It doesn't give you anything you could use.

If I didn't know anything about Auto Painting, how would you describe the knowledge involved?

Some things are a bit complex because they're more theoretical. Understanding colour and colour matching. It's not something that's straightforward with these new paints. It's got theory in it now.

Some things are simple, structured, step-by-step processes like preparing a surface, and you've got to have this sound basic knowledge.

What is sound basic knowledge?
 Largely, that it's tried and tested. It's well established and it gives good results. It's demonstrated in terms of things you can do. Like if a kid's got to do a mudguard it doesn't have to be articulated or theorised. It's got to really produce a good result. That's why we've got the competency stuff. The bottom line is you've got to be able to do it. We've got a PB kid that's failed his half-yearly. But he's good at prac. So they're letting him re-sit - they'll get a remedial teacher in to see if he can read the questions. Trade teachers are often willing to compromise the theory if the kid can do it in the workshop. That's what it's all about.

Will's immediate response to my opening statement was to form categories, and a major dichotomy was readily discernible within his discourse. His primary emphasis was upon a contrast between 'practical knowledge' - practical ways of knowing - and those he described as theoretical. Practical knowledge was of a distinctly empirical kind, being concerned mainly with technological usefulness and common-sense notions. He placed significantly greater value on practical knowledge over theoretical knowledge, and saw 'direct experience' as the primary route to this valued knowledge.

Whilst showing a clear preference for practical knowledge, Will recognised theoretical knowledge as a valid form of knowledge - but it was not his own. He saw theoretical knowledge as knowledge that gave no tangible outcomes, that was complex and general, and that derived from processes such as reading, thinking, writing, and communicating - 'communicating' was portrayed in terms of analysing abstract concepts through oral communication. My representation of this major typology - but using Will's words and Will's contrasts - is presented in Figure 5.03.

Also emerging from the interviews was Will's propensity to resolve problems not by resort to any form of institutionalised knowledge - the term is used here in the sense described by Bishop in Section 2.6 - but by trial-and-error and by borrowing from the experience of others within the trade. This appeared to be related to a perception that the sources of valid knowledge are the materials and processes of the trade. Further, because experiences aggregate in some way that allows the tradeworker

Figure 5.03
Major Typology: Informant AP001

Practical Knowledge	Theoretical Knowledge
<i>Typical Descriptors</i>	<i>Typical Descriptors</i>
Gained through direct experience	Gained through processes of reading, thinking and writing
Experienced-based knowledge	Reading, thinking, writing knowledge
High impact experiences	Theory-generated knowledge
General experiences	
Sound basic knowledge	Complex general knowledge
Narrow	Broad
Technical	
Simple knowledge	
Step-by-step processes	
Tried and tested	
Practical	Theory
<i>Typical Examples</i>	<i>Typical Examples</i>
The skilled trades	School subjects
Panel Beating	Physics
Automotive Painting	Chemistry
Painting and Decorating	Woodwork

to develop an understanding of the whole, this approach is characteristic of a 'good tradeworker'.

Within Will's discourse a number of rule-like elements were discernible. Initially, I was surprised by the axiomatic nature of these elements and the extent to which Will would use such statements as the basis for his argument. But Will was my first informant in this series. The tendency soon became apparent in all informants, and the distillation of rule-like elements became an important outcome of the interviews. These rule-like elements - again, using Will's language - are presented in Figure 5.04.

Figure 5.04
Rule-Like Elements: Informant AP001

<ul style="list-style-type: none"> • Experience shapes your responses and how you think. • You can work things out if you've been around. • Trade knowledge comes from the materials you use, the practical processes you are using. • Simple knowledge is structured, step-by-step processes; complex knowledge ... has got theory behind it. • Sound basic knowledge is demonstrated in terms of practical things you can do.

Classification Task

(See Appendix Two for details of the protocol)

Although Will responded favourably to the Semantic Taxonomy Interviews, he found the Classification Task much more to his liking. He reported no difficulty in undertaking the task, and suggested that 'it made it easier to convey my ideas than the Interview'. The details of the Classification Task - including the process for administering the instrument - are presented in Appendix Two and Section 4.6.3.

Will constructed four main groups, but the practical-theoretical distinction represented his highest-order classification. He included Automotive Painting, Commercial Cookery, First Aid, Greenkeeping, Nursing, Typing and Welding on the practical side of the classification, and all the other areas were allotted to the theoretical side. The areas in the practical group were described as 'practical', 'fairly simple' and lacking 'complexity'. In contrast the areas in the theoretical groups were characterised as 'complex', 'abstract', 'intangible' and lacking any 'useful outcomes'.

Figure 5.05 presents Will's constructed categories, supported by verbatim extracts from the associated interview.

A criterion by which Will distinguished between the several groups was the 'level of intellectual skills involved'. He characterised the areas at the higher end of the spectrum as 'on a higher intellectual plane' and 'having greater complexity' than areas at the lower end of this spectrum.

Figure 5.05
Classification Task Results: Informant AP001

I've responded to the headings the way I see them and I broke them into four main groups. As you go from left to right there's an increase in the level of intellectual skills involved. The knowledge on the right is at a higher intellectual plane ... it's got greater complexity.

If you wanted to go right back you could put these [Group 2] on one side as the theoretical knowledge and this on [Group 1] on the other side. Actually that's where I came from to get these categories.

Group 1	Group 2		
	Group 2A	Group 2B	Group 2C
Automotive Painting Commercial Cookery First Aid Greenkeeping Nursing Typing Welding	Accounting Architecture Counselling Electronics Medicine Selling	Biology Economics Genealogy Interpersonal Communication Philosophy Physics Psychology Sociology	Art English Geography History Mathematics
Practical knowledge is fairly simple but some bits of it can be high level - like there's Metallurgy and that sort of stuff in some areas.	This is theoretical knowledge but it's focused. It's different to the theoretical knowledge they do in schools. This is about as practical as universities get.	In these areas the knowledge is more difficult because it's at an abstract, conceptual level all the time.	This is theoretical but it's fairly general sort of knowledge. It's pre-life knowledge. Schools use it to shape people.
You could sub-categorise these into similar processes. You'd need to put in the other areas to make it fill out a bit and form big enough groups.	I've interpreted Selling as Marketing as in Business Studies, you know. Otherwise it doesn't count for much really.	This is abstract, not observable. It comes from a lot of thinking and discussion. Some of it ends up in some sort of formula that tries to pull it all together somehow. I don't know.	
They would be on how similar the practical processes are. Some things look alike but that's for the wrong reason. You're looking at the wrong basis for grouping them. Like First Aid and Nursing are alike because they're about healing the body and blood and stuff. But Carpentry and Joinery and Welding aren't alike just because they're both about construction. The processes and materials are completely different.	Electronics is at the complex end. It's got the structured knowledge from the practical procedures but it's also got a good bit of it at the conceptual level - the brain level rather than the 'hands on' level. I was thinking of Electronics in the University sense not like in [the trade] Radio and TV.		
	I can't get excited about this stuff. It's complex and there's nothing tangible in most of it. Fair enough if others want to get into it. You've really got to ask what's the use of a lot of it. I mean, what can you do with Physics if it's not hooked into something useful? By itself what is it? I can accept that theory is good when there's a good reason for having it - like it helps you to find out what to neutralise a solvent with or something. And that's the problem with the way the schools do things and universities. You come out not being able to do a simple job. You can't answer a simple bloody question.		

When I probed for an expansion of this Will returned to descriptors such as 'abstract', 'having more theory' and 'lacking tangible outcomes'. Clearly, he placed greater value on the kind of knowledge represented by

the areas listed in the practical group in the scheme he had created, and 'usefulness' appeared to be an important criterion for distinguishing valued knowledge. In this sense 'usefulness' was enmeshed with tangible, practical and common-sense notions.

Will emphasised the centrality of the 'practical processes and materials' in the grouping of - or distinguishing between - areas. He argued that similarities between areas in the practical group should be drawn in accord with an appropriate criterion, and emotively denounced what he saw as inappropriate associations between areas being 'forced on us by the administrators'. To illustrate his point Will described commonality between Nursing and First Aid based on his perceptions of the materials and procedures involved, and used terms such as 'healing', 'looking after', 'cleaning wounds', 'blood', 'bandaging'. He saw First Aid as a subset of Nursing. As contrast he drew a clear distinction between Carpentry and Joinery and Welding. Even though there was a perceived commonality - the notion of constructing things - the practical processes and the materials were significantly different. Welding was described as 'manipulating hot molten metal' and 'harsh', whilst Carpentry and Joinery was described as 'craft-like', 'precise' and 'soft'. Will highlighted the differing materials involved and the differing techniques required to perform the trade procedures in the two areas, and referred to the distinction he had drawn between Panel Beating and Automotive Painting in the earlier interviews. He reiterated the point that the distinctions and similarities need to be made on the basis of the nature of the procedures being used in each of the areas.

Postnate Interview

My final formal contact with Will was in the Postnate Interview in which I sought his reactions to the ways in which I had represented his views in Figures 5.02 to 5.05.

I don't see any major problems with it. It's what I said in a nutshell. Seeing it in that diagram makes it pretty clear. It seems funny to see your words come back at you. Yeah, that's good. Just as well you drew it. I'd never read it if you wrote it out.

I suggested to Will that one of the dangers was that whilst he may recognise what's written, I may have missed something or altered his intended meanings.

No, not really. I can recognise I said that. There's nothing missing that I can think of. It's pretty straight ... I wish some of the goons making decisions around here would ask these questions. You wouldn't like to give it to [The Director] to see what he's got to say about it? ... We're tradies not bookies ... If you want to emphasise something, the points I made about the differences between theory and practical knowledge are the important ones from my point of view.

Will clearly accepted without alteration my representations of his views of knowledge. The tone of his reactions suggested that he was pleased to have someone listen to his point of view, and that the processes in which he was participating for this study were assisting him to clarify his ideas. In the earlier interviews he had given indications that, although he felt strongly about particular issues, he had not developed coherence or strength in his argument about what he termed 'practical knowledge'. The Classification Task and, to a lesser extent, the Semantic

Taxonomy Interviews had been valuable in assisting him to clarify and articulate his position.

The Classification Task was much better because you can work on why you put things here or there. Like I put all those areas up that end [Figure 5.04 - Group 2C] because I knew they were alike. When you pressed me I really got a handle on what it was about them - they're all abstract and they're [Figure 5.04 - Group 1] all based on practical processes and materials. So you have to learn them differently ... They're [Figure 5.04 - Group 2C] all theory, that's why they're abstract. There's nothing based on a practical outcome that you can see.

The theory-practical dichotomy dominated Will's discourse in each of the interviews, and frequently he used the same associated descriptors - 'abstract' and 'complex' with theoretical knowledge, and 'simple', 'trial-and-error', and 'procedures and materials' with practical knowledge. In respect of the notion of 'abstract', Will suggested:

It's all about intellectual skills. You've got to think about it in your mind and the only way anyone knows about it is by communicating with someone else or getting it from a book that the bloke has written. It's like bloody Physics! All up here [the head]. But practical knowledge is much more simple and you depend on your experience in the job and trial-and-error.

Will used Physics to represent his theoretical knowledge category, and he had something of an image of the nature of Physics:

Theories. A lot of abstract thinking. A lot of imaginary things - a bit the way I'd describe Philosophy and those [Figure 5.04 - Group 2C]. Maybe more solid than these [Philosophy, Psychology and Sociology] ... Inventing using your mind. They're all up this end [Figure 5.04- Group 2] of the spectrum.

I asked Will whether his Group 1 had any of the characteristics of the other groups, and whether there was anything 'abstract' or 'theoretical' about the areas in Group 1 of Figure 5.04:

Well I suppose there is to a certain extent. Remember I was talking about Radio & TV, it had more theory-type knowledge. But theoretical knowledge like Physics is nothing but abstract - complex ... In trade knowledge the theory is just part of what you're doing and you don't make a big deal out of it and make them think in abstract ways. You don't sit down and learn it!

Part of Will's distinction between practical knowledge and theoretical knowledge concerned the ways in which knowledge is acquired. He perceives theoretical knowledge as the sort of knowledge that needs to be learnt by communicating with others on a formal basis, by reading the works of others, and by applying abstract reasoning processes. On the other hand, he portrays practical knowledge as the sort of knowledge that can be learnt only by the performance of the procedures, the accumulation of such experiences, and gradual familiarisation with materials and processes through application within the context of the trade. Any abstract reasoning required is so strongly enmeshed in the procedure that it is indistinguishable from the procedure.

That's probably the difference between the abstract areas and the practical areas. Physics is abstract and in the mind and you study it. Experience is the way you learn practical knowledge, and you pick up theory as you go along. I never did any study of theory 'til I had to teach Trade Theory. But I was a pretty fair tradesman. Does that make sense?

Yeah, I suppose trial-and-error's what gives you the experience. You learn through trial-and-error and that's how you build up your experience. When you go to something new you use what you have

built up in your experience and have a go at it. You might still need to fiddle around with it to finally do it but your experience stands you in good stead.

I asked Will about the role of the classroom in learning practical knowledge. If experience and trial-and error are important ways of learning practical knowledge, how does that translate across to what trade instructors do in their classrooms?

It depends on how you interpret 'classrooms'. If you mean the Theory Room or the Workshop. You have to teach in the Theory Room but in the Workshop you can set it up so the kids get right at it - the knowledge. You create the environment where they can directly experience the practical procedures and the materials and you just make sure that you stay out of the way but so you can help if they get into strife. You put your bit in as they come across things ... If a kid's having trouble with a panel because of silicon you can talk to him about that on the spot and he can work out what caused it and have a go at fixing it. He'll learn but he might not be able to give a lecture about it. You don't have to be the 'teacher' and tell him everything.

And what about the Theory Room?

You can't. You've got a heap of kids sitting there waiting for you to tell them something. I suppose that's not quite true - they'd rather not be there in the first place. You know what I mean. They left school because they didn't cope with that sort of knowledge so what's the sense in inventing more of it at 'tech'. I mean what we teach in theory we don't really understand well ourselves. We have to bone up on it. But we can help them learn heaps of practical knowledge because we've done it ourselves and we can model it.

Will's responses in this interview emphasised the centrality of the 'theoretical knowledge - practical knowledge' dichotomy in his views

about knowledge, and of the importance of the process of acquiring that knowledge. In doing so the bases upon which Will distinguished between categories of knowledge emerged. Further, it became quite apparent that participation in the research effort was assisting him to clarify and articulate his views about knowledge. Responding to my questions had sensitised him to links between such views and curriculum and instructional decision-making.

5.4.2 Informant AP002 - Stew

Stew completed his five year apprenticeship with a small firm in a New South Wales country town. He spent the next 15 years with several small firms, rising to the level of workshop foreman. He was proud of the fact that, over that time, two of his apprentices had received state-wide, apprentice-of-the-year awards. He began teaching in TAFE on a part-time basis, and then took up a full-time position as an Automotive Painting trade instructor. In the early part of his 10 years as an instructor Stew, 'The Greyhound', completed the Diploma of Teaching (Technical). One month ago, he moved from his instructional position to become a Special Projects Officer, and his work now involves establishing links between his institution and industry and schools.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

I arranged to meet Stew in his new office, and the first few minutes were spent in good-humoured banter about the intelligence of electricians *vis a vis* spray painters:

You bloody electricians wouldn't have seen the inside of a flash office like this. You only crawl 'round under houses.

After the first formal, audio-taped interview, we spent a further 90 minutes talking about TAFE, trade education and the effects of increasing retention rates of students to Year 12. In this post-interview discussion, Stew admitted that he had entered the interviews with a degree of initial nervousness and that this was reflected in the early good-natured raillery - I recalled that Mealyea (1992) had been struck by the use of humour as a coping mechanism amongst trade teachers and is pursuing this in his current research.

Before the interviews, Stew sought clarification of the intentions of the study, particularly in terms of the benefits it may have for trade education. He questioned me until he was able to form a satisfactory picture of the full study. Initially, Stew had some difficulty understanding the question I was posing. His early statements were tentative and short and were punctuated with 'is that what you mean' or 'is that what you're after?'. However, we talked through his uncertainty until he found an appropriate starting point, and the Domain Structure Diagram of Figure 5.06 is my representation of Stew's views.

Stew perceived knowledge as either high level, characterised by 'abstract conceptualisation' and 'complexity', or practical and low level, characterised by 'natural' ways of knowing and knowledge derived from materials and procedures. He distinguished between useful knowledge and knowledge that did not contribute directly to observable outcomes. Knowledge was useful to the extent that it could serve vocational

Figure 5.06
Domain Structure: Informant AP002

I think I must live in a world of my own. I don't know anything much about other people and what they know or how they know it. I know about my trade and other trades.

Obviously the content differs. But I think I have a general perception that there are levels of knowledge.

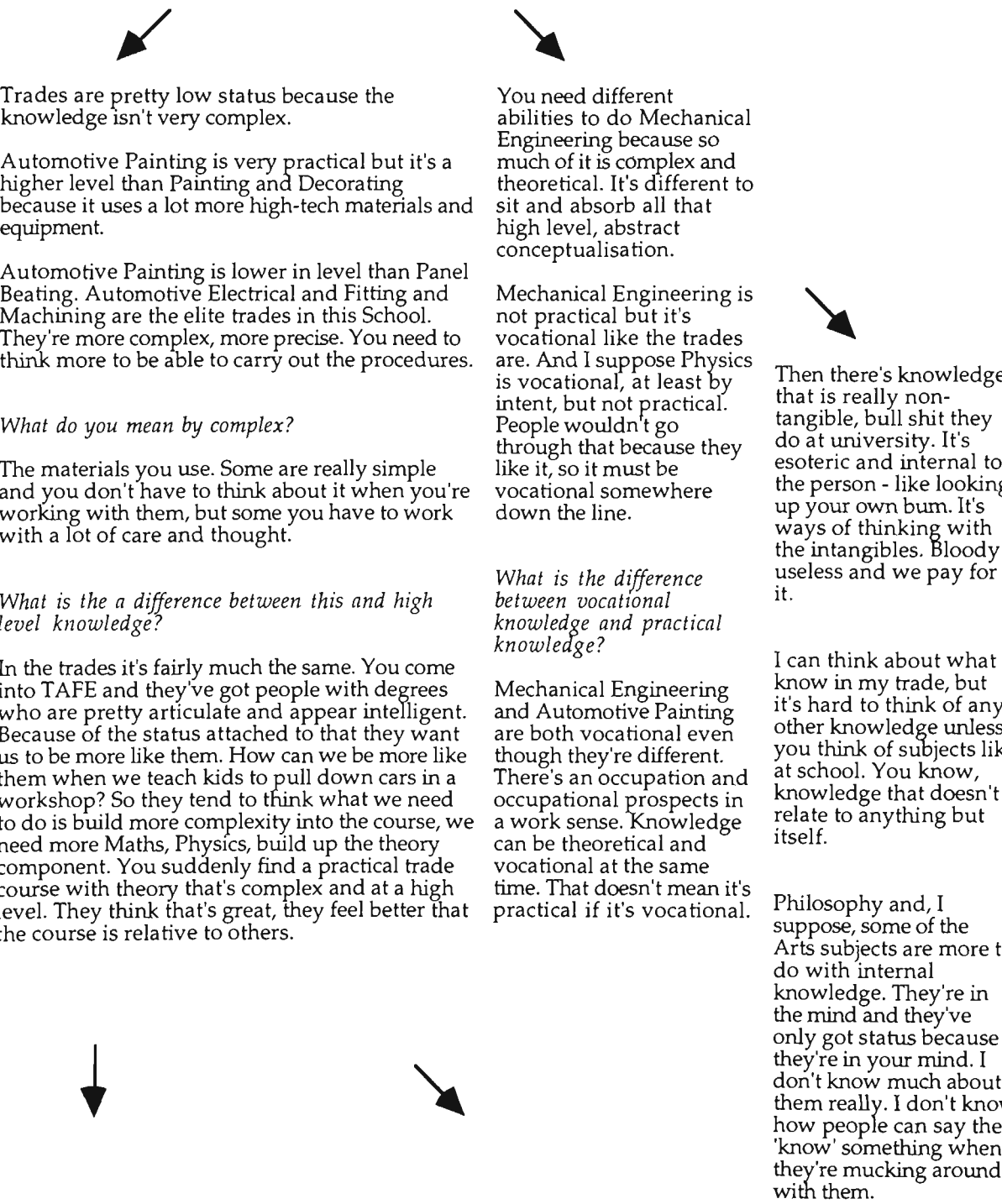


Figure 5.06 (continued)

Domain Structure: Informant AP002

To a tradie theory is unknown, a threatening environment - it's invented and perpetuated for teaching purposes.

I'm always prepared to compromise the theory subjects because all the essential theory is integrated into the practical procedures anyway.

The thought processes in practical processes are not obvious. They become rote to the point where you don't think about it you just do it. To a good tradesman it's intuitive.

What if you come across something you haven't encountered before?

Intuitively I know what to do and where to go with things. You use the same process you use on the job. Go through your experiences, test it, try it and see if it works. Once you've got the experience in the area you can get through most things that are likely to occur.

What if that didn't work?

I'd just keep trying 'til I worked it out or I decided, stuff it, it's not worth the effort. Maybe I'd ask one of my mates.

Would you go to a book?

What do you find in books? You can't read about what we need to know. You might go to the manual but that's not a book like a theory book. I read well, like Tolkein and so on.

Some people place a lot of importance on having all the right words and terminology. I don't give a stuff about the words, I worry about the thing.



Do different practical procedures use different kinds of theory?

Trades don't really have theory as such. Not like Maths and Science and that. The level of a trade's got to do with the materials you use and how you use them and where you use them. I think I'm mixing up how I describe these. You've got levels of trades and that's different from the difference between practical trade knowledge and theoretical knowledge like in Philosophy and Science and Arts and Mech Eng. You've got to separate them and think about them separately.

purposes. Both theoretical and practical knowledge could serve vocational purposes and, thus, could be useful. Knowledge that was not useful knowledge was seen as theoretical, 'internal to the person', philosophical in nature and based on esoteric, perhaps idiosyncratic ways of knowing. Stew showed a clear preference for knowledge that was practical and vocational, and often projected it in a contrast with theoretical knowledge. He recognised other types of knowledge, even

though he considered them not to be his own. My representation of Stew's typology is presented in Figure 5.07.

Figure 5.07
Major Typology: Informant AP002

Practical Knowledge		High-Level Knowledge	
Typical Descriptors		Typical Descriptors	
Low level knowledge of manual skills Low level, second-class knowledge Practical Trade processes Ways of working with materials Intuitive and routine		High level, elite knowledge Theoretical and abstract concepts Theoretical and philosophic Sit and absorb, internal Stand alone intangible theory Abstract, conceptual and esoteric Words and terminology Non-manual and unknown Extreme on the theory scale Complex and idiosyncratic Unknown and threatening	
Competencies Tried and tested Prior experiences Natural			
Useful knowledge			
Vocational Occupational outcomes			
Typical Examples	Typical Examples	Typical Examples	
The skilled trades Painting and Decorating Automotive Electrical Fitting and Machining Motor Maintenance	Mechanical Engineering The skilled trades Physics	Philosophy Psychology The Arts	

Stew's notion of 'useful' knowledge was supported by his frequent reference to 'the thing' as a point of reference. I discerned that he was using this in two ways. In one sense, he was saying that the materials and the procedures are the source of what counts as valid knowledge in the trades - knowledge is acquired through engagement with them. In another sense, he was saying that the products of the trades present evidence of being knowledgeable, and a source of satisfaction and pride in the work. In some part, this is illustrated by the rules or rule-like elements that are presented - using Stew's language - in Figure 5.08.

Figure 5.08
Rule-Like Elements: Informant AP002

-
- Past experience determines what you do and the way you do things.
 - Intuitively you [tradeworker] know what to do and where to go with things.
 - I don't worry about the words I worry about the things.
 - You must assess the kid on the competencies and skills appropriate to the trade, not on what he can write down.
 - You know it if you can do it and show it.
 - Test it, try it, see if it works ... just keep trying 'til it works.
-

Classification Task

(See Appendix Two for details of the protocol)

Stew reported that he had little difficulty in undertaking the Classification Task and, referring back to the Semantic Taxonomy Interviews, suggested that 'creating categories was easier than answering your bloody questions'. Stew's categories, supported by verbatim extracts from the attendant interview, are displayed in Figure 5.09.

Stew's primary division was between the areas of knowledge that were primarily 'practical' (Group 1) and those that were primarily 'theoretical' (Group 2). Practical knowledge was characterised as being 'logical', having 'tangible outcomes', 'deriving from skills' and 'being able to do something useful'. In contrast, 'theoretical knowledge' was generally 'intangible' and 'academic'.

Within the category of theoretical knowledge, Stew established three sub-categories. He described the first category (Group 2A) as containing areas of knowledge that 'could be of some value as an underpinning' for vocational purposes, but he found it difficult to describe how it is

Figure 5.09

Classification Task Results: Informant AP002

There's a major split between this first column and the rest. That was easy for me. I had no trouble saying these [Group 1] are practical. I can see what they are, what they produce. It's manual skills stuff. Over here [Groups 2A, 2B] you've got more academic sort of things.

Group 1	Group 2		
	Group 2A	Group 2B	Group 2C
Automotive Mechanics Fitting and Machining Plumbing	Biology English Geography Mathematics Physics	Counselling Interpersonal Communication Philosophy Sociology	Accounting Economics
Automotive Painting Commercial Cookery Electronics Greenkeeping Welding	Architecture Medicine	Art Genealogy History	Selling
First Aid Nursing Typing			

What I've got I suppose is three columns. I've got what I might regard as more academic-type strand [Group 2A]. What I've got over here is what I would regard as the practical skills, tangible things, things that help people to do something [Group 1]. And over here I've got the 'Mickey Mouse' stuff - things that are not tangible inasmuch as you can't say there is any real knowledge there that takes you anywhere [Group 2B].

There's something basically wrong with this sort of area. I'm not sure what it is at this stage. It's the sort of thing that's not fair dinkum. They don't produce anything.

<p>This column is involved with knowledge that allows you to produce something tangible.</p> <p>I took out Medicine and Architecture because they might produce something but then again they might not. It would be more easy to see them as non-practical areas.</p> <p>I thought that Electronics might come out of here. I was thinking that Electronics was more complex. But I left it because it's more similar to here than to those other areas.</p>	<p>It's academic knowledge. Sometimes it's used to underpin other knowledge for future education - although I've never needed it and I've got on OK. Medicine and Architecture are a bit different because they provide some basis for someone going into work.</p> <p>It's important to get some grounding in these I suppose. That's what schools are on about. I didn't do any good at them because I got behind and you can't self-learn Maths or whatever. And there's nothing to fix it to. No real practical outcomes so you could work it out for yourself, But you might think about them as a pathway to work.</p>	<p>This is the extreme end of the academic division. I would see those areas as not involved with the real world. That's not to say the people in those areas aren't worthwhile people.</p> <p>I suppose an artist or a historian has a measurable outcome to some degree. There's a lot of it that's bull shit as far as I'm concerned. They do something but the end product is not fair dinkum.</p> <p>Philosophy - so it's a lot of profound terms about intangible things. Big deal. Counselling - people become better but it might be because of something else - who knows? They're successful at making people cry.</p>	<p>I might remove that altogether. It's not really knowledge in the same way as the rest. It's shonky.</p>
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valuable, other than 'that's what schools are on about'. He had a tendency to diminish their importance on the grounds that he had 'got on pretty well' without them. A characteristic of these areas of knowledge - and of theoretical knowledge in general - that differentiated

them from practical knowledge was their 'academic' nature, and this made them difficult to 'self-learn'. Stew suggested that theoretical knowledge might be 'more accessible to blokes like me if it was hooked into something'. Because theoretical knowledge in the trades is interwoven with observable, tangible processes it is amenable to learning processes based on trial-and-error. He called into question the efficacy of organising knowledge by 'the school subjects method' and posed the rhetorical question:

Have they ever tried to make up different subjects ... taking useful bits of each one and using them to learn to make something?

A second major factor by which Stew differentiated theoretical areas of knowledge from practical knowledge was the status of the knowledge. 'Academic knowledge' was seen as of higher status than practical knowledge, in part because of the higher complexity of the knowledge and in part by the image portrayed by the 'people who go in for it'. As example, Stew had considered moving Electronics across to a theoretical knowledge category (Group 2A). However, he decided that the complexity of its theory component was outweighed by the tangible, practical and useful outcomes of the area, and that the status of Electronics was more in keeping with practical knowledge than with theoretical knowledge.

The second sub-category of 'theoretical knowledge' (Group 2B) represented the 'extreme end of the academic division'. The areas of knowledge contained in this group were also theoretical knowledge but were characterised as 'extremely academic' and 'highly intangible'. Whilst acknowledging that these areas of theoretical knowledge are

legitimate knowledge, the tone of Stew's discourse devalued them against practical knowledge and, even, against the theoretical areas listed in Group 2A. The basis of the distinction between Groups 2A and 2B was the perceived potential of the areas as underpinning for the development of 'useful knowledge'. Thus 'the school subjects' were of greater potential value than those of Group 2B.

Stew was cautious about characterising the third category of theoretical knowledge (Group 2C) as legitimate knowledge, and said that he had considered not including them at all. The tone of his descriptions of the areas contained in this sub-category was quite pejorative. When probed for a basis upon which to make these claims Stew focused on the uses made of the knowledge contained by the areas. The areas clearly were theoretical knowledge - in the sense portrayed above - but the association of this knowledge with 'shonky practices' and 'people of questionable standing' reduced the 'status' and the 'validity' of these areas of knowledge.

Postnate Interview

Stew reacted quite positively and supportively to my representations of his views in Figures 5.06 - 5.09. Although he commented on certain statements, it was primarily to elaborate rather than to correct or amend.

Pretty accurate I suppose. You started me thinking, especially with the cards. If I did it again I think I'd put Accounting and Economics with Architecture and Medicine and make a separate group ... I suppose I do see that main division [Practical - Theoretical] pretty clearly. I'd be happy for you to put that down to me - without the bad swear-words I hope.

Stew emphasised the importance of the observable as the source of valid knowledge and of 'materials and procedures of the trade' as a focal point for curriculum and instruction purposes. Also, his discourse suggested that trial-and-error was the mode of acquiring such valid knowledge, a process in which the learner interacts directly with the knowledge rather than through an agent such as a teacher or the written word. Here, the trade procedures provides a 'natural' way of organising knowledge.

If you're talking about knowledge and knowing things then I'd reckon that some things just seem more together because you can see it all as one. Not a mess of bits that don't relate. If you've got something that focuses it all - like a procedure you use in the workshop - you can see it all as one thing even if there's some theory in it ... I could never do Maths because it was bits of this and bits of that, here and there and all over the place, I could never figure it out ... If you've got something that pulls it together you can work a lot of it out for yourself without some bastard trying to teach you ... the manual skills are more natural than theory, aren't they? You can work out how to do a practical procedure yourself and you know it's right because your mind and your eyes tell you it's right or it's wrong ... a theory that someone has concocted only an expert can tell you about it.

Also, Stew placed emphasis on 'tangible' and 'observable' outcomes as the means by which knowledge was validated. Knowledge that was 'abstract' was seen to have lower validity despite the fact that some people made such knowledge 'their business'.

I suppose it's all bound up with what I was saying before. If knowledge is simple and natural it doesn't hold the same mystery that the unknown does ... If you can make a fair shake of learning something without having to be taught, it's pretty low level knowledge. It's community perceptions too I suppose. If something is complex and abstract and you

have to be a specialist to know about it, people think it's important. But it's mainly because it's unknown to them. They couldn't tell whether the bastard knew what he was doing or not... Spray Painters are specialists but what they do is really observable and everyone can tell a good job from a bad one so they think less of what it takes to be a Spray Painter.

In respect of his participation in the research, Stew suggested that 'the whole process has been valuable' in heightening his awareness of assumptions that are made about the nature of knowledge and knowing. Without being prompted, he started to grapple with his perceptions of the relationship between the ways in which knowledge is perceived and the framing of curriculum and instruction.

[During the Classification Task] I think I was seeing where knowledge comes from and what you do with it - how you distinguish bullshit from real knowledge ... It's hard to describe knowledge per se ... This is going to have a lot to do with curriculum.

How might this have something to do with curriculum?

Well I'd never really thought before about what happens when we pull theory out of the practical to make up a curriculum ... we teach it that way but we don't do it that way ... I think our knowledge might be more complex and abstract than I used to think. I don't know. I think we'll need to have a good hard look at it.

Despite my probing, Stew didn't move much further than this, though clearly it was something about which he would continue to ponder. He said he felt pleased to have been able to make a contribution and was keen to hear of the outcomes of the study.

5.4.3 Informant MF001 - Jack

Jack completed a four-year apprenticeship with a medium-sized company. He became a foreman-boilermaker and, later, moved to the Drawing Office. During his years in industry he completed a paraprofessional Structural Engineering Certificate by part-time study. After seven years as a qualified boilermaker he became a trade instructor in TAFE. He has been a trade instructor for eight years, during which time he completed the Diploma of Teaching (Technical). Six months ago, Jack left the instructional role to work in the Staff Development Unit.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

Because Jack works in an open-plan office setting, I met with him in an interview room attached to the Staff Development Unit. He was quite enthusiastic about being involved, and sought little clarification of the study or the interview process. My representation of Jack's views, as portrayed in the interviews, are given in Figure 5.10.

Jack's primary emphasis was on a distinction between 'practical' knowledge and 'theoretical' knowledge. Practical knowledge was of an empirical kind, being concerned largely with knowledge of skills, procedures and information that produced a tangible, useful outcome. The tangible nature of practical knowledge made it 'substantial knowledge' because of the ease with which its validity could be verified.

Figure 5.10

Domain Structure: Informant MF001

I've always envisaged two types of people. Those who know things because they have direct experience and have learnt with that experience and can do things because of what they know. Then there's others who get to know something because they think about it or talk about it or read or something like that - but it's basically what you think. It's theory kind of knowledge. They're always looking to solve a problem or nut something out - like in Maths.

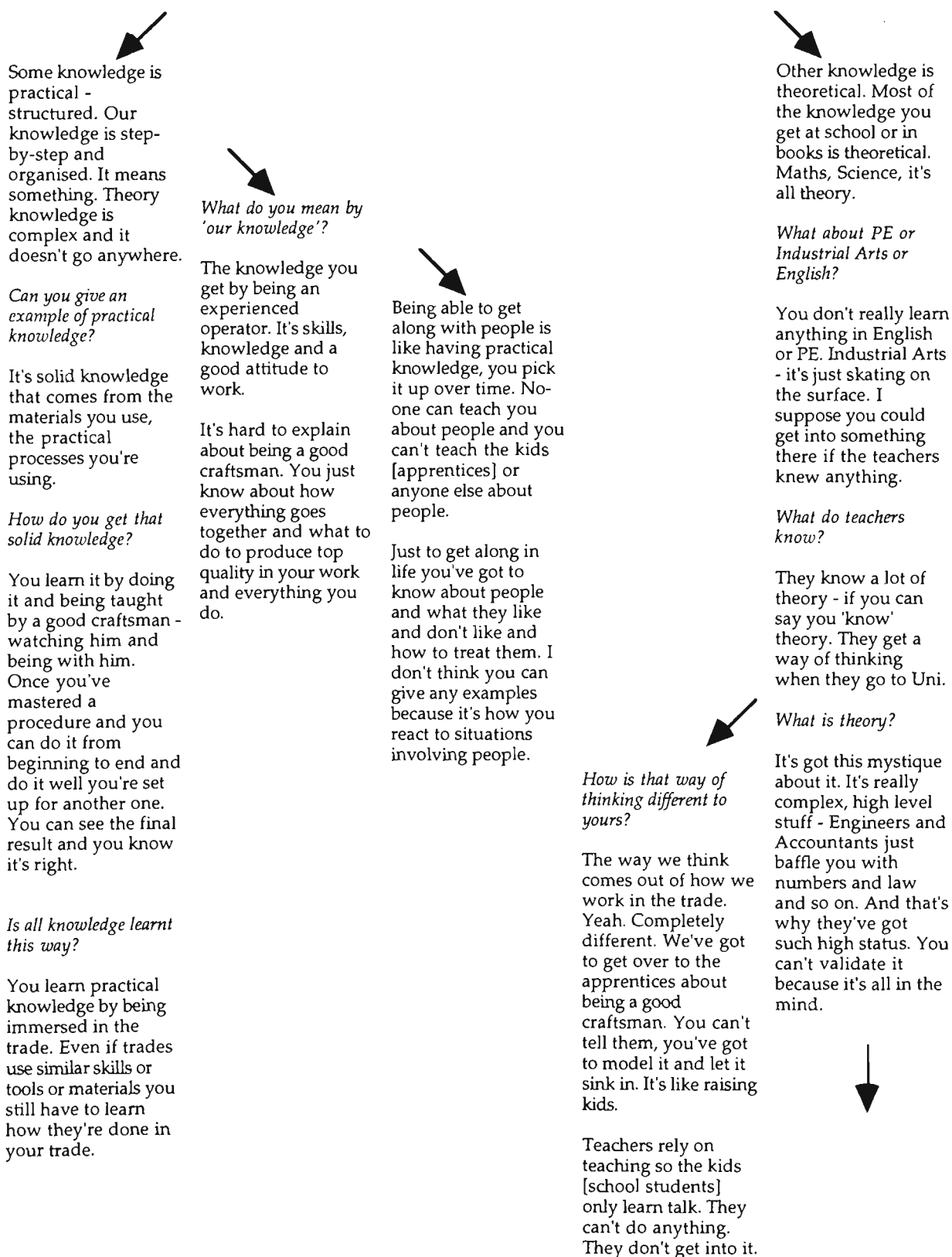
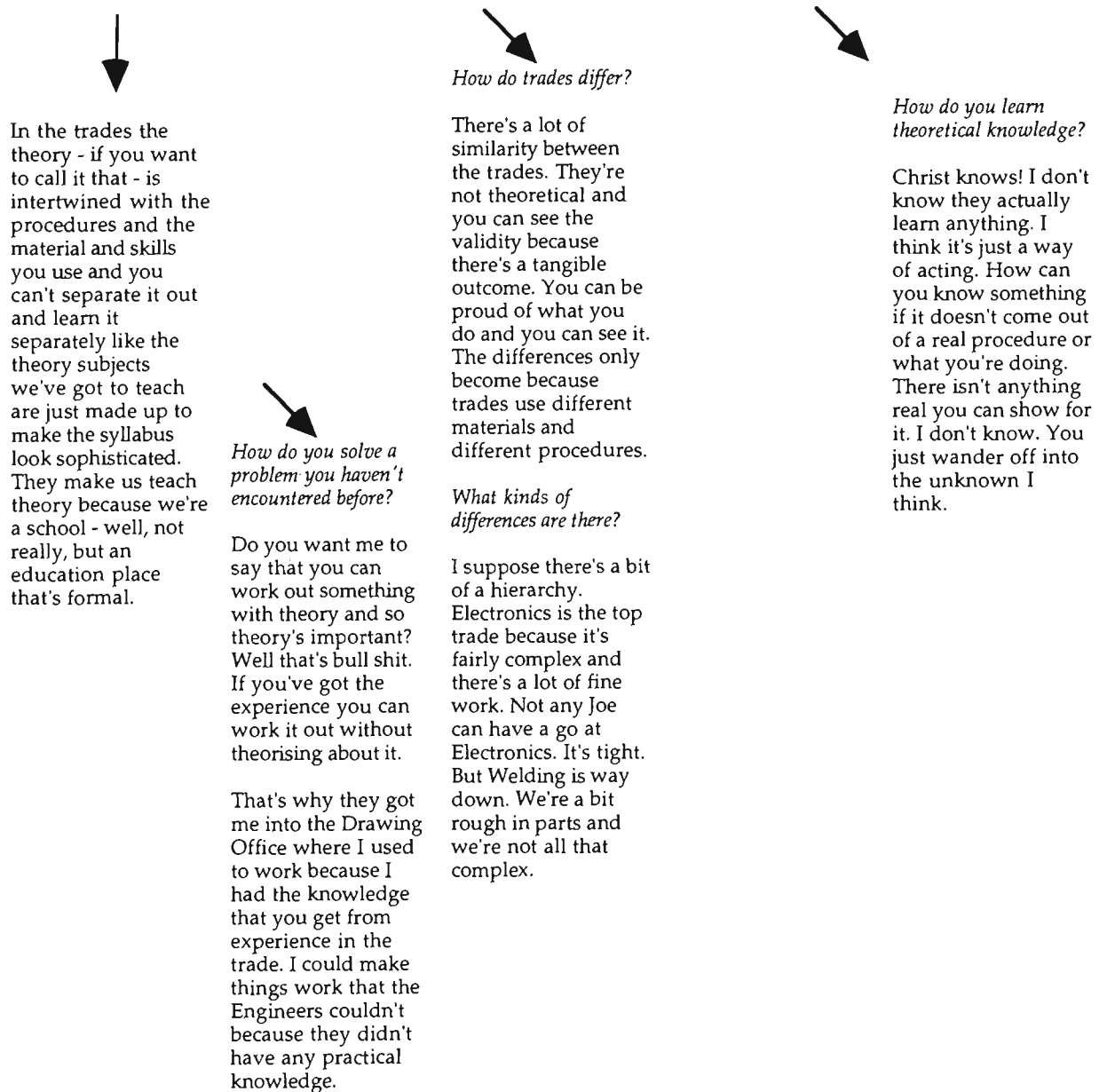


Figure 5.10 (continued)
Domain Structure: Informant MF001



He characterised theoretical knowledge as having a high degree of uncertainty surrounding its 'validity', primarily because such knowledge did not manifest itself in tangible outcomes. Knowledge that remained 'in the mind' was not easily verified. Jack's clear preference was for practical knowledge.

Jack identified a difference in status between practical knowledge and theoretical knowledge. Despite his doubts about its validity, Jack believed that theoretical knowledge held greater status because of public perceptions about 'complexity' and the corresponding 'mystique' surrounding complexity. He proposed that the people who have this knowledge 'inherit the status' that accompanied it. The fact that practical knowledge produced tangible outcomes and that it was verifiable meant that it became available to the public. It was, thus, accorded a lower status.

On several occasions, Jack alluded to something that he considered to be part of practical knowledge but which was much less tangible. It was captured in his use of the term 'craftsman'. Although he spoke of it in relation to the work of the trade, it related also to the development of apprentices. It was about 'doing a good job', 'top quality work' and 'good attitude to work'. When Jack spoke of 'craftsmanship', I noted a shift in tone. It became much more personal, and he spoke with stronger conviction.

The typology that emerged from my interviews with Jack is presented - using Jack's language - in Figure 5.11.

Figure 5.11
Major Typology: Informant MF001

Practical Knowledge	Theoretical Knowledge
<i>Typical Descriptors</i>	<i>Typical Descriptors</i>
Gained through direct experience of materials and processes High validity Tangible outcomes Low status Simple knowledge Step-by-step Practical Substantial basic knowledge Taught, learnt and experienced Processes and materials	Gained through processes of reading, thinking and talking Low validity In the mind High status Complex knowledge Theoretical About theory Taught and learnt Books and lectures
<i>Typical Examples</i>	<i>Typical Examples</i>
The skilled trades Electronics Welding	School subjects Mathematics English Physical Education Industrial Arts Engineering Accounting

Also emerging from my interviews with Jack were indications of the operation of rule-like elements - as I had found in my discussions with Will and Stew. I was able to discern expressions of preference that appeared to guide his approach to knowledge, and these are presented in Figure 5.12.

Figure 5.12
Rule-like elements: Informant MF001

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • If you've got the experience you can work it out without theorising about it. • Solid knowledge comes from the materials you use, the practical processes you are using. • Your knowledge is there to be seen. • Our knowledge is structured, step-by-step, and organised; theoretical knowledge is complex. • Substantial basic knowledge is validated by the real things you can do. It's natural. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

After the first interview had concluded Jack was keen to talk informally, and there were two items that dominated the discussion. Jack was keen to explore my background, particularly how I came to be involved in the formal preparation of TAFE instructors and how I went about my work. I detected that he was excited by his work in staff development but was struggling to establish a clear understanding of what the whole process was about. The second item was of particular note, even though he had addressed it during the interviews. Jack emphasised the 'wholeness' of knowledge obtained through the processes of personal exploration and experimentation - *vis a vis* knowledge obtained through formalised teaching. In describing this mode of acquiring knowledge he used terms such as 'intuition', 'trial and error', 'getting right into it' and 'knowing something is about more than you can get taught'. Further, Jack's discourse portrayed fondness for the 'knowledge of my trade', and a desire to pass on his knowledge to novices who displayed appropriate commitment to the trade area. I detected that this was a strong focal point in Jack's commitment to teaching his trade.

Classification Task

(See Appendix Two for details of the protocol)

Jack reported little difficulty in undertaking the Classification Task. He was able to provide clear descriptions of the categories he developed, the bases upon which the categories were formed and the distinctions between the categories. These are displayed diagrammatically in Figure 5.13, and are supported by verbatim extracts from the attendant interview.

Figure 5.13
Classification Task results: Informant MF001

I think I've made two main groups with other groups under them. Like I've put all the practical ones here [Group 1] and the theoretical ones over there [Group 2].

Group 1		Group 2	
Group 1A	Group 1B	Group 2A	Group 2B
Electronics Nursing	Automotive Painting Commercial Cookery First Aid Greenkeeping Typing Welding Plumbing Panel Beating	Accounting Architecture Medicine Genealogy Psychology Sociology Biology Economics English Geography History Mathematics Philosophy Physics	Art Counselling Interpersonal Communication Psychology

If you put together all these areas that have got solid, sort of useful knowledge you get all these.

Most of these are knowledge that is observable somewhere along the line. They're really about the practicals, you know, the procedures and things - real.

I separated the practical into these [Group 1A] because they have theory as an identifiable part of the practical processes and these [Group 1B] where the theory is concealed in the procedure. You can't make it separate.

You can see these are all practical but they vary on how much theoretical thinking is involved in what you're doing.

The average person can see what all these are about. They're public and, you know, observable.

All these other areas are hazy and intangible.

I find these are complex because they rely so much on abstract reasoning. I know they've got status. It's not all rubbish but there's a gap between most of it and reality.

These are more typical of theoretical knowledge. They focus on something and you can learn it if you go to school or whatever - all the theories and laws they teach.

There's not much in this that's not hidden from the average person.

If you could tie [these areas] into something practical it could be OK.

These are the ones I had left. There's no real knowledge here like the others have. You couldn't take some of it out and talk about it.

They're really the private knowledge and values and personal perceptions.

In keeping with the typology displayed in the Semantic Taxonomy Interviews, Jack separated the areas of knowledge into those that were primarily 'practical' (Group 1) and those that were primarily 'theoretical' (Group 2). He characterised Group 1 as being 'solid', having 'tangible outcomes', and providing 'useful' knowledge. Clearly, Jack aligned himself with practical knowledge. He described it in positive terms, implying that it was the more 'proper' form of knowledge.

The areas in Group 1 focused primarily on knowledge derived from practical procedures. As such the knowledge was 'public' and 'verifiable' and, therefore, more 'solid'. Practical knowledge was 'observable', 'tangible' and 'useful' and, therefore, open to scrutiny and validation by the 'average person'. Within the category of practical knowledge Jack formed two groups. Group 1A encompassed the areas of knowledge that were deemed to be practical but which incorporated a 'theory component'; Group 1B encompassed those areas of knowledge that were practical but which had a 'concealed theory component'. The distinction between the groups was made in terms of the extent to which the practical procedures relied on identifiable 'theoretical thinking' rather than on 'trial-and-error'. In the areas of Group 1B any 'theory component' was inextricably intertwined with the practical procedure; in the areas of Group 1A the 'theory component' was an 'identifiable part of the practical procedure'.

In contrast, Group 2 was generally 'intangible' and 'hazy'. Jack acknowledged the existence of theoretical knowledge, but depreciated it largely because of the lack of 'concreteness' and, therefore, its non-verifiable nature. Within the category of 'theoretical knowledge' he formed two groups. Group 2B encompassed knowledge that was 'private knowledge', reflecting the personal perceptions and values of the individual and deriving from the individual's 'experiences of life'. Whilst such knowledge was theoretical knowledge it was not amenable to 'being taught'. Individuals displayed 'private knowledge' through their 'reactions to situations', and gained such knowledge gradually and through experiences over the lifespan. The second category, Group 2A, was 'more typical theoretical knowledge'. This knowledge exhibited

itself as 'theories' and 'laws' most of which were difficult to validate because the knowledge was 'hidden from the average person'. Theoretical knowledge derived from 'abstract reasoning' and was highly complex. Thus it enjoyed a 'high status' that was inherited by those who 'possessed the knowledge'.

Group 2A was separable into subsets with differing primary focuses. Some areas of knowledge - though theoretical in the sense portrayed above - focused on 'things' - Accounting, Architecture, Medicine. Others focused on 'concepts' - Biology, Economics, English, Geography, History, Mathematics, Physics; and the remainder focused on 'people' - Genealogy, Psychology, Sociology. Jack was careful to draw distinction between theoretical knowledge that focused on 'things' or 'people' and practical knowledge that focused on 'things' or 'people'. The distinction was drawn in terms of the dichotomies noted above: 'tangible' - 'intangible', 'observable' - 'hidden', 'solid' - 'hazy', simple (implied) - 'complex', concrete (implied) - 'abstract'.

Jack classified twenty-five of the twenty-six areas of knowledge. However, Selling was omitted from all groups. He suggested that 'it doesn't really fit' and proffered Faith-Healing and Water-Divining as areas similar in nature to Selling. In response to my probing Jack described these areas primarily in terms of their deficiencies in relation to important criteria and attributes they lack - 'no credibility', 'has no content either practical or theoretical', 'intangible waffle' and 'anyone who can string six words together can do it'.

Postnate Interview

By the time I returned to speak with Jack about the outcomes of the two protocols, he had contacted me on several occasions to discuss staff development issues and ideas related to his current work. I had become a mentor for him. Thus, the Postnate Interview became something of an extension of our earlier conversations, including the interviews that accompanied the earlier protocols. I asked his reactions to the ways in which I had represented his views in Figures 5.10 - 5.13:

Good. Good. I agree with you. It was a bit hard to say things about such abstract ideas. The cards [Classification Task] were much easier. I had something I could work with ... My practical background I suppose ... I was surprised I'd said those things ... They make sense, I just didn't know I'd say that.

Jack suggested that the Classification Task had been the more valuable as a way of explaining his views. The criteria by which he had made the categories had emerged as he was constructing the categories - he was able to see and manipulate the areas and the scheme he was creating. It appeared that the process had not only provided information for me, but had assisted Jack to clarify and articulate ideas. The tone and emphasis in his discourse suggested that he felt that his views, as a trade instructor, were not influential in determining the fundamental approach to curriculum and instruction. Decision-making was dominated by groups 'outside the trade' and, according to Jack, trade instructors harboured an underlying desire to alter the approach. I noted some resonance here with the sorts of things Stew and Will had said.

Oh, you know how we talk in the staff room and talk about things but we don't get to this level of thinking. We complain about what's

imposed on us but we don't know how to use the right words to put together to explain to the administration and [the curriculum unit] how we want to do things ... they have their way of doing things and we have to go along ... If we had better arguments against them - if we could explain - they don't ask the questions like you did. We could probably improve things.

I probed Jack about the sorts of 'things' that might be improved:

Everything really. I suppose mainly the courses. The workshops and the classrooms too. It's getting better now that we've got some more space - control over the premises ... The curriculums have to be approved by the powers that be and they want it written in their way. Then we've got to teach it that way.

How would courses and classrooms be organised if you had the choice?

It's not giving me the choice it's taking notice of what we're teaching. It's practical [Jack's emphasis] knowledge. We should do things differently. Look at the bloody theory subjects we have to teach. I can hardly understand what I'm teaching. Why can't we get it all together ... I admit I don't know enough background theory. I'd be better off if I did - as a teacher. Metallurgy and Science. Maybe a bit of the history of how Welding developed ... The kids don't need to have lessons on it. Not yet anyway. Christ, they're struggling to learn the skills without distracting them with theory lessons.

But you said there was theory in the practical areas. When should they learn this theory?

The theory's there. In the practical procedures. You learn it as you go. Why pull it out artificially. That's what I said when I showed you the cards how I'd arranged them. All the practical knowledge was on the left and the theoretical knowledge was in that group [Group 2 - Figure 5.12].

Over this latter point Jack became emphatic, and I detected that this, together with his commitment to 'craftsmanship' and 'passing the trade on' to acceptable novices - apprentices - seemed to be major elements in his bid for a 'tradies approach' to curriculum and instruction.

A point of interest for me was the apparent knowledge/non-knowledge boundary that had emerged when I had asked Jack about the way in which dealt with the area of Selling in the Classification Task.

Well it's bullshit really. Isn't it? What's in it? What do they call a good salesman - someone who cons you into buying something. There's no knowledge in that - anyone can do it ... I don't see anything to learn. It's just common sense - and the guts to not tell all the truth.

What if I defined Selling as Marketing in the Business Studies sense?

That's fair enough. It'd be more like Accounting and understand the market and draw up strategy plans and that. There's something to learn there ... 'Theoretical knowledge'. I'd put it in that group [Figure 5.12 - Group 2A] ... Probably this set [Figure 5.12 - Group 2A: subset focusing on 'things']

So where is the point at which you're willing to accept Selling as valid knowledge?

When it gets something substantial in it whether that is theory or - well it wouldn't be practical ... The knowledge has to be acceptable - not just ways of conning people.

It appeared that Jack was not willing to accept as valid knowledge that which did not conform to a criterion of social/moral acceptability. Knowledge that had an obvious content-base was not valid knowledge if it derived from socially/morally unacceptable sources or was put to

unacceptable uses. I felt that this moral concern was at least in keeping with Jack's earlier comments about the responsibility that tradeworkers - including trade instructors - hold for the development of apprentices beyond the acquisition of trade skills - 'being able to get along with people', 'good attitude to work' and modelling good 'craftsmanship'.

At the end of the interview I felt I had to make an explicit and deliberate effort to confirm that Jack was happy with my representations of his views:

One of the dangers is that I could select material from the transcripts in such a way that I distort what you really want to say. How accurately have I put down what you believe? Have I missed anything important? Is it a balanced representation?

I don't think you've got any problems there. Yeah, put that down as my ideas to a 'T'. Especially the cards [Classification Task] ... No, nothing missing that I can see ... You couldn't put down everything I said. What you've got is the guts of it. I'd pick it if it wasn't.

5.4.4 Informant PB001 - Lou

Lou was the most experienced of the informants in this phase of the study. His colleagues often would refer to him affectionately as the 'the lead man' or 'the old bloke'. These were not nick-names but a way of referring to Lou - 'ask the old bloke, he'll know'. Lou was apprenticed to his father and served a five-year apprenticeship. He spent 17 years as a plumber during which time he completed the paraprofessional level Building Certificate and the Clerk of Works Certificate. When he entered TAFE as a trade instructor, he undertook the compulsory Technical Teachers Certificate. Subsequently, he upgraded this to a Diploma of Teaching (Technical). He has been an instructor for 18 years.

Three months ago, Lou transferred from the Plumbing Department to the Educational Support Unit where he now works on the development of instructional materials.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

Lou came to my office for the interviews. It was on his way to work, and he knew he'd have no peace in his open-plan office. Lou required no preliminaries, and we moved straight into the interviews. The Domain Structure Diagram of Figure 5.14 is my representation of Lou's views.

Figure 5.14

Domain Structure: Informant PB001

I see knowledge like a large reservoir of something that's disorganised and people draw from it according to their purposes. Knowledge is formed around the functions you perform. People put it together in different ways.

What kinds of different ways are there?

Two basic ways. It's either a practical focus because you're doing something useful, or it's theoretical because it's abstract.



Practical knowledge is organised, it's step-by-step, logical. It's useful and you get real outcomes. It shows up in real outcomes. You learn something because it belongs to what you're doing.

Are there different kinds of practical knowledge?

In the ways that the different trades work in different ways. Some are really intricate and some are coarse. Each trade develops its own ways of doing things, how they think about things depending on what they have to work with. I don't think like an Electrician.

Can you give an example?

Plumbing is coarse, it's rough. A lot of it is large scale. You don't worry about being precise and that shapes how you think about things generally. But in Electronics and like Panel Beating you have to be precise and well ordered so you tend to think that way about everything.

Are there any other differences?

I suppose something like Electronics is a fine trade. It's got stronger theory to it, a bit more theoretical knowledge associated with it - like circuits and Calc's. In Plumbing all the theory you need is just part of being able to perform the task.



The theoretical knowledge is there but it's not organised around anything obvious. If you're studying something really theoretical, like Sociology, you learn it according to the textbook. The only way theoretical knowledge can be learnt is by being taught deliberately. Like, someone talks about it from his head.

Are there different kinds of theoretical knowledge?

Only in how theoretical they are. Like, Philosophy is extremely theoretical. It's intangible in the extreme. Medicine - there's a lot of theory in it about understanding the human body and drugs. There'd be some practical knowledge there because you'd have to be able to operate on people. Can all doctors do that? But you'd have to pass the theory or they wouldn't let you be a doctor.

Figure 5.14 (continued)
Domain Structure: Informant PB001

<p><i>What is the difference between the theory in Plumbing and the theory in, say, Sociology?</i></p> <p>It's not really theory in Plumbing. It's just some things you have to know about so you can do the job. Sociology is purely theoretical. In practical knowledge the theory is in the procedures. What's Sociology about?</p> <p>Maths is a good example. I mean it doesn't hang together. It just gives you an answer to a sum. You might need that sometimes but with practical knowledge its about the whole job. There's no 'thing' like a job or a service you provide that relates to Maths.</p>	<p><i>Are practical and theoretical knowledge of equal value?</i></p> <p>Not to me mate. I wouldn't let a kid through if he didn't have practical knowledge but I wouldn't give a stuff about the theory if he didn't have it. You can tell if someone doesn't have practical knowledge.</p>
<p><i>How do you get practical knowledge?</i></p> <p>You have to experience it so that you build up the picture. You know, watch an expert and learn from him then have a go yourself and keep trying 'til you get it perfect. Keep doing that 'til you're an expert yourself. You pick up more than just the skills that way. You learn to think like a tradesman. You know how they operate. It's not the sort of thing you can just read about.</p> <p>The thing about practical knowledge is that you know whether it's right. It's there to be seen. But you can't tell with theory. If it's not right you can go back and try something different. In the end you've just got to get it right because it's there for everyone to see and there's no excuse for not working it out and getting it right.</p>	<p>Theoretical knowledge has got higher status and we don't care about that because it doesn't affect us what people think about theory. What we know we can show and anyone can tell if we've done things right. I reckon that's really important.</p>
<p><i>Do you ever find something that you haven't come across before?</i></p> <p>Your experience is your first source of help. The more direct experience, the more you've been doing it, the better you understand it. You work at it 'til you get it right and then you know next time. As I said, if you're really stuck you can go to one of your mates.</p>	<p>I do a bloody good job and I teach my kids [apprentices] to do a good job too so we can be proud of what we do and we can show that we do things well. If you're into theory how can you do a good job when no-one knows what it's about?</p>
<p><i>How do you teach your apprentices to do a good job?</i></p> <p>You look after them and you're a model to them. I don't let them get away with any rubbish. If a kid does a bad job I'll tell him and he'll do it again.</p>	<p><i>Would you go to other areas such as Chemistry or Mathematics?</i></p> <p>What for?</p>
<p><i>Is there anything in Chemistry or any other theoretical knowledge that might help you solve a problem or do your job better?</i></p> <p>Shit, Chemistry is so far removed from anything how could I use it? I haven't found a time yet when I needed any of that stuff. I never did any good at school and that hasn't slowed me up at all.</p>	<p><i>Then how do you teach you apprentices?</i></p> <p>In the theory room you have to teach, but normally it's different. When I had apprentices I'd tell them to do something but I wouldn't always tell them how to do it. They'd have to work at it and use their nous. It's not the same here at 'tech' because you're expected to do it in a school way. Teach them.</p>
<p><i>Would you go to a book?</i></p> <p>If it's got the answer like an instruction manual. The best help you can get is to go to the bloke who's got more experience than you have. But if you're worth your salt there won't be much you can't work out in your trade unless you're a kid just starting out. That's why it takes four or five years to get your qualification.</p>	

Lou's first description of knowledge was as an amorphous, undifferentiated 'reservoir of knowledge'. Elements of knowledge from that 'reservoir' were organised according to the function performed by the individual. Lou identified two ways in which knowledge was framed and thus organised - 'practical' and 'theoretical'. He showed a distinct preference for 'practical' knowledge, describing it as 'useful', 'logical', and 'meaningful'. Knowledge that was 'complex', 'high faluting' and with no tangible outcomes was classified as theoretical. This major typology is presented in Figure 5.15.

Figure 5.15
Major Typology: Informant PB001

Practical Knowledge	Theoretical Knowledge
<i>Typical Descriptors</i>	<i>Typical Descriptors</i>
<div> <div>Practical</div> <div>Low status</div> <div>Public knowledge</div> <div>Logical</div> <div>Step-by-step</div> <div>Useful</div> <div>Processes and materials</div> <div>More reliable</div> <div>Meaningful</div> </div>	<div> <div>Theoretical</div> <div>High status</div> <div>Learnt by being taught</div> <div>Complex</div> <div>Purely theoretical</div> <div>Less certain</div> <div>High faluting</div> </div>
<i>Typical Examples</i>	<i>Typical Examples</i>
<div> <div>The skilled trades</div> <div>Applied Electricity</div> <div>Plumbing</div> <div>Electronics</div> <div>Panel Beating</div> </div>	<div> <div>Sociology</div> <div>Mathematics</div> <div>Chemistry</div> <div>Philosophy</div> <div>Medicine</div> </div>

According to Lou, an individual operating as a tradeworker needs knowledge organised according to the processes and materials of the trade. In such case, any theoretical knowledge required is interwoven with the processes to such an extent that it is indistinguishable from the practical. An individual operating in a profession, such as the medical profession, may need some practical knowledge, based on the

procedures to be performed, but relies primarily on theoretical knowledge. Individuals working with Sociology work with 'purely theoretical knowledge', a sub-category of theoretical knowledge that includes areas such as Philosophy and which may be described as 'extremes of theoretical knowledge'.

Lou's image of practical knowledge was of an empirical kind, being concerned mainly with knowledge of skills, procedures and information that produced tangible, useful outcomes. As knowledge is more theoretical so it is less tangible and 'less certain'. That is, theoretical knowledge is characterised as the type of knowledge for which there is some degree of uncertainty about its 'validity'. The tangible nature of practical knowledge makes it 'more reliable knowledge' because of the ease with which its validity can be verified. Lou also identified a difference in status between practical knowledge and theoretical knowledge. Despite the doubts he holds about its validity, he argues that theoretical knowledge has greater status than practical knowledge because of public perceptions about its 'complexity'. The fact that the outcomes of practical knowledge are tangible and verifiable means that it is accorded a lower status. In these respects Lou and Jack hold very similar views.

Also emerging from the interviews were indications of the operation of rule-like elements. That is, I could discern expressions of preference that appeared to guide Lou's approach to knowledge and knowing. Figure 5.16 presents these elements, as verbatim extracts from the interviews.

Figure 5.16
Rule-Like Elements: Informant PB001

•	Knowledge is formed around the functions you perform.
•	Practical knowledge is logical, step-by-step; theoretical knowledge is complex and high faluting.
•	Practical knowledge comes from the procedures and materials of the trade.
•	You know whether practical knowledge is right because it's there to be seen. But you can't tell with theoretical knowledge.
•	I'd tell them to do something but I wouldn't always tell them how to do it.
•	Our knowledge is about understanding the whole thing.

Classification Task

(See Appendix Two for details of the protocol)

Lou reported no difficulties in undertaking the Classification Task, and was able to provide descriptions of the groupings and the bases for classification. He sounded quite confident about what he had constructed. The categories he developed are displayed in Figure 5.17, supported by verbatim extracts from the attendant interview.

Lou described Group 1 as 'practical knowledge', 'logical', 'useful' and deriving from 'practical procedures'. For him, these areas represented the epitome of knowledge. They conformed to the standards by which the other areas were found wanting - tangible outcomes, usefulness, verifiable, logical, derived from observable functions and processes. Further, knowledge in this category could be obtained by the individual through trial-and-error and experience. In the sense that they supported the pursuit of vocations, the areas of knowledge in Group 1 had something in common with those of Group 2A.

Figure 5.17
Classification Task Results: Informant PB001

I put them into four groups which I think are fairly logical and fairly self-contained. Although there are some similarities over the groups.

Group 1	Group 2A	Group 2B	Group 2C
Automotive Painting Commercial Cookery Electronics First Aid Greenkeeping Nursing Typing Welding Selling	Accounting Architecture Biology Genealogy Geography History Medicine	Art Economics English Mathematics Philosophy Physics	Counselling Interpersonal Communication Psychology Sociology
<p>This is practical knowledge.</p> <p>I wasn't sure about Selling. I suppose you'd have to put it here. It's got a sort of useful outcome but just what is a bit funny. I'm not comfortable about it.</p> <p>With this sort of knowledge you know where you're at. It's logical. It's got useful outcomes, and you can tell whether it's right or wrong.</p> <p>There's no theory bull shit here. It's about procedures and how to get something done. And your experience is worth a hell of a lot.</p> <p>Einstein would have been better off if he'd had more of this kind of knowledge. It'd have brought his theories down to earth.</p>	<p>All these are about procedures and doing things but they're theoretical procedures. Not as abstract as those [Group 2B] - more useful.</p> <p>They're complex and theoretical and it's pretty high level knowledge, but you know it'll get you a job. Not like we'd [tradeworkers] do, one of the professions.</p>	<p>This is a bit more solid than them [Group 2C]. It's theoretical knowledge but it's more to do with ideas. It's at the extreme end of theoretical knowledge.</p> <p>There must be a lot of abstract thinking about things to get this knowledge. But I can't understand most of it. I mean, so what? It's funny how if you want to be an educated bod you have to go and learn this high knowledge. Ours [tradeworkers'] wouldn't count.</p> <p>You'd never work it out for yourself. You have to go to Uni or do well at school.</p>	<p>This is the touchy-feely stuff. It's to do with understanding people and their thinking.</p> <p>You come across lots of people in your life and they've all got different dispositions. You've got to be able to get along with them if you want to survive in the world. But there's nothing to prove that what you know or what they try to tell you is right. It's so abstract that you never really know anything.</p> <p>They might make subjects out of it but that doesn't make it any more real. It just gives them something to teach. I remember doing this sort of stuff in Communications in my Diploma.</p>

According to Lou, the areas of knowledge in Group 2A derived from 'theoretical procedures'. Such knowledge was 'useful knowledge' to the extent that it supported the pursuit of 'the professions'. Its theoretical nature meant that it was complex and of high status, attributes shared with the areas of Group 2B. It meant also that such knowledge was obtainable only by 'being taught'. The lack of highly 'tangible outcomes' instilled some doubt in Lou's mind about their validity.

Lou's view of the areas in the Group 2B was that they focused on 'theoretical ideas'. Such knowledge was at the 'extreme of theoretical knowledge' and derived from the processes of 'abstract thinking'. The knowledge contained in Group 2B was pursued by those who wanted to be 'deemed educated' and to acquire the status associated with the knowledge. Such knowledge was the province of schools and universities. Although acknowledging the existence of such knowledge, the lack of 'tangible outcomes' caused Lou to express concerns about its validity.

The fourth of Lou's groups focused on knowledge related to 'understanding people', their 'dispositions' and their 'thinking'. This knowledge derived from interactions between people, was developed over the course of 'life's experiences', and was 'important knowledge' for the proper functioning of the individual in society. The knowledge was 'abstract'. It did not derive from observable actions or procedures, there were no 'tangible outcomes', and the knowledge was not, therefore, open and verifiable.

Postnate Interview

Lou controlled the early part of the interview. He commenced with comments on my representations of his views of knowledge in Figures 5.14 - 5.17.

Unsolicited comment:

I think this looks good. I was thinking about the bit here about 'reservoir of knowledge' and that's not what I want to emphasise.

Lou requested that the references to 'reservoir of knowledge' be interpreted less literally than he suggested in the Semantic Taxonomy Interviews - and I had represented.

Unsolicited comment:

Look, a plumber develops practical knowledge about processes and materials. It might not be top drawer knowledge like a Scientist - that doesn't matter. It's fair dinkum knowledge that hangs together around what you're doing and what processes and materials are involved. That's what I meant. You can take out this part about the reservoir of knowledge.

He had used the 'reservoir' idea as a starting point and did not literally perceive knowledge as a 'pool of something waiting to be dipped out when it was needed'. He preferred to eliminate the reference to 'reservoir of knowledge' and to replace it with the notion of knowledge being framed by the 'functions performed by the individual'. An individual develops and acquires knowledge for particular purposes and contexts. This, he claimed was the basis for the scheme he had constructed in the Classification Task.

In all these [Figure 5.16 - Group 1] there are practical procedures and materials for each one, so the knowledge is framed - to use your word - by those procedures and it forms a sort of enclave of knowledge for each one. The same in these [Figure 5.16 - Group 2A] and so on. Actually, this [Classification Task] is a good exercise. When you put them all together from what you feel you can sit down and nut out just why they go together. Then you argue with yourself 'til you're satisfied.

Unsolicited comment:

That's something else I wanted to mention. In the Classification Task I put all the 'practical knowledge' together in one group. I think you could subdivide that if you got into it. I didn't think about it at the time

because I was separating all the areas on a larger scale. I think there's differences between the trades.

Again, Lou referred to differences arising from the nature of the materials and procedures involved in the trades, and I recognised some resonance here with the image portrayed by Bensman and Lilienfeld (1991).

Then in what ways is 'practical knowledge' different from 'theoretical knowledge'?

I put these three [Figure 5.16 - Groups 2A, 2B and 2C] as 'theoretical' and this one [Figure 5.16 - Group 1] as 'practical knowledge'. That's a big division and it's pretty obvious. None of these [Figure 5.16 - Groups 2A, 2B and 2C] deal with tangible outcomes. They're all to do with knowledge that is in a way secret ... practical knowledge is out in the open and you can see the outcomes of what it's all about. Theoretical knowledge is knowledge you develop in the mind and you have experts to tell you when you're right. We [tradeworkers] can tell when we've got it right because it's all tangible outcomes. If you're wrong you keep at it 'til it's right ... I don't want to knock anything but some of this stuff [Figure 5.16 - Groups 2B and 2C] is a lot of twaddle really.

In both the earlier interviews Lou indicated that it was important that practical knowledge can be acquired, monitored and verified by the individual. Conversely, he displayed a cautiousness about knowledge that is controlled by 'experts' and thus beyond the control of the individual - theoretical knowledge.

As a trade instructor don't you play the role of expert, in the same way that you spoke about the role of the expert in 'theoretical' knowledge?

No. I play the role of the boss!

What's the difference?

The boss tells you go and do it and you have to use your own nous to get the job done. It's basically up to you to work on it 'til it's done and done right.

And the expert?

He tries to tell you how to do it and where you're right and wrong and why. He's not all that interested in getting you to be able to do something. He'd rather you were able to write it down or talk about it. Like in an exam. He wants you to understand it without being able to do anything.

In the final segment of the interview Lou indicated that he was satisfied that my representations of his views of knowledge were an appropriate, fair and balanced reflection of his views.

One of the dangers inherent in the process of interviewing and reporting is that what I have selected as representing your views may have distorted what you intend or may not have included some important points. What are your feelings about that?

I don't think there's any worries there. I know I rambled on a bit in the interviews but I think you've got the guts of it down pretty well ... Will you change that bit about the 'reservoir'? Don't worry, I'll let you know if you've cocked it up.

Further, Lou indicated support for the research effort and that he 'looked forward to something coming from it'.

Unsolicited comment:

I'm glad you're doing this. It's made me think a bit. We should get all the Plumbing teachers together to talk about these things. You can ask the questions, you're good at that.

This was notable because several of the informants made comments of similar nature. I felt I had been accepted.

5.4.5 Informant UH001 - Tom

Tom completed a six-year apprenticeship in Holland. He had been apprenticed to his father and, after migrating to Australia, spent 22 years as an upholsterer, mainly in his own business. He began teaching in TAFE on a part-time basis. He so enjoyed the work that he commenced a Diploma of Teaching (Technical) and, nine years ago, he became a full-time trade instructor. Recently, injury forced Tom to retire. He remains involved in TAFE through membership of an Advisory Committee. He has maintained social contact with his teaching department and attends special functions and events.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

At Tom's invitation, I met with him in his own home. He welcomed the opportunity to be involved in the study because it helped him to maintain contact with his former work setting. Before the interviews, we chatted informally about his background, including his apprenticeship days. Each of the interviews took some 60 minutes, and the Domain Structure Diagram of Figure 5.17 is my representation of Tom's views, but using Tom's language.

Figure 5.18
Domain Structure: Informant UH001

I want to say I think there's a kind of spiritual personal knowledge that isn't really knowledge it's a context you build for yourself. I think that provides the context for developing other knowledge. I think about that external knowledge in two ways - that's practical knowledge and theoretical knowledge. It may not necessarily be a big difference in what the content's like, it's more the way you go about using it or learning it or whatever. It's sort of a difference in style I think.

Knowledge that you share with other people can be of two kinds, practical and theoretical. That's the focus of each. This is knowledge you learn more or less deliberately. It's more tangible, you can learn it and you can pass it from person to person.

Theoretical knowledge is equally valid and important but it's not what I need or work with. The distinction is you work in your mind.

Trade knowledge is practical rather than theoretical. I mean any theory is within the trade procedures. It's part of the whole thing, not separate.

Can you describe trade knowledge to me?

There's structure in it. There are tasks that are step-by-step tasks that you master over a number of years and you need to master one task before you step up to the next level of difficulty.

It's an expression of hard work and satisfaction in seeing it all combined into a useful article and it's knowledge and wisdom of the trade all intertwined and you see the outcome.

Is there a difference between trade knowledge and wisdom?

It's not religious. It's personal wisdom and knowledge of life that's intangible, internal and can't be passed on. You bring it together over time in an inexplicable Gestalt-like process and it alters as you grow. I think that's my spiritual side. You can't say much about it because it's just personal.

Can you give an example?

Psychology I suppose is quite theoretical. Philosophy is just all in the mind, it's the ultimate in theoretical knowledge, it's out at the extremity. Chemistry is theoretical knowledge and Physics. They're all valid knowledge, just different from practical knowledge and they're not tangible.

Trade knowledge is tangible. It's got logic and step-by-step approach. It's based on the practical procedures and processes of the trade and the materials you use.

It relies on observation and repetition and mastery of the techniques.

Do trades represent different kinds of knowledge?

The methods, materials and techniques is what makes trades similar. I mean, all trades work with materials and techniques and that's what makes them different from other areas - theoretical. But they differ from each other below that level.

A tradesman has years of experience, had the trials and errors, seen the heartache of seeing it work and who's had the practicality of having to make it work. He's got a perception of quality and style and a concept of the whole thing.

It's influenced by what you do and who you meet. My father was a huge influence on this side of me. He modelled for me and I picked up a lot of my spiritual side by working with him.

I think it's about understanding and knowing your 'self'. You know. It's a different way of knowing about something because it's so personal. Self-knowledge.

Can you give some examples?

What if you come across a problem you hadn't encountered before?

It either works or doesn't work. If it doesn't work then try something else til it does work.

Figure 5.18 (continued)
Domain Structure: Informant UH001

You learn them in different ways from the trades. You have to rely on abstract concepts, working always in your mind with no evidence to give you a guide. You might be wrong and not know it.	Butchery and Welding are rough trades and they have quite different methods and materials. They're rough and rely on pure hard practical trade.	Cabinetmaking and Motor Trimming are similar to Upholstery because they have quite similar history of methods and techniques. They have the art. A feeling for shape. You need to have a firm but fine approach.	<i>Would you get help from somewhere?</i> If your good at your trade you don't usually need help. As a teacher sometimes I have to go to books to look up a theory point like what's the chemical difference between a natural fibre and a synthetic fibre to help explain why they behave differently. But you don't need that to be a good tradesman, just to pass the theory subject. The added theory knowledge sometimes is a help to me but not to the apprentices.
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At the most fundamental level, Tom formed a division between knowledge that is about 'self', and that which is 'externalised' and about 'things'. He found it difficult to talk in detail about knowledge of self, but did indicate that it was foundational, provided context for the development of externalised knowledge, and was 'private'. He portrayed it as knowledge 'internal' to the individual, unable to be passed on, and concerning understandings that enable the individual to interact with other people and with 'things and processes'. The distillation of many random life experiences into a meaningful whole was perceived by Tom as occurring through an 'inexplicable Gestalt-type' mechanism, and was subject to processes of adaptation through

further experiences and the action of the 'environment in which the individual operates'.

Tom portrayed knowledge of 'things' as knowledge external to the person, able to be taught and learnt, typically tangible and useful. Within this category he made a further distinction between practical knowledge and theoretical knowledge. As with the previous informants, practical knowledge was of an empirical kind, being concerned mainly with technological usefulness, common-sense notions, and completion of tasks. The tasks were mainly, but not exclusively, associated with a job, and included both the skills necessary to complete the work and 'the expression of hard work and satisfaction in seeing it all combined into a useful article'. Theoretical knowledge was seen as a form of knowledge that was abstract, and which sometimes provided background for tangible outcomes. Tom claimed that these two forms of knowledge were of equal status, and clearly identified his trade knowledge as practical knowledge. Figure 5.18 presents this major typology using verbatim extracts from the interviews.

Figure 5.19
Major Typology: Informant UH001

Shared Knowledge		Knowledge of Self
		<i>Typical Descriptors</i>
		Wisdom of life Knowledge about concepts and people General trial-and-error Inexplicable, Gestalt-like Intangible Can't be passed on Random general experiences
		<i>Typical Examples</i>
Practical Knowledge	Theoretical Knowledge	Interpersonal Communication Genealogy Counselling
<i>Typical Descriptors</i>	<i>Typical Descriptors</i>	
Gained through directed experiences Knowledge about things External Observation and repetition Directed trial-and-error Observable and tangible Logical and ordered Useful Step-by-step Pure hard trade Methods and procedures Wisdom of the trade Concept of the whole product Years of experience	Gained through directed experiences Knowledge about things External Taught Run through the mind Perceptions Forms and shapes Soft and abstract	
<i>Typical Examples</i>	<i>Typical Examples</i>	
The skilled trades Butchery Welding Cabinetmaking Motor Trimming Upholstery	Psychology Philosophy Chemistry Physics	

Also emerging from the interviews were indications of the operation of rule-like elements. That is, as for the other informants, I could discern expressions of preference that appeared to guide Tom's approach to knowledge. I felt, however, that there was some difference here. Tom

appeared to be guided by a somewhat larger framework or context that related to what he termed 'self' and 'wisdom'. Figure 5.20 is my representation of these rules, but using Tom's language.

Figure 5.20
Rule-Like Elements: Informant UH001

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- Spiritual knowledge ... provides the context for developing other knowledge.
 - A good tradesman has both the hard trade knowledge and perception of the overall feel and form.
 - Good tradesmen have an aptitude, an innate ability to master a task, and many years of experience.
 - Trade knowledge is a very natural knowledge. It's tried and tested and you know it's right.
-

Classification Task

(See Appendix Two for details of the protocol)

In the Semantic Taxonomy Interviews, Tom had presented a typology that differed, at least in part, from those of the earlier informants. I was interested, therefore, to see whether the Classification Task would suit Tom's approach - in particular, his notion of a 'spiritual' view of knowledge as expressed in the Semantic Taxonomy Interviews.

Tom reported no difficulty in completing the Classification Task. He indicated that he had found it an interesting and challenging activity and that 'it really made him think' about how and why he was distinguishing between areas of knowledge. He was able to provide clear categories and descriptions of the bases upon which they were formed. The categories are displayed in Figure 5.21, supported by verbatim extracts from the attendant interview.

Figure 5.21
Classification Task Results: Informant UH001

I've started with the assumptions that all the areas, including Interpersonal Communication, are areas that can be studied and learnt. They're sort of outside the person. Not the personal knowledge I described in the first interview. What I've made is nine groupings but in two main divisions. On this side [Group 2] are the academic ones like Medicine and on the other side [Group 1] are all the practical ones.

Group 1							Group 2	
Group 1A	Group 1B	Group 1C	Group 1D	Group 1E	Group 1F	Group 1G	Group 2A	Group 2B
Automotive Painting Art Physics Mathematics	Commercial Cookery Art Mathematics History Interpersonal Communication Linguistics	Electronics Mathematics Physics	Greenkeeping Mathematics Art Economics Physics Biology	Typing English Mathematics Interpersonal Communication Art Linguistics	Welding Physics Electronics Accounting Art	Selling Sociology Interpersonal Communication Economics	History Genealogy English Art Geography Architecture Interpersonal Communication Archaeology Linguistics Anthropology	Medicine Nursing First Aid Counselling Philosophy Psychology Interpersonal Communication Sociology

I've separated these into groups that cluster around a main area. Like for Welding, it's a main area and it's got some Physics knowledge and some Mathematics knowledge in it and there's some Art knowledge. Some of the Welding knowledge is about numbers and so I put Accounting into the list. But I don't want to make too much out of these.

I put Physics into several because it's a sort of Science theory ... the Metallurgy for Welding or the chemicals in Auto Painting ... there are aspects of Art knowledge that come into most of these areas too but they don't come from artists' knowledge they come from what you're doing in the task.

Yes, these are distinct areas but they're all practical knowledge areas that have some academic knowledge in them. Some of it is more obvious than others. It's not academic knowledge like in Sociology or Philosophy. It's the theory that comes out of knowing how the practical works. You don't learn the academic knowledge away from the practical.

These are very distinct from ordinary school subjects because you could take the knowledge here and translate it into the vocational and commercial, the main areas I mean. The main difference between practical knowledge and the academic knowledge is that the practical knowledge comes out of the practical processes. I don't know where full academic knowledge comes from. Somebody's mind.

Each of these main areas is what makes up a trade. Electronics is more complex because there are more component parts and more of it requires thinking than say Welding or Typing. Whereas they are basically manipulative skills that have only a small amount of thinking .

There are commonalities across these areas. You could say that there's some basic Mathematics knowledge that you use to get into this knowledge ... there's some business knowledge that could come in. But you can't do what they [Curriculum unit] want to do and put on a module of trade knowledge for a whole lot of areas. That's disaster. You lose the setting and that's what your knowledge for each trade comes from ... I suppose there might be a similar argument against putting all trades together for Calc's. I don't know. The kids don't do any good at Calc's, but they can do the job so stuff it.

The practical knowledge areas are different from each other. The setting. It makes them different and the processes and materials you use and that's what generates the knowledge. Physics knowledge is academic knowledge because it comes from thinking and working in the abstract and you could say that about all the other abstract theory areas. But that doesn't make all the areas the same because they all use abstract thinking. It's the same way in the trades. They're not all the same just because they're practical. But they're all different from academic knowledge. Does that make sense?

These are fairly much the traditional subjects. The way I've grouped them there's a sort of theme running through them in each column. One is people-oriented. One is things or events or ideas.

If I took, say, Physics separately I'd group it with the traditional subjects. I might make a sort of Science group so that the academic disciplines would have three columns.

Tom separated the areas of knowledge that he deems to be theoretical knowledge from those that he deems to be practical knowledge. He sees this as the first division - after making the assumption that his category

of personal knowledge is the most fundamental. Areas that have overt and tangible outcomes, that are associated with practical procedures and tasks, and which are strongly structured by those tasks, are considered to be practical knowledge [Group 1]. Further, practical knowledge is more likely to be translated through to 'the vocational and commercial' - the work setting. Areas that are more commonly associated with academic pursuits and the traditional disciplines, and for which the outcomes are abstract and less obviously linked to the area, are considered to be theoretical knowledge [Group 2].

Within Group 2 Tom clustered the areas around two themes - a 'people-oriented' theme [Group 2B] and a 'things or events or ideas-oriented' theme [Group 2A]. He classified areas according to his perceptions of the primary or most dominant outcomes that the areas supported, and postulated that, if he interpreted Physics - and Biology and Mathematics - as a discipline, he would develop a 'science - oriented' group within Group 2. Such a group would have an 'ideas - oriented theme', where the ideas involved were specifically 'Science ideas'. However, his approach had been to consider these areas not as disciplines but as areas that provided knowledge as 'services' for the 'practical knowledge groups'. That is, his focus on practical knowledge outweighed what he recognised as another way of viewing knowledge using the traditional academic disciplines.

Within Group 1 Tom had seven sub-groups, each headed by one of the areas that he described as practical knowledge - Automotive Painting, Commercial Cookery, Electronics, Greenkeeping, Typing, Welding and Selling. A selection of the other areas was clustered around the key areas

in accord with Tom's perceptions of the support they provided for the key areas. For example, a key area such as Electronics drew on knowledge which, in traditional terms, was Mathematics knowledge; thus Mathematics was grouped under Electronics. Each of the seven key areas was seen as distinctive, even though associated areas - such as Mathematics and Art - may be grouped under several of these key areas.

Tom distinguished between the key areas in the practical knowledge group using two main criteria. First, each key area had procedures and materials that were peculiar to that area. Knowledge formulated about these procedures and materials was similarly unique to that area. Second, the environment from which the knowledge emanated was characterised by unique ways of thinking and working - what he termed a 'setting'. Thus, even though there may appear to be commonalities across the practical knowledge - for example, several areas may be underpinned by Mathematics - the settings associated with each key area created significant differences.

The tone of Tom's discourse suggested that he felt a sense of achievement in completing the task and being able to talk about the bases on which he had classified the areas. After I had closed the interviews, Tom renewed the conversation, and discussion ensued for more than an hour thereafter. He indicated concern over the direction in which training for the skilled trades was 'being forced to move', suggesting that the 'ever increasing academic creep' and 'ideas of efficiency in training' were debasing trade training. 'Academic creep', he suggested was the increasing pressure being placed on trade instructors to accept students with high academic qualifications and to increase the

'amount of theory taught'. This appeared to be 'more efficient in dollar terms' because more students could be 'processed' in a theory class than in the workshop classes, and students from different trades could be put together for the theory areas that they shared - 'such as Calc's'. However, in terms of students acquiring 'the right knowledge', Tom claimed that this was false economy and the students would become 'under educated tradesmen'. He meant that because the training ignored important factors such as 'an appropriate setting' and the uniqueness of 'the procedures and materials of the trade', it would become divorced from 'reality' - such 'reality' could only be attained if the these factors dominated curriculum and instructional decision-making.

Postnate Interview

Tom indicated that he was pleased to be involved in the process and that it had been '... good for me. It's made me think a lot'. This was a reaction that several other informants had given, and supported my feelings that there was a lot of 'good will' proffered by the informants.

The early part of the interview focused on my representations of Tom's views of knowledge in Figures 5.18 - 5.20. He reacted most positively, and indicated genuine commitment to assisting the research effort by suggesting that I visit classes in order to gain greater insights into the views he was presenting.

What are your reactions to my representations of your views of knowledge?

I'm very happy with it. I think you've been fair. I was surprised at how you made all that talk we had into such a concise summary.

That's a danger actually. In selecting materials for this summary I may have omitted something you feel is important or I may have distorted the way in which you want your views represented.

I thought about that as I read it. But what's there is right at the core of what I would want to say. Who's going to read this? ... If you give a seminar or write a paper out of this I'd be delighted ... If you've got the time I'd like you to go to some of the classes so you can see what's happening as well as talk to you like this. It's hard to express just what I mean. If we could use a classroom example it might make it clearer still - and maybe you could write that up too.

Tom identified three points that classroom observations⁵ could elucidate. The first related to the 'theoretical knowledge - practical knowledge' dichotomy that had been central to much of his discourse in both previous protocols. The second point was the notion of 'trade wisdom' that Tom felt could be worthy of greater emphasis in my representations of his views of knowledge. The third point was the way in which the 'trade areas' draw on knowledge from the areas used by the informant as 'supporting areas' in the Classification Task.

Is there something in particular that you think my observing a class would highlight?

Everything. I think the theory-prac issue would be one. And maybe what I was talking about with trade wisdom in that first interview ... And I think how I was using some areas of knowledge as supports for the main areas in the practical side.

⁵ In fact, the researcher has spent considerable time in trade classrooms over many years.

I questioned Tom about the 'trade wisdom' and asked whether he felt he had been able to convey the 'spiritual' view of knowledge that he had expressed in the Semantic Taxonomy Interviews:

I think you'd have to spend months with me to pick that up. Come to the classes and you'll see it in action. You can't put it into a simple answer ... it's part of me and other tradies . You know.

In discussing what Tom had labelled the 'theory-prac issue', notions such as 'tangible outcomes' were again identified as important in distinguishing between practical knowledge and theoretical knowledge. In common with several other informants, Tom referred to the 'theory component' of practical knowledge' and described such theory as being inextricably linked with the practical procedures and materials of the trade area. Of particular note, however, was Tom's reference to acquiring this knowledge in conjunction with the performance of the practical procedures and not in the ways that theoretical knowledge was acquired. That is, theory served an instrumental role in achieving the 'tangible outcomes' characteristic of practical knowledge, rather than being a form of knowledge to be pursued in its own right. As such knowledge of 'the theory' of a 'practical' area develops over time and through the experiences of working in the area.

Obviously it's about areas of knowledge that rely on practical processes versus areas that rely on theoretical thinking. There's more than that I think. In the practical areas the knowledge displays itself in tangible outcomes which have been worked out, step-by-step, over time you build experience into knowledge you can use in tangible ways ... The theoretical areas are just as important but they don't present tangible outcomes where someone can say 'there it is'. You have to get

knowledge that is only available through thinking and reasoning and by listening to people who are expert in the area ... I'm not saying that these are absolutely separate at all times. Practical knowledge has some theory in it. But it's not the kind of theory where you learn it like theoretical knowledge. It's part of how you think when you're working on something [practical] and you can try it out there and then ... And some practical areas have theoretical procedures that are more apart like in Electronics where you might have to theoretically work out a circuit while you're building it or fixing it.

In further pursuit of this issue, I explored Tom's ideas about the extent to which different areas of practical knowledge - Tom had moved to the term 'trade areas' rather than 'practical areas' - contained elements of knowledge in common. Such a notion appeared important in distilling Tom's views about the ways in which knowledge was organised.

How can you take knowledge away from what gives it its meaning and expect it to be useful any more? If your knowledge - and I'd say the same is true for theoretical knowledge probably - is 'in' the practical procedures and materials and has developed because of the way the procedures and materials and technologies have developed over the years. That's where all its meaning is.

Keep going, tell me more.

We use glues and do a lot of gluing in Upholstery. But it's not the glue that's important in its own right it's what makes gluing important and what kind of gluing is going to do the best job and what went before the gluing and what comes after in the procedure. The whole procedure is a whole thing and gluing is part of it. The closest we'd come to another area is Cabinet-Making but then there's big differences. So you can't take out 'gluing' and teach it in isolation or in with the Cabinet-Makers or whoever else uses glue just because it's 'gluing'. Well you can I suppose but that's moving away from what's important - not the glue but where

it is in the practical procedure and how it plays its role in making the procedure one complete whole thing.

But don't you take 'gluing' out and teach it separately in your class?

In Theory [class]? Yes. It's a bit artificial because you teach more about 'gluing' when you get to the workshop ... When I first started I had to go and read and look up things so I could teach Theory. Seems silly that I'd been a tradesman for twenty-odd years and I had to spend hours learning theory so I could teach it in the Theory class.

In general discussion, Tom revealed his feelings of uncertainty about conducting 'theory classes'. He suggested that very often they are 'a waste of time', not because he sees no value in having theoretical knowledge but because his own theoretical knowledge base is neither broad nor deep enough to enable him to present convincing explanations and arguments about 'that kind of knowledge'. He was learning the theory only a short time before he had to teach it, and that meant he didn't have time 'to explore it properly'. He indicated that he felt he has a lot of theoretical knowledge but that it is 'spread across the practical procedures and materials' that he has grown to know over his many years of experience. He can not gather it together in sufficiently cohesive amounts to be able to use it as a 'theory topic' that could be taught 'separated from the practical'.

5.4.6 Informant TM001 - Mitch

At the age of 15, Mitch left the family sheep and wheat property in country New South Wales to undertake a five-year apprenticeship in Greenkeeping. He spent 18 years as a tradeworker in industry, mainly with small businesses and, for a time, ran his own business. During these years he completed a paraprofessional Horticulture Certificate and

a degree in Agriculture. He has been a trade instructor for 12 years, and has completed the Diploma of Teaching (Technical). Recently, Mitch was seconded to work on the master plan for a new site for his Department.

Semantic Taxonomy Interviews

(See Appendix One for details of the protocol)

I met with Mitch in a portable, on-site classroom. It was adjacent to garden beds, orchards, lawns and machinery sheds. This was Mitch's equivalent of a workshop or laboratory. The classroom was dirty and poorly appointed, but this did not seem to be of any concern to Mitch - it was his setting. Prior to the interviews, he showed me around, pointing out what he would like to change in the development of the new site. He noted that, even though the term 'Turf Management' is used by the institution, as far as he's concerned, it's still 'Greenkeeping'. We drank tea from enamel mugs as the interviews progressed. The Domain Structure Diagram of Figure 5.21 is my representation of Mitch's views.

In the interviews, Mitch portrayed an image of knowledge organised by the functions and roles performed by the individual in their vocation, social setting and cultural context. That is, knowledge is valued to the extent that it serves these functions and roles. He acknowledges other ways of perceiving knowledge - here, school subjects provide the most prominent example - but they are not his own. Mitch focused on the vocation - and, particularly, the trades - and the notion of 'trade wisdom' heads a hierarchy that subsumes knowledge of processes and procedures. In this sense 'trade wisdom' refers to insights and patterns

Figure 5.22

Domain Structure: Informant TM001

Who knows what knowledge is? I don't know what knowledge is, but I do see it as being either organised in a way that provides a useful framework and it's unified, or it's segmented.



Can you explain more about these notions of 'framework' and being 'unified'?

It's organised by the functions you perform and they can be social or cultural, economic, vocational and so on. It's unified. It's integrated by the function. The knowledge you need to perform a function fits together around the function. You need to acquire skills and information for certification for a job. That's brought together by the wisdom of the job. It's an appreciation of the broader view of your work, the wisdom you get from being in the trade shapes how you think.

Can you explain more about the 'wisdom of the job'?

The maturity, the wisdom affects just what people do with all they know. The classic is work, your job. You need to be in tune with your level of output, enthusiasm you have for your work, fulfilling expectations of the workplace. It's also having clarity of purpose, a view of the career path. It's coming to grips with everything about the vocation.

It develops over time. It's a lengthy process. You have to discover it by working in the area. You observe from others on the job. You have to stay in the job to experience the situation and make observations and the boss has to care about what you're learning if you're an apprentice. It's not only working in the vocation, it's being in it so you develop the framework for the knowledge base.

What is the 'knowledge base' you speak of?

I don't know of anyone who says I'm right but what I'm saying is that the way knowledge is organised must be based on very recognised industry practices.

What's the difference between this and the segmented knowledge you spoke of?

It's integrated, conceptual, based on industry practices and procedures. It's practical. People think they need to organise knowledge into subjects because they're teaching it and they're teachers but it needs to focus on the problems and the skills in the industry. Competency-based training is a good idea because it focuses on the trade procedures and practices. A tradesman is not a teacher even if he's teaching trade courses because he thinks in terms of the trade procedures not theory subjects like Comm's and Calc's.

It's what you learn in the trade. It's the procedures and the materials and who you work with and how you put it all together. It's the wisdom you get by being really in it so you understand the whole thing.

How, then, do you acquire such knowledge?

By being in the trade. Really in. You become part of what your boss is doing. The whole idea of the apprenticeship system is about this. You know, passing on what you've learnt through your experiences. You don't sort of teach it outright. You put the kid into the position where he can experience it too. He's got to learn more than just the technical skills. Actually, they're the easy bit.

Can you describe what you mean by segmented knowledge?

Formal packaging of knowledge into compartments like Maths and Science like they do in schools.

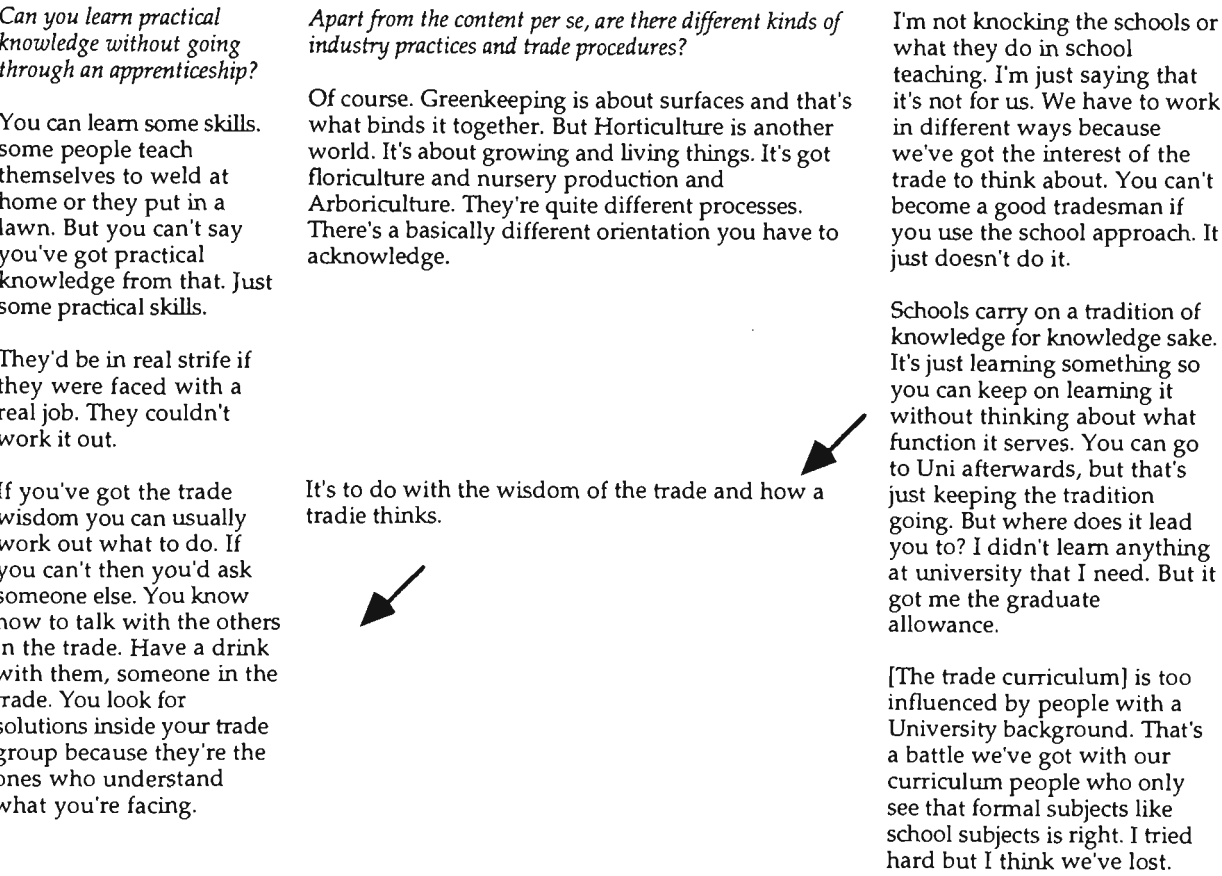
They don't make much sense in the real world. We [trade instructors] can't build on what kids did at school. Passing something like Botany at school doesn't give you a base for real understanding in a real sense like an industry sense. If a kid does botany and passes at school, it doesn't mean he actually can do something with it. He can't use it to do anything because what he's learnt doesn't have any meaning in a real world sense. It's just theory without the practical that holds it all together.

Don't school subjects like Botany address practical knowledge through laboratory work?

Ha! No! Have you seen what they do in their lab work? Really, it's not practical in any way. They don't let the kids really get at it because they make them follow recipes. That's not learning practical knowledge. It's just extending the theory class into a different room.

If you're a school teacher and not a tradesman then you lack so much in terms of the hierarchies and the patterns and how it all goes together. All you can do is theoretical stuff because that's all you learnt at University. You haven't got the wisdom that the trade gives you. Tradesmen don't think in subject compartments. You really have to be part of the trade to have a real understanding.

Figure 5.22 (continued)
 Domain Structure: Informant TM001



of relationships used by the competent tradeworker to inform actions and decision-making within the vocation, and direct experience is seen as the primary source of 'trade wisdom'. The 'trade knowledge' is concerned mainly with the performance of procedures and processes deriving from 'the job', and relies on a range of specific 'trade skills'. In order to attain coherence, trade knowledge needs to be embedded in a framework of 'trade wisdom'. A strong distinction is drawn between knowledge in which the main organising elements (for instructional purposes) are processes/procedures derived from 'the job' and that in which the main organising elements are 'subjects' of the kind dominant in schools and universities. Mitch referred to these as 'unified' and

'segmented' respectively, and places significantly greater value on the former. Figure 5.23 is my representation of Mitch's typology.

Figure 5.23
Major Typology: Informant TM001

Unified knowledge	Segmented knowledge
<i>Typical Descriptors</i>	<i>Typical Descriptors</i>
Framed by functions and roles Integrated conceptual approach Recognition of job practices Performing in an industry sense Processes and procedures	Learning for learning sake School curriculum structures Formal and school like Passing subjects Maths and science and other subjects
<i>Typical Examples</i>	<i>Typical Examples</i>
The skilled trades Greenkeeping Welding	School subjects Comm's and Calc's Mathematics Science Botany University subjects

Mitch conveyed a view of knowledge as framed by the functions and roles performed by the person, encapsulated in the notion of 'trade wisdom' and being very much related to the 'person'. By listening to the interviews several times and noting the bases on which Mitch made his distinctions, explanations and categorisations, it was possible to identify the operation of rule-like elements in Mitch's approach to knowledge. Figure 5.24 lists these rule-like elements.

Figure 5.24
Rule-Like Elements: Informant TM001

- If you've got this trade wisdom you can work it out.
- A tradesman ... thinks in terms of processes and procedures.
- Knowledge is organised by the functions and roles you perform.
- Deep understanding ... in the industry sense.
- Knowledge must be based on the very recognised industry practices.
- The main dimension is the person - knowledge is not external.
- You learn it through your experiences because you get used to self-evaluating and self-correcting.
- You don't teach it outright ... you put the kid [apprentice] into the position where he can experience it too.

Classification Task

(See Appendix Two for details of the protocol)

Mitch reported that he had really enjoyed 'the cards'. He indicated that the process had caused him to reflect on 'what makes things go together'. He was able to describe groupings and the basis upon which he had formed the groups. Figure 5.25 presents Mitch's classification scheme, supported by verbatim extracts from the accompanying interview.

Figure 5.25

Classification Task Results: Informant TM001

I've got five main groupings. These [Groups 2A, 2B] are the formal, academic areas and I've split them into the traditional Humanities and Sciences. Then I've put all the practical and the vocationally-useful knowledge into these groups [Groups 1A, 1B, 1C]. I've indulged myself a bit by making these a separate group [Group 1B]. If I was fair I'd probably have to put Greenkeeping in there [Group 1A] and Biology in there [Group 2A].

Group 1			Group 2	
Group 1A	Group 1B	Group 1C	Group 2A	Group 2B
Automotive Painting	Biology	Counselling	Electronics	Economics
Commercial Cookery	Greenkeeping	First Aid	Mathematics	English
Typing		Medicine	Physics	Genealogy
Welding		Nursing	Economics	Geography
		Architecture		History
		Art		Philosophy
		Accounting		Art
		Interpersonal Comm'n		Psychology
		Selling		Sociology
I took all these to be much more vocationally useful and probably more practical. You can see how these are based more in the practices of the industries. Procedures and processes and the materials involved. And professions I suppose.			These are the areas that I would associate with academic pursuits. These are the strands you'd have if you were going to go through school and on to uni and that's the goal you'd set yourself.	
You have to perform something here and that demonstrates you have acquired the knowledge. You know, put knowledge into action. So you know when you're wrong and you keep working 'til it comes right. Authorities assess you if you've got to be certified or licensed but you know that you've got it out because you can't learn just some of it - you must learn the whole thing.			In these, if you want to gain this knowledge they hand yourself over to a teacher, you know. They've got the knowledge and they pass it on to you. It's not like us where you watch an expert and he's got it all together - you do it yourself by self-learning, sort of. It's the same in assessment too. They rely on the teacher to tell them if they're right or wrong. They have the control over you, over it all and your function is to learn as much as you can. They don't have to know it all but we do.	
As you get more and more experience you get to see things more globally and you take a more heady approach to the area. You can't teach that - you learn it through your experiences because you get used to self-evaluating and self-correcting. You learn to be independent because you're carrying out a function and it's up to you.			By and large the traditional way of looking at these would be, I think, to have quantitative ones and the Humanities. I think that's how schools and universities arrange themselves and that must be how they see knowledge being logically divided.	
I think you could argue that the knowledge in these is not organised so much by 'subjects' as by practical outcomes. It depends a bit at what level you take it, too. In the largest way you can see that this is so, but then when they carry that across into the curriculum and how they teach it they tend to use more of the 'subjects' way of looking at knowledge.				
It's hard for us tradies when they want to use school-type subjects to organise our teaching. It's not really how we think. We're more organised around the procedures and the materials, you know, in a complete sense, the whole bit, not broken up.				
These are the real practical areas. These are relevant to the job. This is where you get down to real, earthy knowledge. You'd know what I mean.	Really, I just put these aside as a group because they relate to me and what I do.	These are vocational too. Some of them focus on caring and helping roles. some of them are a bit 'arty'. You might ask why Selling is there.		

Mitch formed two major groupings using 'academic and formal' and 'vocationally - oriented and practical' as the labels for the categories. The former category [Group 2] included areas that Mitch perceived as the kinds of knowledge pursued by those who wanted a 'good education' through to university level without pursuing vocational training. The knowledge was the province of schools and universities wherein people acquired knowledge mainly 'for the sake of learning'. The latter category [Group 1] contained those areas that had an obvious 'vocational' orientation and which were 'practical' in nature. Within each of these major categories Mitch formed groups. He divided the 'academic' group [Group 2] into what he labelled the 'traditional' categories of Sciences [Group 2A] and Humanities [Group 2B]. The Sciences were characterised as quantitative, formal disciplines, deriving from the empirical Sciences and Mathematics. The Humanities were 'the more classical disciplines' and were characterised as being 'quite abstract'. They were both 'like school subjects'.

Mitch divided the 'vocational' group [Group 1] into three sub-categories one of which he labelled as 'the caring/helping vocations' [Group 1C] and two of which he labelled 'other vocational areas' [Group 1A and 1B]. The 'caring helping' areas [Group 1C] were grouped together because of the common focus on the role of caring and helping people. Mitch described this as an 'essential and fundamental function in our society'. The 'other' areas [Group 1A and 1B] were 'vocationally-oriented', and there was an 'element of creativity' involved in the areas of Group 1A. To varying degrees these were also 'practical' areas with 'tangible outcomes'. A further characteristic common to 'most vocationally - oriented' areas was the extent to which 'self-evaluation' and being 'self-

correcting' were essential parts of the learning. In such case the learner was very much in control of the learning, and was able to monitor progress because the outcomes were, in the main, tangible. As a consequence experience became an important method by which further knowledge was gained and a 'global' view of the area was formed. In contrast, 'academic' areas required that the learner defer to an expert who 'controlled' the knowledge and gave indications of progress, mainly through 'formal assessment procedures'.

Mitch isolated a group that he called 'my areas' [Group 1B] and which he described as the areas with which he felt aligned in his work as a Greenkeeper. He acknowledged that he should have allotted the Biology area - an area of knowledge that supported 'his' area - to the Sciences [Group 2A] and the Greenkeeping area to the 'other vocational areas' [Group 1A]; identifying them as a separate group had been some 'self indulgence'.

In the early part of the interviews Mitch suggested that most people make a fundamental assumption about the organisation of knowledge that he did not necessarily share. He suggested that 'everyone assumes' that knowledge is organised into the 'subjects' presented in the task. He questioned whether such an assumption was appropriate, especially when knowledge was removed from the constraints of having to be formalised for curriculum and instructional purposes. This appeared to be an epistemological position, elements of which had arisen in the Semantic Taxonomy Interviews. Mitch emphasised that he was 'continually being asked to put that aside by the powers that be' when he was devising and writing new courses. That is, Mitch felt that the

constraints placed upon him when he was undertaking course design were such that he conformed to 'a subjects approach', and thus courses in his area contained 'subjects such as Botany and Maths'. His preferred position was that knowledge should be organised primarily around the functions that are performed in the trade, that whatever knowledge was needed to perform a function 'should be brought together around the function', and that notions of 'school-type subjects' should be abandoned in this context. Mitch indicated that he had tried to write a course based on this principle 'in my own time' but that it had been 'rejected out of hand'. He had not been given reasons for the rejection other than 'it doesn't conform to the way we do things'.

Postnate Interview

The early part of the interviews focused on Mitch's reactions to my representations of his views of knowledge in Figures 5.22 - 5.25. He indicated that the representations were abbreviated but adequate and fair reflections of his views of knowledge and he had no significant changes or additions to make.

You painted me as a bit of a rebel.

Do you think I've been fair and accurate in what I've written?

Oh yes. No worries. You've written it pretty well. I'm not worried about minute detail - I'm concerned that the main messages are there, and I think that's what you've done. I can't think of anything of any importance that's not already there. I know you had to pick and choose to get it down to size ... The main thing is that you've got my main point about the constraints placed on us and the assumptions that they're based on. If you start with certain assumptions where you go to is predetermined and you can tinker with it all you like - it won't change what is basic and fundamental.

After the Classification Task interview Mitch had showed me a course document that he had prepared and submitted for approval. He had attempted to abandon the 'normal' in favour of a way of thinking that focused more closely on what he proposed as the functions performed by a 'good tradesman'. The course document had been organised and written in accord with his views of trade knowledge and had been rejected by the relevant TAFE authorities.

Is that what you tried to reflect in the course document you showed me?

I tried to put down in that document what I believed was a more natural approach to trade knowledge. If you start with the assumption that trade knowledge is merely specific combinations of existing subjects that's exactly what you'll get. But if you start from a different beginning you can build something that's a better representation of trade knowledge. What I said was let's look at what being a tradesman is all about. It's about performing a vocational role in society, it's about gaining wisdom about life and your trade area and to be able to tackle anything in your area confidently and competently. To get that you need certain skills and knowledge, but it must be set into a context of what the trade is all about. And I'm afraid that means changing from courses which have Botany 1 and Botany 2 and the like to one which focuses on different formulations of knowledge.

Why did you call that a more natural approach to trade knowledge? Are you suggesting that all trade knowledge is different to other knowledge?

I don't know that, I just suspect it. The thing about trade knowledge as far as I'm concerned is that it's hard to formalise it the way you can say Chemistry knowledge. With Chemistry there's a lot of abstract material and lot's of things you can teach in a fairly formal way. Like Chem 1. I did it at Uni. None of that has to lead somewhere except on to other Chemistry knowledge. So you learn it for the sake of learning Chemistry. But you don't learn trade knowledge of that same kind. You don't learn it by doing theory and thinking about it in the abstract. You

actually have a function to perform and a procedure to apply. So you learn the procedure in its context and you learn what the procedure means as you go and how it works. And I think all trades, well most of them, are probably like that. And you learn any theory by doing that.

What happened when you submitted the course for approval?

I think they looked at it and couldn't see subjects like Botany 1 in it. None of them have been Tradies or if they have they think that writing courses is an academic thing to do and has to look academic. They've been told to get the documentation into a format that's been handed down to them. So I didn't get very far.

What did the other trades teachers think about your course?

We basically worked it out together. There's only three of us and I guess I wrote it because I write more fluently than they do. Smaller hands I think!

Mitch displayed an air of capitulation over the issue of the course document. He indicated that the controls placed on him as an instructor were such that he could not exercise his 'professional judgement' about what to teach or how to teach it.

If it had been successful what changes would it have made?

I think it would have changed our job a fair bit. Instead of being a 'teacher' I think we would have operated more the way they do in industry. Projects and tasks and making the students act like workers with responsibilities ... I guess our job would have been less formal ... We wouldn't be phased by that. I think we'd be happier. New teachers would be.

In this last statement Mitch was alluding to the extent to which newly-appointed trade instructors find difficulty in taking the 'theory' classes.

His tendency had been to ensure that newly-appointed trade instructors were allocated to 'practical' classes in their first semester of teaching. However, at a more fundamental level, Mitch was alluding to the 'change in thinking' required by instructors when faced with the formalising of their trade knowledge for instructional purposes. In a sense this meant that they needed to 'objectify' and reconfigure their knowledge so that it could be made available to students in the form predetermined by the course documentation. Mitch was suggesting that this predetermined form was based on 'academic' interpretations of the ways in which knowledge was organised and hadn't taken into account his notions of the basic differences between 'practical' knowledge and 'theoretical' knowledge.

5.5 The Next Step

As noted in Section 4.5, Phase B of this study was an intensive study with a small number of informants. For clarity of presentation, the outcomes of Phase B are presented across two chapters. The role of this chapter has been to present the results of the fieldwork of Phase B on an informant-by-informant basis; the more detailed discussion of the results as a whole, including discussion of the ways in which these results shaped the emerging theoretical position, is presented in Chapter Six. Both Chapter Five and Chapter Six continue to develop the argument of the thesis.

Chapter Six

Grounded Investigation Exploration of Phase B Results

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Chapter Six

Grounded Investigation Exploration of Phase B Results

Pragmatism has no objection whatever to the realising of abstractions, so long as you get among particulars with their aid and they actually carry you somewhere.

(William James¹)

6.1 Introduction to the Chapter

This study attempts to achieve theoretical development in a process that involves both the systematisation of existing theories, research and literature, and empirically-based, grounded investigation. These are represented in the study as Phase A and Phases B/C respectively.

Phase B is an intensive, two-stage investigation based on a small number of informants. One of the stages - involving the Semantic Taxonomy Interviews and the Classification Task - focuses on data-capture, whilst the second stage - involving the Postnate Interviews - focuses on confirmation and validation of the researcher's interpretations of the results of the earlier stage. The outcomes of this intensive empirical work are presented across two complementary chapters - Chapter Five reports the results on an informant-by-informant basis, and this chapter focuses on the results considered as a whole. In Phase C, the empirical investigation continues with a focus on

¹ James (1967: 40)

communication with a large number of trade instructors, and this is reported in Chapter Seven.

Phase B of this study provides the first empirically-based contact with the views that trade instructors hold about knowledge and knowing. In the results presented in Chapter Five, informants display substantive positions of separate and independent character that appear to extend well beyond mere acquiescence or subservience to other positions. They provide commentary on epistemological issues - in the sense described in Section 1.1 - and, from their discourse, it is possible to discern frameworks and typifications by which to represent these views. Further, it is apparent that the views that these trade instructors hold about the domain of 'knowledge' are likely to be of some significance in decision-making and action at the level of curriculum and instructional processes. Whilst both common wisdom and the insights provided by the earlier theoretical considerations may have predicted that such a result could emerge, there had been insufficient argument and empirical evidence available to this research effort to permit any assumptions about the fundamental nature of these views to be taken for granted.

Development from the results presented in Chapter Five involves distillation of commonalities and differences in the views expressed by the informants, exploration of the ways in which such outcomes shape the emerging theoretical position, and the positioning of the study for communication with a large number of informants - the next phase of the study. It is also the purpose of this chapter to widen the

opportunities for interpretation by reflecting on the process of the research.

6.2 The Structure of the Chapter

The first two sections of this chapter - Sections 6.1 and 6.2 are these introductory sections. Each of the following four sections - Sections 6.3 to 6.6 - considers a major aspect of the outcomes of Phase B. Section 6.3 focuses on the emerging theme of pragmatism-functionalism that appears in the outcomes of Phase B; Section 6.4 portrays what the trade instructors of Phase B view as valid and valued knowledge; Section 6.5 describes the apparently dominant typology that arises from Phase B, and Section 6.6 examines the practical-theoretical dichotomy that appears to underpin the typology. Although they are presented as independent sections, it is not possible to establish clear separations for, inevitably, there is a need to address some of these aspects from several viewpoints. Within each of these four sections links are forged with the outcomes of Phase A so that theoretical development occurs across this chapter.

Section 6.7 provides some reflections on the methods of the study as they were enacted in Phase B, and in terms of direction for Phase C. The final section is Section 6.8 which creates links to the next chapter - the reporting of Phase C.

6.3 An Ambience of Pragmatism and Functionalism

Perhaps the feature most conspicuous and pervasive within the views elicited from the six informants in this phase of the study - and presented in Chapter Five - is the ambience of pragmatism and

functionalism. That is, in considerable part, the positions taken by these informants appear to be underpinned by a propensity to deal with matters according to their practical significance and their importance in the resolution of immediate problems. In using the terms 'pragmatism' and 'functionalism' to describe the views of these informants, the intention is to capture a collection of related ideas under a theme, whilst acknowledging the integrity of the individual positions. It is to suggest that there is a family of characteristics that serve to mark off the views taken by these informants. Not all of these characteristics appear within every position, and those that are attributed to more than one informant may appear in different combinations. It is not to suggest that these qualities are portrayed by a single characteristic common to each of the positions taken by the informants.

It would appear that, in varying degrees, all informants involved in Phase B agree that valued knowledge is distinguished on the basis of its practical usefulness. Central to this view is a notion that, when developing ideas, the knower is guided more by successful practice than by theoretical concepts or metaphysical postulates. Informants appear to perceive knowledge as those processes and tools that have been found to be effective in practice - successful ideas that have been fully tested by experiment and experience. This is illustrated most clearly within the dimensions used by informants to establish groupings in the Classification Task. For example, five of the informants used 'usefulness of the outcomes' as a primary dimension by which to distinguish between knowledge areas. Here, the interpretation of 'usefulness' is distinctly empirical - including 'vocationally useful' and 'technologically useful' - and functional. Related to the dimension of

'usefulness of outcomes', is that of 'tangible outcomes'. The interpretation given to 'tangible' by several of the informants is that the knowledge area not only leads to useful outcomes but that the outcomes are observable by both the individual and in a public sense. Where outcomes are 'useful', 'tangible' and 'observable', they are open to public scrutiny. Whilst this does not mean that the process for achieving the outcomes necessarily is public, the open nature of the outcomes means that insights may be gleaned about such knowledge and judgements may be made by those who are not knowledgeable of the area. Conversely, informants question the validity of knowledge that remains hidden from all but the experts, and for which public verification is available only by indirect measures. For example, three of the informants note that 'school subjects' are publicly verifiable only by the indirect and highly tenuous measure of their usefulness as preparation for embarking on vocationally relevant pursuits or further study at university. These trade instructors doubt the value and, to a significant extent, the validity of knowledge from the regimen of school subjects. Such concern extends more generally to all such theoretical knowledge.

It would seem that the criteria by which these informants judge the validity of valued knowledge relate strongly to practical consequences and bearing. Validity is demonstrated in terms of success in assisting the knower to carry out functions. Thus, 'understanding' implies the ability to act consciously to achieve a desired end and, it would seem, this involves an emphasis more on method than on subject matter. That is, the basic elements are the methods. The use of agreed methods - in this case, agreed within the trade - allows all knowers to reach the same

conclusion. Valid ways of knowing are part of a successful method of performing roles, carrying out functions and solving problems. A most forceful illustration of this derives from the rule-like elements that emerge from the Semantic Taxonomy Interviews. Figure 6.01 presents a selection of such elements taken from across all informants, and assembled under the heading 'criteria for judging valid knowledge'.

Figure 6.01
Rule-like elements portraying criteria for judging valid knowledge

-
- Sound basic knowledge is demonstrated in terms of practical things you can do.
 - Substantial basic knowledge is validated by the real things you can do.
 - You must assess the kid on the competencies and skills appropriate to the trade.
 - Knowledge must be based on the very recognised industry practices.
 - Deep understanding ... in the industry sense.
 - You know whether practical knowledge is right because it's there to be seen. But you can't tell with theoretical knowledge.
 - You know it if you can do it and show it.
-

In combination, these factors - knowledge as successful practice and an emphasis on method - suggest that these informants perceive that knowledge is developed in the context of practice. Theory - in the sense of a system of ideas that explain something, and general principles - arises from practice and ideas are tested in terms of practice, by what is to be done if that idea is accepted as correct, and by the contribution of that idea to the overall success of practice. In this sense, they portray the notion that knowledge is not independent of the knower - a somewhat anthropocentric attitude that emphasises the role of the knower in what counts as valid knowledge. As Informant TM001 notes:

The main dimension is the person: knowledge is not external.

(From Figure 5.24)

6.4 What Counts as Valid Knowledge

The discourse of at least four informants appears to be characterised by a consistent prescriptive quality. They make little attempt to use neutral typologies, and there is a tendency for these informants to use contrastive devices - one of the major purposes of which is to display their preference for one kind of knowledge. In presenting their views about what they regard as an adequate way of knowing, these informants tend to contrast it with ways of knowing that they regard as inadequate - too 'complex' to be of any 'tangible' worth. The tone of their discourse clearly is closer to asseveration and obduracy than to the judicious balancing of different views. It is possible to discern at least four aspects of the image of knowledge that these informants perceive as valid and valued. In part, these aspects are reflected in the rule-like elements reported in Chapter Five, and Figure 6.02 presents typical examples of these elements.

Figure 6.02
Rule-like elements portraying the nature of valid knowledge

-
- Intuitively, you know what to do and where to go with things.
 - If you've got this trade wisdom you can work it out.
 - Our knowledge is about understanding the whole thing.
 - Our knowledge is structured, step-by-step, and organised; theoretical knowledge is complex.
 - Your knowledge is there to be seen.
 - You know it if you can do it and show it.
 - Sound basic knowledge is demonstrated in terms of the practical things you can do.
 - I don't worry about the words I worry about the things.
 - Knowledge is organised by the functions and roles you perform.
 - Spiritual knowledge provides the context for developing other knowledge.
-

One aspect of the image resides in terms such as 'wisdom', 'natural', 'understanding of the whole' and, even, 'spiritual'. In this image, valid knowledge has unity. It involves not only skills and information but also the web of relationships that brings them together in practical application. To the extent that the skilled trades epitomise these

qualities, the referents for these terms are the materials and processes of 'the trade'.

A second aspect of the image of valid and valued knowledge is captured in terms such as 'tried and tested', 'intuitive and routine' and 'step-by-step'. That is, valid knowledge is characterised by such immediate apprehension and certainty that it may be applied with confidence and the assurance of a reliable outcome.

A third aspect to emerge from the informants' views is that of openness - 'there to be seen', 'show it', 'practical things you can do'. That is, the public ways in which the applications of such knowledge are expressed provides a process by which its validity may be judged. To these informants, the skilled trades epitomise such knowledge. But openness, together with the 'narrow' and 'technical' sources of such practical knowledge - particularly in 'materials and procedures' of the job rather than in 'academic' settings - portrays a fourth aspect of the image of valued and valid knowledge. The skilled trades have 'low status'. Conversely, it is noted by three of the informants that because it is complex, hidden from public verifiability and accessible only through a knowledgeable authority, theoretical knowledge commands higher status than practical knowledge. The notion of theoretical knowledge presented here relates not to the 'theory' that might emerge in the context of practical application - see Section 3.7 - but to those areas of knowledge that appear to be divorced from any sense of practical application - in the eyes of these informants, areas such as Mathematics and Philosophy.

Related to this image of the nature of valid and valued knowledge are insights into the informants' positions on the sources of knowledge and the processes for acquiring such knowledge. It is clear that, within a basically pragmatic-functionalist position and from the perspective of informants who are both tradeworkers and trade instructors, valid and valued knowledge derives from the processes of the skilled trades. The trades provide context and 'trade processes', 'methods and procedures' and 'processes and materials' provide points of reference. That is, informants claim valued and valid knowledge as deriving from and shaped by the experience of work in the skilled trades - as portrayed in Figure 6.03.

Figure 6.03
Rule-like elements portraying sources of, and processes for acquiring valid knowledge

<i>Sources of valid knowledge</i>	
<ul style="list-style-type: none">•••••	<ul style="list-style-type: none">Trade knowledge comes from the materials you use, the practical processes you are using.Solid knowledge comes from the materials you use, the practical processes you are using.Practical knowledge comes from the procedures and materials of the trade.A tradesman ... thinks in terms of processes and procedures.The main dimension is the person: knowledge is not external.
<i>Processes of acquiring valid knowledge</i>	
<i>Trial-and-Error and Self-Learning</i>	
<ul style="list-style-type: none">••••	<ul style="list-style-type: none">Test it, try it, see if it works ... just keep trying 'til it works.You learn it through your experiences because you get used to self-evaluation and self-correcting.You don't teach it outright ... you put the kid [apprentice] into the position where he can experience it too.I'd tell them to do something but I wouldn't always tell them how to do it.
<i>Experience and Intuition</i>	
<ul style="list-style-type: none">••••••••	<ul style="list-style-type: none">Intuitively you [tradeworker] know what to do and where to go with things.You can work things out if you've been around.Experience shapes your responses and how you think.Past experience determines what you do and the way you do things.If you've got the experience you can work it out without theorising about it.If you've got this trade wisdom you can work it out.Good tradesmen have an aptitude, an innate ability to master a task, and many years of experience.A good tradesman has both the hard trade knowledge and perception of the overall feel and form.

There are two points that might be highlighted about this position. First, the notion of experience presented here is not simply the chaotic and

difficult-to-control impressions made on the senses through continuous interaction with the environment. Rather, it is a notion of structured and coherent experience framed by the processes and context of the skilled trades - there is some resonance here with the Deweyan notion of 'fastening on to the regular to control the precarious' (Dewey 1960: 86). Second, the emphasis on experience appears to be related to a rejection of any separation of knowing from doing or theory from practice. This is not a contradiction of the practical-theoretical dichotomy that is so prominent within the discourse - and discussed in Section 6.6. It is the notion that whatever theoretical knowledge exists and is valued, it is inseparable from the practice from which it derives. Knowledge structured by identifiable procedures, materials or processes of the trade is 'structured', 'simple', 'real' and 'logical'. To the extent that any theoretical component of such knowledge is identifiable, it is closely intertwined with practice and not separable from the practice or the context within which such practice occurs.

Several of the informants place considerable emphasis on portraying the modes of acquiring valid knowledge as requiring the knower to be 'really in it'. For example, three of the informants hold the view that because theoretical knowledge is abstract and complex and has few observable or tangible outcomes, it remains 'hidden' - the province of a knowledgeable authority such as a teacher. Some of the consequences of this include the need for the individual to relinquish control of the process of acquiring knowledge to that knowledgeable authority, to rely heavily on 'abstract reasoning' processes, and to acquire knowledge at a rate determined by that authority. Thus, these informants perceive the knowledgeable authority as an intermediary, holding a position

between the individual and their access to the experience from which knowledge derives. Further, the lack of observable outcomes in theoretical knowledge means that no avenues are available to individuals to confirm or to adjust their knowledge base of their own volition. Again, this requires that the knowledgeable authority - the teacher - determine the extent to which the individual has become knowledgeable, and deepens the asymmetrical dependence of the novice on the authority - it attenuates the individual's access to knowledge. On the other hand, practical knowledge produces tangible, observable outcomes that are available to the novice and allow that individual to 'self-evaluate' and to 'self-correct'. The processes by which such knowledge is acquired include the notions of 'self-teaching' and 'trial-and-error', processes that can be controlled by the individual and which do not require the knowledgeable authority as an intermediary - the notion of anthropocentrism noted earlier. In this sense the individual becomes the primary agent in the processes of acquiring 'practical' knowledge, and whilst knowledgeable authorities are appropriate and necessary sources of assistance and advice, their primary role is to create the setting and the framework within which the novice acquires knowledge. Perhaps this is typified in the comment by Informant PB001 in the Postnate Interviews:

I'd tell them [apprentices] to do something but I wouldn't always tell them how to do it.

Closely related to this is the notion of 'passing-on' the knowledge and wisdom of the trade through the institution of apprenticeship. That is, 'the setting and the framework' that provide for the novice access to the experiences they need to acquire the knowledge of the trade, are

provided in the master-apprentice model. From the results presented in Chapter Five, it is possible to discern an image of this interaction. It is captured, at least in part, in terms such as those displayed in Figure 6.04.

Figure 6.04
Characteristics of the master-apprentice process

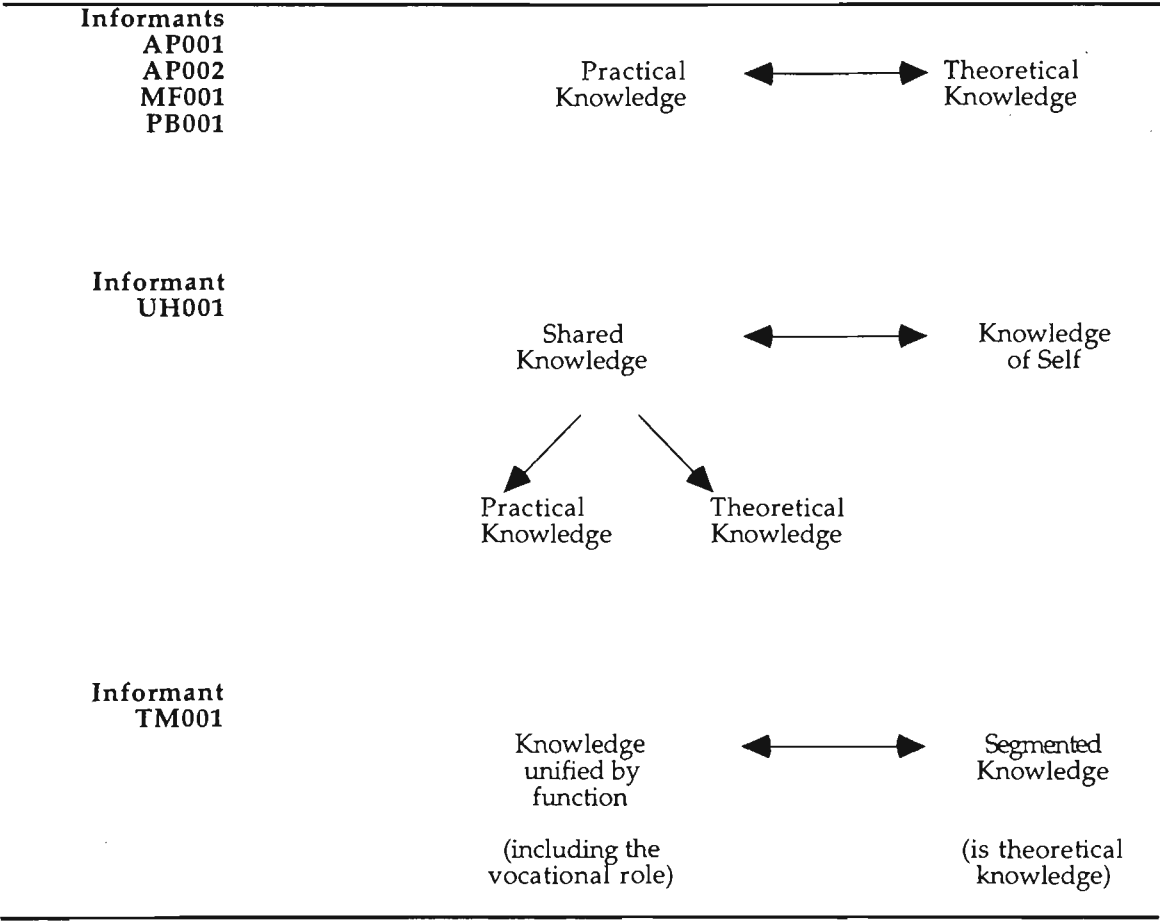
-
- You can't tell them, you've got to model it and let it sink in. It's like raising kids.
 - You look after them and you're a model to them.
 - You put the kid into the position where he can experience it too.
 - The whole idea of the apprenticeship system is ... passing on what you've learnt through your experiences.
 - You learn practical knowledge by being immersed in the trade.
 - You have to teach in the theory room but in the workshop you can set it up so the kids get right at it - the knowledge.
-

The image appears to include a notion that the 'master' is mentor and model in senses that extend beyond the mere acquisition of skills. For example, several of the informants note that 'wisdom of the trade', 'doing a good job' and 'getting along with people' are part of what apprentices need to learn. They learn these aspects by being exposed to the experience of the trade, under the guidance of a qualified tradeworker.

6.5 An Emerging Typology

Perhaps the strongest contribution to the pragmatism-functionalism theme relates to the nature of the typologies that emerge from the results presented in Chapter Five. For example, in the Semantic Taxonomy Interviews three major typologies are discernible and, whilst they display clear differences, in varying degrees each incorporates a practical-theoretical dichotomy. Figure 6.05 provides a summary of these typologies.

Figure 6.05
Major typologies



The typology common to four of the informants is based directly on the practical-theoretical dichotomy - or minor variations thereof. Here, informants establish an opposition between knowledge characterised as 'tangible', 'practical', and 'useful' and that characterised as 'theoretical' and 'intangible'. Much of the discourse of these informants involves supporting and displaying preference for practical ways of knowing, and drawing contrast with other, more theoretical ways of knowing.

The practical-theoretical dichotomy also is evident in the typologies emerging from the other two informants. However, it might be noted that, for one of the informants, the dichotomy is located within a major element of a higher-order dichotomy comprised of 'knowledge of self'

and 'shared knowledge'. Further, the typology portrayed by another informant presents an opposition between segmented knowledge - described by the informant as 'theory' and 'theoretical' - and knowledge shaped and constructed with regard mainly to its function. This latter category holds some resemblance to a 'forms of knowledge' approach with its 'different but equal' emphasis, and it is within this category that the skilled trades provide a focus for practical knowledge. Whilst the 'practical-theoretical' dichotomy is central to the views of all informants, the evidence of at least two of the six informants contains elements that tend to place this dichotomy within a more detailed typology. The possibility that, in a larger population of informants, there may emerge a wider range of views reinforces the importance of obtaining slices of data at different levels and of balancing the different kinds of data - as provided in this study by both the data-capture and validation strategies in Phase B, and by Phase C.

In very large part, the typologies formulated from the Semantic Taxonomy Interviews are echoed in the outcomes of the ensuing Classification Task. Here, informants formed six schemes, each of which organises the 26 given knowledge areas into groups based on the informants' views of similarities between areas. In five of the six cases, it is clear that the major typology is based on a 'practical-theoretical' dichotomy. In the sixth case, the typology again is evident, though disguised somewhat by the incorporation of the 'practical' element within a broader category, labelled by the informant as 'vocationally-oriented and practical'. All informants value practical knowledge over theoretical knowledge, although two informants, again, attempt to temper this with an 'equal but different' emphasis.

It is notable that, although there existed a range of opportunities to do so - in the Semantic Taxonomy Interviews and in the options available within the Classification Task - none of the informants gave any prominence to a category that might be noted as a 'sciences' category - although, in the Classification Task, two of the informants indicate the possibility of devising a group that has a science orientation. Further, none of the informants distinguished between areas on the basis of a 'sciences-humanities' dichotomy - though, again, two informants indicate the possibility of devising groups based on this distinction. These outcomes stand in some contrast with the those from the works of researchers in other areas, notably Biglan (1973a, 1973b), Young (1981), Benson (1989, 1984), Donald (1986, 1983), and Donald and Nagy (1985) - whose works were noted in Chapter Two². In those studies, the most frequently identified typologies involve the sciences, the social sciences and the humanities as the major elements. Often, the sciences emerged as the most prominent category and, in some cases, science is portrayed as the epitome of knowledge - but these are studies about teachers in schools and universities rather than tradeworkers who become trade instructors.

6.6 The Practical-Theoretical Dichotomy

From the evidence available so far, and notwithstanding the outcomes of Phase C of the study, it would appear that central to any emerging position is the 'practical-theoretical' dichotomy. In Phase B, informants provide descriptors for the two major elements in this dichotomy.

² One of the criticisms that might be made of the work of these researchers is that, in large part, they begin with the traditional disciplines approach as the basis for the organisation of knowledge, and provide little opportunity for their respondents to challenge this assumption. The work of the present study attempts move beyond this assumption.

'Practical knowledge' is described in terms of clarity of structure and organisation, and providing useful and tangible outcomes. On the other hand, 'theoretical knowledge' is described in terms of abstractness, complexity and formlessness, and separated from any practical context. The descriptors most prominent in the views of the informants are presented in Figure 6.06.

Figure 6.06
Descriptors used for practical and theoretical categories.

Descriptors Typical of Practical Knowledge	Descriptors Typical of Theoretical Knowledge
Useful outcomes	Abstract
Simple and logically structured	Complex
Public and verifiable	Acquired by being taught
Tangible outcomes	Lacking tangible outcomes
Derived from procedures and materials	Academic
Theory interwoven with practice	High status
Acquired by self-learning/trail and error	Hidden
	The 'good' education

Insights into the nature of the practical-theoretical dichotomy may be gleaned from some further analysis of the results of the Classification Task, and a number of features may be identified. First, informants display a high degree of concordance about which knowledge areas are 'practical' and which are 'theoretical'. Figure 6.07 presents the distribution of the 26 knowledge areas of the Classification Task across these two categories.

All six informants agree that Automotive Painting, Commercial Cookery, Greenkeeping, Typing and Welding are 'practical' and might be considered 'typical examples' for such a category. Not only do informants agree that these are practical, but they agree also that there is no basis for any of these areas to be classified as theoretical. Similarly, all

Figure 6.07
Distribution of knowledge areas across practical and theoretical categories

N ^o of times classified as practical	Knowledge Areas	N ^o of times classified as theoretical
0	Geography	6
0	Philosophy	6
1	English	6
1	History	6
1	Psychology	6
2	Sociology	6
2	Genealogy	5
2	Accounting	5
1	Architecture	5
2	Art	5
1	Counselling	5
1	Economics	5
2	Interpersonal Communication	5
1	Mathematics	5
1	Medicine	5
1	Physics	5
2	Biology	4
3	Selling	3
4	Electronics	2
5	First Aid	1
5	Nursing	1
6	Automotive Painting	0
6	Commercial Cookery	0
6	Greenkeeping	0
6	Typing	0
6	Welding	0

* A total in excess of six is possible because informants were able to allocate an area to more than one category.

six informants agree that areas such as Geography, Philosophy, English, History, Psychology and Sociology are 'theoretical'. In this case, however, there is not quite the same level of agreement amongst informants. This might be noted as an indicator of the extent to which these informants perceive practical knowledge - particularly that which derives from the skilled trades - as isolated from other forms of knowledge.

A second feature that can be discerned relates, again, to the visions these trade instructors hold about the natures of practical and theoretical knowledge. By determining the extent to which each knowledge area is linked to all other knowledge areas in the Classification Task, it can be

shown that the areas with the larger number of such linkages or associations are drawn exclusively from the category identified by informants as theoretical knowledge, and those with the smaller number of associations are drawn from the practical category - see Figure 6.08.

Figure 6.08
Associations of each knowledge area with all other areas

Knowledge areas with high number of associations	Knowledge areas with low number of associations
Mathematics	Automotive Painting
Psychology	Commercial Cookery
Sociology	Typing
Art	Welding
Interpersonal Communication	Greenkeeping
Physics	Electronics

Examination of the classification schemes generated by informants shows that the areas with a high number of associations appear across a large number of sub-groups and/or in sub-groups containing a large number of areas. This provides some support for the notion that there are some differences between informants about the nature of these areas, and this lack of agreement lends some support to the earlier notion that the informants consider these areas to be more sequacious and, perhaps, unstructured than clearly discernible and bounded.

Conversely, the knowledge areas with the lower numbers of associations in Figure 6.08 are drawn from the areas that informants classify as practical knowledge. Again, examination of the classification schemes generated by informants shows that these areas are confined to a small number of smaller-sized sub-groups, and this supports the notion that informants are more likely to share perceptions about the nature of these areas. That is, it is likely that there is considerable

agreement amongst informants that these areas are quite focused and bounded, and more clearly differentiated in terms of the major dimensions used by the informants to distinguish between areas.

A third feature that emerges from the analysis of the results of the Classification Task relates to the notion of the degree of separation between the major elements of the practical-theoretical dichotomy. From the data given in Chapter Five, it is possible to establish the areas with which any given area is most strongly/weakly associated and to establish the strength of association between any given pair of areas. The basis for identifying strong/weak associations is the number of times an area is associated with each of the other 25 knowledge areas in the Classification Task. This is presented in Figure 6.09, and portrayed graphically in Figure 6.10.

In very large part, the knowledge areas with which theoretical areas are most strongly associated also are from the theoretical knowledge category, and the areas with which they are most weakly associated are from the practical knowledge category. Similarly, knowledge areas with which practical areas are most strongly associated also are from the practical knowledge category, and the areas with which they are most weakly associated are from the theoretical knowledge category. All associations between practical and theoretical knowledge are, at best, weak associations. That is, this analysis indicates that there is a strong degree of separation between the elements of the practical-theoretical dichotomy. It would appear that these trade instructors perceive practical knowledge - as they have described it - as clearly separated from other areas of knowledge. The strength of the separation is illustrated

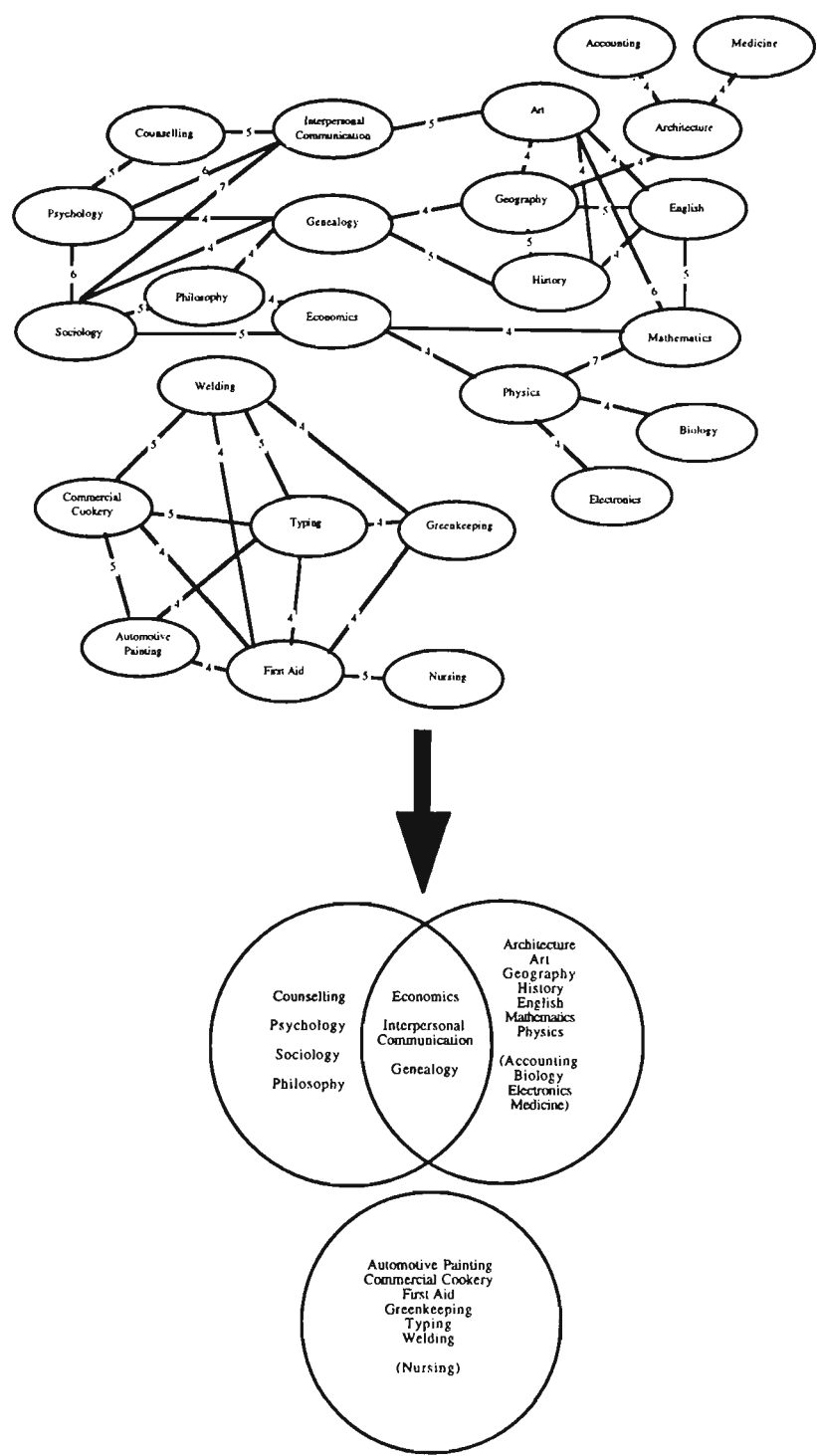
Figure 6.09

Strong/weak associations between knowledge areas

Practical			Theoretical		
Weakest Associations		Strongest Associations	Weakest Associations		Strongest Associations
Biology History Medicine Sociology English Psychology Economics Counselling Genealogy Interpersonal Communication Sociology	Automotive Painting	Welding Commercial Cookery First Aid Greenkeeping	Automotive Painting Commercial Cookery Electronics First Aid Typing Welding Greenkeeping Typing Nursing Selling	Geography	English History
Biology Counselling Economics English Geography Genealogy Medicine Philosophy Physics Psychology Sociology	Commercial Cookery	Welding Typing Automotive Painting	Welding Typing Selling Commercial Cookery Electronics Greenkeeping	Philosophy	Sociology Psychology
Accounting Architecture Counselling English Geography Genealogy	Greenkeeping	Typing Welding First Aid Commercial Cookery Automotive Painting	Automotive Painting Commercial Cookery Counselling Electronics First Aid Greenkeeping Nursing Welding	English	Geography Mathematics
Biology Counselling Economics Genealogy Geography History Medicine Philosophy Physics Psychology Selling Sociology	Typing	Commercial Cookery Welding	Automotive Painting Electronics First Aid Greenkeeping Nursing Selling Typing Welding	History	Genealogy Geography
Biology Counselling Economics English Genealogy Geography History Interpersonal Communication Mathematics Medicine Philosophy Psychology Selling Sociology	Welding	Commercial Cookery Typing	Automotive Painting Commercial Cookery Electronics Greenkeeping Typing Welding	Psychology	Interpersonal Communication Counselling Sociology
			Automotive Painting Electronics Typing Welding Greenkeeping Commercial Cookery	Sociology	Interpersonal Communication Psychology

most vividly in Figure 6.10 which maps the stronger associations between knowledge areas - weak associations are those between zero and three, and stronger associations are those in excess of three.

Figure 6.10
Diagrammatic representation of the stronger associations between knowledge areas



It would appear that there is some basis for claiming that these informants have a framework of views about knowledge and knowing, and that they distinguish between areas of knowledge not on the popular basis of sciences-humanities-social sciences but in accord with a typology based on a practical-theoretical dichotomy. Indeed, the separation appears to be so significant, and the commitment to practical knowledge seems so determined, that it provides something of an echo to Aristotle's 'obvious' dichotomy between the heaven and the earth - the perfection of one and the imperfection of the other.

A fourth feature to emerge from the Classification Task is that one area - Selling - formed no strong associations with any other area of knowledge. Further, Selling received a sum total of raw associations significantly lower than any other area and placing it in the realm of an outlier. Whilst this suggests that Selling may be a clearly differentiated, bounded area of knowledge - a characteristic of practical knowledge - the evidence presented through the several interviews indicates that informants question the validity of Selling as an area of knowledge, and one informant omitted it from his classification scheme. Two of the informants portray Selling as close to a knowledge/non-knowledge boundary in the sense that, whilst valid and valued knowledge derives from practice, this does not extend to knowledge that tempts the boundaries of ethical practice. In this case, the 'used car' image of Selling takes the area across this boundary. However, if Selling is interpreted as Marketing, in the Business Studies sense, informants classify it as 'theoretical' knowledge.

There is a sense in which this outcome for Selling could be seen as an artefact of the selection of areas for inclusion in the Classification Task. However, it should be noted that Selling was included because it was representative of one of a number of dimensions included in the Classification Task - as described in Section 4.6.3. Further, there was considerable flexibility for informants to add other areas of knowledge or delete areas that did not serve their purposes - the Classification Task was presented to informants as a very open task.

6.7 Reflections on Method

It was noted earlier that the Semantic Taxonomy Interview method may be at its best in more highly structured domains. Despite the fact that the domain for this study is not highly structured and clear-cut, through the Semantic Taxonomy Interviews informants provided not only typifications but appeared to be unrestricted by the common or traditional views of knowledge. Overall, their views seem not to be subservient to more prominent positions and there appears to be little in the data from this phase of the research to suggest that the method is unduly restrictive.

Similarly, there is little to suggest that the method caused undue difficulties for informants. The protocol adopted for recruiting trade instructors, apprising them of the nature of the task, establishing rapport, and conducting the interviews was conducive to open and frank discussion. Informants were both cooperative and supportive of the research effort, and informal commentary from all informants confirms that they feel they have contributed meaningfully. For each of

the informants, consideration of the domain of 'knowledge' in the depth sought by the Semantic Taxonomy Interview protocol was a new and, perhaps, a challenging experience. The clarity with which informants were able to respond varied somewhat but generally was greater than the researcher had expected. Whilst some of the informants provided quite well-developed accounts of their frameworks, others were not so clear, and one of the informants had particular difficulty in articulating his ideas.

The variation in the extent to which informants have frameworks, are aware of them and can enunciate them, made the retrieval of the accounts of the frameworks an arduous procedure, and emphasises the importance of returning the researcher's representations of the frameworks to the informants to explore the extent to which the informants consider them fair and adequate. This process of confirmation - primarily through the Postnate Interviews - is not only valuable for the insights it provides but also for the confidence it generates in the outcomes of the process.

All six informants displayed a high degree of enthusiasm for the Classification Task, describing it as interesting, stimulating and significantly easier to perform than the Semantic Taxonomy Interview. It is probable that some of this enthusiasm for the Task occurred because informants had become more comfortable about participating in the research effort and had overcome any initial hesitancy. However, it is evident that the informants' enthusiasm was generated also by the opportunity to explore and to express opinions about fundamental issues associated with 'their' knowledge. Informants portrayed a sense

of revelation as they discussed the categories they had formed and the criteria by which they worked. Informants used the Classification Task interview to 'talk through' the ways in which criteria are enacted - or not enacted - at curriculum and instructional levels, and to pass commentary on the forces that bring about curriculum and instructional decisions in their areas. It appears that both the Semantic Taxonomy Interview and the Classification Task caused informants to search for clarification of their own views on some basic issues and to consider the consequences of adopting stances that are, in essence, epistemological stances.

A theme that emerges in both the Semantic Taxonomy Interview and the Classification Task is the value informants place on knowledge that displays attributes such as 'tangible outcomes', that is obtained through 'trial-and-error' and 'self-learning', and in which the learner is 'in control' rather than being taught by an expert. In part, the informants' enthusiasm for the Classification Task, and their preference for it over the Semantic Taxonomy Interview, appears to be a reflection of this same theme. Whilst the Semantic Taxonomy Interview requires, what informants term, 'abstract thinking', is controlled by the researcher as interviewer, and leaves the informant with no observable, tangible outcome by which they can judge their performance, the Classification Task requires informants to work with what appears to be a more concrete activity, to assume a good degree of independence of action, to utilise 'trial-and-error' in forming categories, and to produce 'observable' outcomes by which they can judge their performance. It is a controlled and defined activity. In essence, there is greater congruence between the processes required to complete the Classification Task and

the ways in which the informants prefer to operate than is the case for the Semantic Taxonomy Interview.

Another expression of this preference for the Classification Task over the Semantic Taxonomy Interviews emerges from the Postnate Interviews. Here, it is evident that the informants tended to rely quite heavily on the Classification Task as a point of reference. That is, informants tended to be able to recall the substance of their responses to the Classification Task more easily than those of the Interviews and, in explaining or expanding upon a point, tended to use examples drawn from the Classification Task.

6.8 The Next Step

Against the three research questions of the study - noted in Section 1.1 - there are at least three points to be made about the focus of, and approach to the next phase of investigation - Phase C of the study. First, the outcomes of Phase A and Phase B suggest that trade instructors use frameworks that may rest on a basic practical-theoretical dichotomy and that this is consistent with an essentially pragmatic-functionalist approach to knowledge and knowing. Thus, in the next phase of investigation, it would seem appropriate to explore the extent to which this proposition holds under the weight of evidence from a larger number of informants.

At the same time, there is a small amount of evidence within the outcomes of Phase B to suggest that it is appropriate to explore whether some informants use other typologies or, at least, variations of this

seemingly dominant typology. The next phase of the investigation provides an opportunity to uncover these other typologies. Thirdly, the evidence provided by the systemisation of the research, theories and literature - Phase A of the study - suggests that there may be differences in the views held by groups of informants determined by the nature of their prior experiences of work - for example, their trade area, the extent of their previous industrial experience, the amount of instructional experience - and, perhaps, gender. There was a glimmer of support for this in the outcomes of Phase B. Three informants indicated the possibility that some differences might arise between the trade areas. Whilst Phase B provides significant insights into the nature of the constructs used by trade instructors across a variety of trade areas, it does not seek to explore the differences between groups of informants. Thus, the next phase of the investigation provides an opportunity to begin to uncover variations between groups formed on the basis of such dimensions. In order that the study can move in these directions, research methods must be chosen not only to capture the required data but also to work with the prevailing context and climate. Clearly, the intensiveness of the Semantic Taxonomy Interviews and the Postnate Interviews makes them unsuitable for large scale investigation in this study. However, the Classification Task displays attributes that suggest that, within the context and the climate in which trade instructors work, it is an appropriate instrument by which to communicate with the large number of trade instructors in Phase C of the study.

In considering the form of the Classification Task for Phase C, it might be noted that, in Phase B, although there was encouragement for informants to include other knowledge areas or to omit knowledge

areas, there arose only a small number of instances where they moved beyond the set of knowledge areas provided. That is, although none of the informants acknowledged being restricted by the presentation of a list of areas, the outcomes leave open the possibility that this may have occurred in some degree. In developing the Classification Task, consideration was given to providing a longer list of areas - mainly by selecting more areas for each dimension noted in Section 4.6.3. Evans (1970a, 1970b), for example, provides a precedent for a large task by supplying some 340 items to be classified. The decision to use the 26 selected areas was based, in part, upon the need to represent the identified dimensions, but also, in part, upon an understanding that any increase in the size or complexity of the task would have an adverse effect on the quality of the results and on the response rate. It is clear in the reactions of the informants in Phase B, and the climate in which the study was set, that a large task was unlikely to succeed. Thus, although the form of Classification Task used here comprises but 26 knowledge areas, some flexibility and openness is provided by the options to add, omit and duplicate knowledge areas, to create as many groups as the informant deemed necessary, and to include written descriptors of the groups formed.

Chapter Seven

Grounded Investigation Phase C

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Chapter Seven

Grounded Investigation

Phase C

The particular is always a match for the universal; the universal always has to accommodate itself to the particular.

(Goethe¹)

7.1 Introduction to the Chapter

The outcomes of the earlier phases of this study generated several directions for further empirical investigation in Phase C. Central to this is an exploration of the extent to which the emerging, and seemingly dominant typology - based on the practical-theoretical dichotomy - holds its form and its position under the weight of further evidence. This creates an imperative to communicate with a large number of trade instructors. At the same time, there is a need to determine whether, across a larger number of respondents, other typologies may emerge. And, to the extent that it can be achieved at this stage of development, there is a place for the study to undertake some early exploration of how views of knowledge and knowing might vary across groups of trade instructors - for example, do trade instructors from Plumbing hold views that differ from those of Cabinetmaking trade instructors?

The place of Phase C in the structure of the study is presented in Figure 4.01 and in Section 4.5. At its core is the administration of the

¹ Quoted in Eisner (1991: 197)

Classification Task to 215 trade instructors. This data-capture method was developed in the process of Phase B. It is a 'construction' activity - rather than a 'selection' or 'reaction' inventory - in which trade instructors construct categories using a list of 'knowledge areas' and describe the bases upon which they form the categories. It is through this process that the study pursues the directions noted above. The purposes of this chapter, therefore, are to present the results of these explorations and to consider the ways in which they shape the emerging theoretical position.

7.2 The Structure of the Chapter

This chapter contains 8 sections. The first two sections - Section 7.1 and 7.2 - are these introductory sections. The process of Phase C of the study is presented in Section 7.3. This involves describing the main stages of this phase of the study - though much of the description is achieved by referring to other sections of the thesis. Section 7.4 contributes to the portrayal of context by describing key attributes of the respondents to this phase of the study.

In Section 7.5 the results of administering the Classification Task to 215 trade instructors are presented using groupings of subsets as the basis for presentation; then, in Section 7.6 the results are considered as a whole. Throughout both of these sections results are discussed with particular reference to the contribution they make to the emerging theoretical position of the study.

Section 7.7 presents some reflections on the methods used within this phase of the study and, finally, Section 7.8 provides links to the focus of the final chapter - the consolidation of the theoretical position for this study, speculation about the implications of this work for curriculum and instruction in the skilled trades and for further research, and reflection on the process of the study.

7.3 The Process of Phase C

The nature and purpose of this phase of the study derive from the outcomes of Phase A and Phase B and, in large part, are described in other places in this thesis. Thus, what is presented here is an outline of the main stages:

- The first stage of Phase C is the identification of the Classification Task as an appropriate data-capture method, and its development for use in this study. The rationale for the Classification Task is presented in Section 4.6.3 and Section 6.7, and the details of the procedures involved are presented in Section 4.6.3 and Appendix Two.
- The second stage is the selection of an appropriate sample of trade instructors with whom to work. The details of this are presented in Section 4.6.1.
- In the third stage, the Classification Task is administered to 215 trade instructors, as described in Section 4.6.3 and Appendix Two. The context in which this takes place is described in Section 4.4 and Section 5.3.

- The fourth stage of Phase C involves creating a data management file, as described in Appendix Three. This acts as the input file to the analysis of the data by the Cluster Analysis statistical technique, and enables data to be manipulated as required - for example, for the formation of subsets of respondents as described below in Section 7.4.5.
- In the fifth stage, the data from the Classification Task, as organised into subsets, is analysed using the Cluster Analysis technique. The results of these analyses - in the form described in Appendix Two - and some interpretation of these outcomes are presented in this chapter.

7.4 A Profile of the Respondents

Earlier, an effort was made to portray something of the climate and the context in which this study is located and in which the trade instructors work - see Section 5.3 and Section 4.4. This section continues that intention by portraying a profile of respondents in Phase C across selected attributes.

7.4.1 Response rates

The sample for this phase of the study comprises 215 trade instructors from across 19 trade areas and across two TAFE regions - as described in Section 4.6.1. An overall response rate of 62% (133 responses) was obtained, consisting of 132 useable responses and one unusable response. Figure 7.01 details the response rates by TAFE region and by trade area.

Figure 7.01

Response rates by region and trade area

Trade Area	ACT Region		Illawarra Region		Totals
	x_i/n_i		x_i/n_i		x_i/n_i
Applied Electricity	4/7	57%	10/14	71%	14/21
Automotive Engineering	5/11	45%	2/12	17%	7/23
Automotive Painting	3/6	50%	0/5	0%	3/11
Bricklaying	0/2	0%	6/6	100%	6/8
Butchery	2/4	50%	2/3	67%	4/7
Cabinetmaking	3/3	100%	0/0	-	3/3
Carpentry and Joinery	3/9	33%	4/9	44%	7/18
Commercial Cookery	3/5	60%	4/5	80%	7/10
Fitting and Machining	4/4	100%	14/21	67%	18/25
Foundry	0/0	-	2/3	67%	2/3
Greenkeeping	1/1	100%	0/1	0%	1/2
Printing	7/7	100%	0/1	0%	7/8
Hairdressing	8/10	80%	5/5	100%	13/15
Industrial Electronics	6/9	67%	3/5	60%	9/14
Metal Fabrication	5/5	100%	12/12	100%	17/17
Panel Beating	2/4	50%	0/5	0%	2/9
Plumbing	5/5	100%	1*/7	14%*	6*/12
Refrigeration	3/3	100%	3/5	60%	6/8
Upholstery	1/1	100%	0/0	-	1/1
Overall response rates	65/96	68%	68*/119	57%*	133*/215

Key x_i/n_i Number of responses/Number of respondents in subset population.
 $xx_i\%$ Overall response rate for that trade area.
* Includes the one unusable response.

Care must be exercised in drawing inferences from the response rates presented in Figure 7.01, for some of the cells contain small numbers of respondents. In such case, a single response accounts for a considerable amount of the response rate. There are, however, some observations that can be made about the patterns of responses. For example, low response rates were returned by two trade areas in the ACT and by six trade areas from Illawarra - though two of these areas each contain but one trade instructor. Possible explanations for these low response rates can be found in the contexts within which these trade instructors work. These are portrayed in Figure 7.02, where the names of the trade areas have been changed to maintain confidentiality.

Figure 7.02

Low response rates

<p>A low response rate was returned for both Department A and Department B. Both trade areas are located on a main campus.</p> <p>At the time of the survey, the members of these departments were engaged in a dispute. Recently, the areas had been required to combine into one department, and the Head of Department position had been declared vacant. In protest, none of the staff would apply for the position.</p> <p>Management appointed a person from another trade area to fill the position in a temporary capacity, and the staff resented this action.</p> <p>Further, this acting Head of Department was very reluctant to permit the researcher to approach members of the department. He rejected - with a good deal of hostility - the initial approaches of the researcher, and it was only after considerable negotiation that he acceded to the researcher's request to approach the trade instructors.</p> <p>Throughout the research process, he remained reserved about any involvement by his staff in the research effort.</p>	<p>Department C is on a main campus. From the outset, the trade instructors displayed hostility towards the research effort. There was a tendency for them to laugh (literally) at the proposal that such research could lead to beneficial outcomes.</p> <p>The Head of Department saw little value in the study, though he placed no barriers to the researcher's approaching the staff:</p> <p><i>I don't care what you do. If they want to bugger around with this they can.</i></p> <p>Whilst the researcher was able to make personal contact with all trade instructors, as a group they displayed little enthusiasm to participate.</p>	<p>Departments D, E and F are separate departments, though co-located on the main campus. Each is managed by a Head of Department. They share a staff common room and there is considerable interaction between the staff of the three departments.</p> <p>The Heads of Department were reluctant to allow the research effort to place demands on their staff - though they were hospitable and encouraged the researcher to spend time within the departments. From the outset, they made their opposition to the research known to the staff.</p> <p>Thus, although, the researcher was able to develop personal contact with individual trade instructors, the general lack of support from the Heads of Department diminished the importance of the research for the trade instructors.</p>
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In some contrast, high response rates were returned by eight trade areas in the ACT - though two of these had but one trade instructor - and three in Illawarra. Figure 7.03 portrays the contexts within which these trade instructors work, but the names of the trade areas have been changed to maintain confidentiality.

It would appear that, in part, the response rates reflect something of the organisational climate within which the trade instructors work. Higher response rates appear to emanate from trade areas displaying greater stability and internal harmony, and in which the Head of Department is supportive of the research effort.

Figure 7.03
High response rates

<p>Department G is the sole occupant of a large purpose-built building on a main TAFE campus. As a department it has developed along 'business lines' and there is a strong emphasis on participative management. For example, it operates through weekly team meetings, it has developed strong and active links with local industries, it conducts profit-making and entrepreneurial activities, it advertises its services, it tenders for production contracts within Australia and overseas, and it generates sponsorship for the purchase of equipment.</p> <p>The Head of Department facilitated the administration of the survey by including the research as an agenda item on the Department's management meetings. Thus, the research was afforded the same status as the other business of the Department.</p> <p>Additionally, the researcher was invited to meet socially with the staff and to attend functions - such as those recognising the contribution of major sponsors.</p>	<p>Departments H, I and J are the sole occupants of a purpose-built and separate campus. They are administered by Heads of Department, and a Head of School - a former trade instructor - acts as Campus Manager.</p> <p>Both the Head of School and the Department remained supportive of the research.</p> <p>The researcher was able to spend considerable time with the trade instructors. This time included 'touring' the new facilities, joining with the trade instructors for lunch and morning tea periods, serving on a Curriculum Advisory Committee, and sitting in on classes. Thus, the researcher was able to gain insights by observing interactions and engaging in discussions well beyond the administration of the survey.</p> <p>Further, the trade instructors engaged the researcher in discussions about the nature of curriculum innovations being developed and implemented across the nation.</p>	<p>Departments K and L are located on a small campus away from the main campus. Each has a Head of Department, and the campus is managed by an on-site College Principal.</p> <p>The College Principal was a former trade instructor and remained highly supportive of the research effort.</p> <p>The researcher was afforded open access to the trade instructors. Contact ranged from attending the monthly 'College Lunch' - organised by and for the staff of the College - to participating in classes and providing advice on teaching approaches.</p> <p>Frequently, the College Principal and the two Heads of Department engaged the researcher in discussions about likely changes and developments in trade training in response to the Training Reform Agenda.</p>	<p>Departments M, N and O are co-located on the main campus. Each is administered by a Head of Department.</p> <p>The departments are brought together by a local Head of Branch - a position remnant from the former long-standing organisational structure and which is in the process of being phased out.</p> <p>The Head of Branch holds responsibility for subject-specific issues across the three trade areas, a 'super' Department Head bonding these trade areas into a cohesive unit.</p> <p>The supportive actions of the Head of Branch and the three Department Heads enabled the researcher to spend considerable time with the trade instructors. Whilst some of this time was spent briefing trade instructors about the Classification Task, the period also included joining with the trade instructors for lunches/morning teas, and sitting in on classes. Thus, the researcher was able to gain insights by observing interactions and engaging in discussions beyond the administration of the survey.</p>	<p>Department P presented an unusual situation. When contact was made, the Head of Department realised that he knew the researcher from the time when they both worked in industry. The Head of Department was highly supportive of 'an old mate', and the researcher was able to make significant personal contact with trade instructors from this trade area.</p> <p>It might be noted that the staff of this Department, themselves, were 'good mates' who socialised outside the work setting.</p>
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Comparison of the response rates for trade areas located on small, satellite campuses and those on main campuses also is instructive. For example, in the ACT Region the response rate per trade area for small, satellite campuses was 82.4%, whilst for larger, main campuses the mean response rate per trade area was 58.5%. Similarly, in the Illawarra Region, the mean response rate per trade area for the small satellite campuses was 74.5%, whilst, for trade areas located on the larger campus, it was 41.1%.

Further, 18 of the trade areas are located on main campuses and 17 are on satellite campuses. Yet, of the 25 trade areas providing a response rate of at least 50%, 14 are on satellite campuses and 11 are on the main campuses; of the ten trade areas presenting a response rate of less than 50%, nine are on main campuses and one is on a satellite campus. It appears, therefore, that stronger response rates are provided by those trade areas located on smaller, satellite campuses - where a certain degree of independence can be established - than on the main campuses. That is, there is a tendency for the response rates to be better in trade areas able to act without the close scrutiny of management and in which relationships are more likely to be collegially rather than organisationally established.

The image that emerges from these considerations is quite in keeping with the outcomes reported by Gleeson - see Section 2.4. That is, there appears to be greater harmony in settings where the trade instructors are able to establish small, enclave-like environments and in which their identity and culture can be established. In these settings, tutelary Heads of Department/School have the same lineage as the trade instructors, and perform not only administrative functions but also, what appear to be, quasi-kin functions - *paterfamilias*.

7.4.2 Educational profile

The educational profile of the respondents is presented in Figure 7.04. These data show that all but one of the respondents possesses a trade qualification, that all trade qualifications were obtained through the apprenticeship system, and that all trade qualifications were attained prior to entering TAFE. Thus, the trade instructors in this phase of the

study are former tradeworkers who, now, are teaching their 'discipline' through the same educational and social framework in which they gained their own qualification.

Figure 7.04
Respondents' post-compulsory education qualifications

Qualification	ACT Region x_i $xx_i\%$		Illawarra Region x_i $xx_i\%$		Totals x_i $xx_i\%$	
No post-compulsory non-Education qualification	1	1.5%	0	0%	1	0.76%
Trade Certificate other than by apprenticeship	0	0%	0	0%	0	0%
Trade Certificate by apprenticeship:						
3 Year	6	9.2%	4	6.2%	10	7.6%
4 Year	32	49%	35	52%	67	51%
5 Year	25	38%	28	42%	53	40.2%
6 Year	1	1.5%	0	0%	1	0.8%
Post-trade qualification						
Prior to entering TAFE	16	25%	12	18%	28	21%
After entering TAFE	4	6%	2	3%	6	4.5%
Para-professional qualification						
Prior to entering TAFE	21	32%	27	40%	48	36%
After entering TAFE	3	5%	4	6%	7	5%
Bachelor degree						
Prior to entering TAFE	1	1.5%	1	1.5%	2	1.5%
After entering TAFE	20	31%	10	15%	30	23%
Post-graduate degree/diploma	0	0%	0	0%	0	0%
Teaching qualification other than by compulsory teacher education program	2	3%	1	1.5%	3	2.3%
Teaching qualification by way of compulsory teacher education program ²						
Prior to entering TAFE	2	3%	1	1.5%	3	2.3%
After entering TAFE	61	94%	65	97%	126	95%
Other miscellaneous qualifications						
Prior to entering TAFE	2	3%	1	1.5%	3	2.3%
After entering TAFE	2	3%	0	0%	2	1.5%
Key	x_i	Number of responses;				
	$xx_i\%$	Proportion of that region.				

² The compulsory teacher education program is a major proportion of an accredited award. Although continuation beyond the compulsory portion to attain the full award is not a requirement of the employing authority, most trade instructors do complete the award.

Further, all but 11 of the trade qualifications were obtained through a four or a five year apprenticeship. Nine of the exceptions are trade instructors from Hairdressing; the other two obtained their qualifications in European countries and came to Australia as qualified tradeworkers.

The data show, also, that amongst the 34 trade instructors who hold post-trade qualifications, 28 obtained these qualifications prior to entering TAFE; and of the 55 who hold para-professional qualifications, 48 obtained them before entering TAFE. It is likely that the reasons for this are related to recruitment into the position of trade instructor. For example, in the criteria for selection as a trade instructor, post-trade and paraprofessional qualifications, typically, are listed as 'highly desirable'. Thus, in competition for the position, tradeworkers who hold such qualifications are likely to be recruited before those who do not. Conversely, amongst the 32 trade instructors who hold a degree qualification, 30 obtained their degree after joining the TAFE system. It would seem that the impetus for obtaining a degree is generated after the tradeworkers enter the instructional role, and that this may be related to criteria for progression after recruitment. For example, for some time there existed a 'degree allowance' for all instructors who held a bachelor degree. More recently, a salary barrier has been introduced that prevents trade instructors from progressing to the top of the salary scale without the equivalent of four years of tertiary education.

Also notable from the data of Figure 7.04 is that only three of the trade instructors in this sample held teacher education qualifications before entering TAFE. These trade instructors came from the Victorian schools

sector, bringing with them the experience of the trade teacher recruitment and preparation featured in the works of Hibburt (1978), Mealyea (1989a) and Gleeson (1990). All other trade instructors in this sample completed the compulsory, in-service instructor education programs required as a condition of employment in TAFE in NSW and the ACT.

7.4.3 Industry experience

The data of Figure 7.05 show that the trade instructors who responded to this survey have considerable industry experience before entering the instructional role.

Figure 7.05
Respondents' prior work experience

Work Experience		ACT Region <i>x_i xx_i%</i>		Illawarra Region <i>x_i xx_i%</i>		Totals <i>x_i xx_i%</i>	
Industry experience ³ :							
	< 6 years	7	11%	4	6%	11	8%
	6 - 10 years	22	34%	33	52%	55	43%
	11 - 15 years	13	20%	15	22%	28	21%
	> 15 years	23	35%	15	22%	38	27%
Instructional experience:							
	< 6 years	22	34%	10	15%	32	24%
	6 - 10 years	18	28%	34	41%	52	39%
	11 - 15 years	14	22%	9	13%	23	17%
	> 15 years	11	17%	14	21%	25	19%
Key	<i>x_i</i> <i>xx_i%</i>	Number of responses; Proportion of that region.					

In the ACT region, the mean length of experience in industry - prior to entering the role of trade instructor - is 13.3 years and, in the Illawarra region, it is 12.0 years. These figures exclude the period of time required

3 Industry experience is the number of years after completion of apprenticeship and prior to entering a full-time instructional role. The raw data show that, of the 11 trade instructors who have less than six years of industry experience after completing their apprenticeship, one has three years industry experience, four have four years industry experience, and six have five years industry experience.

to complete an apprenticeship. Thus a trade instructor who commenced, say, a four-year apprenticeship at the age of 17 years, and who has the mean industry experience, would enter TAFE as a trade instructor some 17 years after leaving secondary school and at the age of approximately 34 years. Further, the mean instructional experience for trade instructors in the ACT region is 9.5 years and, for the Illawarra region, 10.1 years.

7.4.4 Gender

The data of Figure 7.06 show that most trade instructors are male.

Figure 7.06
Respondents by gender and region

Gender	ACT Region		Illawarra Region		Totals	
	x_i	$xx_i\%$	x_i	$xx_i\%$	x_i	$xx_i\%$
Male	57	88%	62	93%	119	90%
Female	8	12%	5	7%	13	10%

Key

x_i	Number of responses;
$xx_i\%$	Proportion of that region.

It might be noted that 12 of the 13 female respondents identified in Figure 7.06 are from the one trade area - Hairdressing - and one is from Butchery. Thus, the subset of respondents who are female is, essentially, the same as the subset whose trade area is Hairdressing.

In sum, these data indicate that, typically, the trade instructors in this sample are men who, after serving an apprenticeship, gain significant experience of their trade before entering the instructional role, probably in their mid-thirties. If they have post-trade or paraprofessional qualifications, they gained them before entering TAFE; and if they have bachelor degree qualifications they gained them after entering TAFE.

7.4.5 The formation of subsets

The formation of the subsets for the purposes of analysis and comparison is presented in Figure 7.07.

Figure 7.07
Subsets of respondents

Subset Description	Subset Code	Subset Population
All respondents	1	132
Respondents from:		
Illawarra region	2A	67
ACT region	2B	65
Respondents whose gender is:		
Male	3A	119
Female	3B	13
Respondents whose trade area is:		
Applied Electricity	4A	14
Automotive Engineering	4B	7
Automotive Painting	4C	3
Bricklaying	4D	6
Butchery	4E	4
Cabinetmaking	4F	3
Carpentry and Joinery	4G	7
Commercial Cookery	4H	10
Fitting and Machining	4I	18
Foundry	4J	2
Greenkeeping	4K	1
Printing	4L	7
Hairdressing	4M	13
Industrial Electronics	4N	6
Metal Fabrication	4O	17
Panel Beating	4P	2
Plumbing	4Q	5
Refrigeration	4R	6
Upholstery	4S	1
Respondents whose industry experience is:		
< 6 years	5A	11
6 - 10 years (inclusive)	5B	55
11 - 15 years (inclusive)	5C	28
> 15 years	5D	38
Respondents whose instructional experience is:		
< 6 years	6A	32
6 - 10 years (inclusive)	6B	52
11 - 15 years (inclusive)	6C	23
> 15 years	6D	25
Respondents whose industry experience is:		
>> instructional experience	7A	12
<< instructional experience	7B	8
Respondents whose highest qualifications is:		
< bachelor level	8A	100
≥ bachelor level	8B	32

The earlier phases of this study generated the possibility that the views of trade instructors may be influenced by a variety of social factors. These include the nature of work in their trade area, the extent of their industry experience, the extent of their instructional experience, the industry setting in which they work (represented here as the 'region'), gender, and the level of their educational qualifications. By establishing subsets of respondents it is possible to gain some insights into the nature and extent of these influences.

The analysis of the data generated by the Classification Task was by the application of the Cluster Analysis technique to the data from each of these 36 subsets, and the results of these analyses are presented in Section 7.5.

7.5 Presentation of Phase C Results

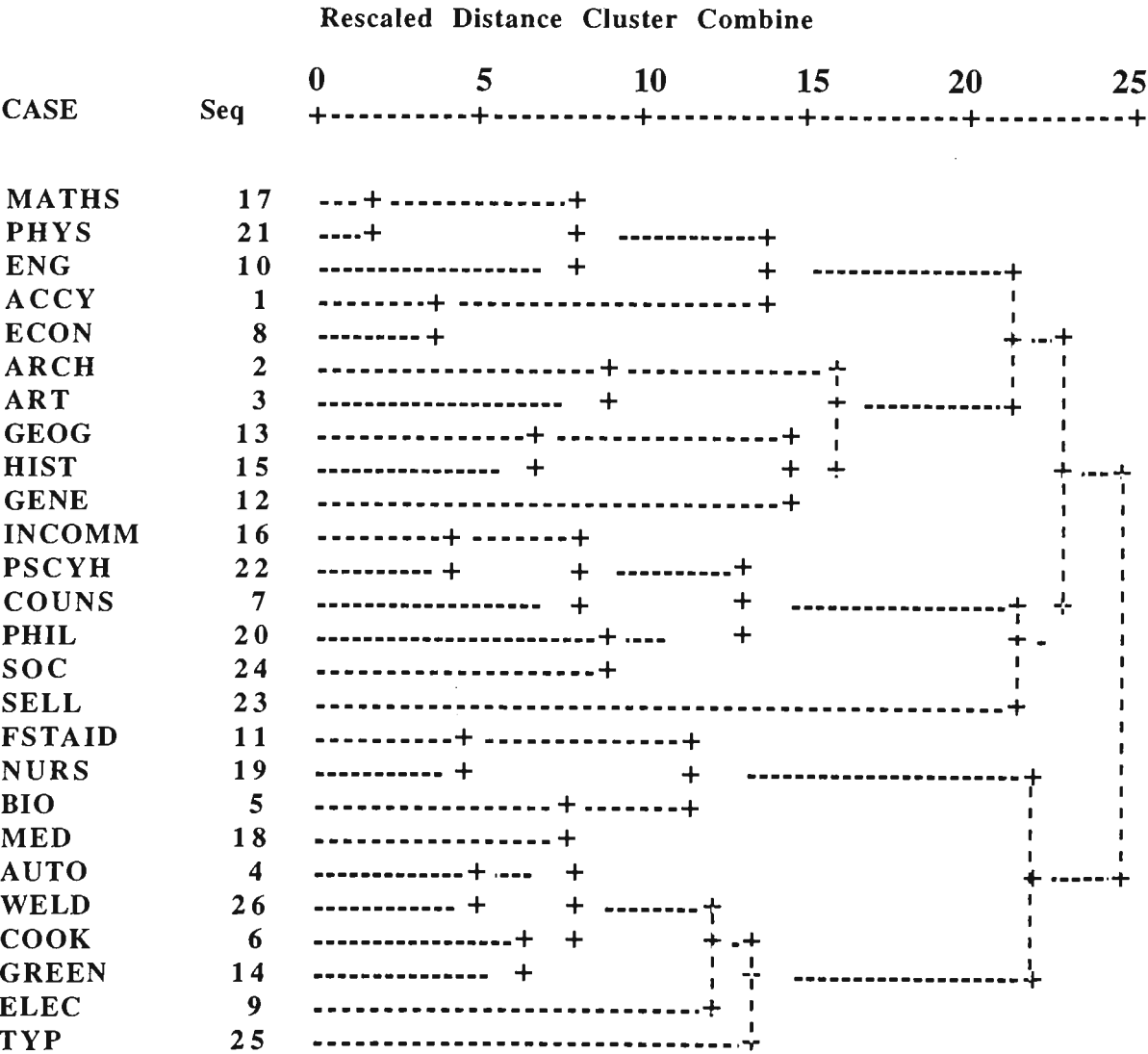
This section presents the results of the analysis of the data from the Classification Task by the Cluster Analysis technique. There are several points to note about the presentation of these results. First, whilst the output is presented more fully in Appendix Four, a selection is presented here for detailed analysis. It is acknowledged that the subsets identified as the most appropriate to illustrate trends and ideas are based, at least in part, on judgments made by the researcher about what is most salient. However, as Baker (1986) notes:

There is no privileged extra-social point form which any research can be undertaken. We need not treat social interaction or the interpretation of subjective materials as a barrier to adequate scientific work. What we do need is an awareness of our own participation, an acknowledgment of the interpretive work we necessarily do, and to build into our analyses a recognition that the social world is studied through social methods.

(Baker 1986: 9)

A second point to note is that the data are presented not as raw, computerised output but in stylised, diagrammatic form, supplemented by interpretive commentary. The primary output from the Cluster Analysis procedure is the Dendrogram, as illustrated in Figure 7.08.

Figure 7.08
Annotated example of a Dendrogram output



The Dendrogram is a diagrammatic representation of the major associations present in the categories formed by respondents. In this sample Dendrogram:

- The left column contains the knowledge areas with which the trade instructors worked in the Classification Task;
- The output from this computerised process was transformed into a more manageable form by determining from the Dendrogram the main typology and its components. For example, in the sample Dendrogram of Figure 7.08, the main typology is a dichotomy comprised of two major clusters - Major Cluster 1 contains those knowledge areas listed between FSTAID and TYP, and Major Cluster 2 contains the knowledge areas between MATHS and SELL. In turn, at the Rescaled Distance of 20, Major Cluster 1 comprises two separate subclusters - Subcluster 1.1 contains AUTO, WELD, COOK, GREEN, ELEC, and TYP; Subcluster 1.2 contains FSTAID, NURS, BIO, and MED. A similar separation into subclusters can be made for Major Cluster 2;
- 'Rescaled Distance' is a measure of the degree of association between the components of a given cluster. It represents the strength of agreement between respondents about the allocation of knowledge areas to that cluster. Strong agreement is represented by lower numbers, and lack of agreement is represented by higher numbers. In the data presented below, most of the solutions identified as appropriate are formed at or below a Rescaled Distance of 20, and are labelled 'subclusters'. Thus, '20' is

something of a marker for the identification of appropriate cluster solutions - but there are some minor variations. Within these subclusters, another marker is apparent at the Rescaled Distance of 14. Major components of the subclusters tend to form below 14, whilst other major components form at distances between 14 and 20 - these are characteristics evident in this data rather than markers that characterise the method.

Appendix Four provides full detail of the Cluster Analysis protocol, the nature and use of Dendrograms, and the translation of Dendrograms into forms more suited to presentation in this Chapter.

A third point to note is that the statistical analysis requires the researcher to determine what constitutes the 'best solutions'. For example, the researcher must judge whether, say, a nine cluster solution or a five cluster solution most adequately represents the data. This typology and its components then may be represented in stylised diagrammatic form - see Figure 7.09 - and it is in this form that data are presented in this chapter in Figures 7.10 to 7.17.

Figure 7.09
Main typology, major clusters and subclusters of the sample Dendrogram of Figure 7.08

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Mathematics Physics English Accounting Economics	Architecture Art Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	Selling

Further details of the Cluster Analysis procedures and results are presented in Section 4.6.5 and in Appendix Four.

7.5.1 The set of all respondents

The Cluster Analysis results for the set of all respondents are displayed in Figure 7.10. They indicate that, taken as a whole, the trade instructors in this sample form two major clusters, one comprising two subclusters and the other comprising four subclusters.

Figure 7.10
Cluster Analysis results : All respondents

Subset 1		All respondents (n ₁ = 132).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing	Architecture Art	Counselling Interpersonal Communication Psychology	Mathematics Physics		
		Biology Medicine	Geography History	Philosophy Sociology	English		
14			Genealogy		Accounting Economics		
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3		Selling Subcluster 2.4
25	Major Cluster 1		Major Cluster 2				

There are several points worthy of note at this stage. First, all the knowledge areas that relate to the skilled trades - described by informants in Phase B as 'practical' - appear in Subcluster 1.1 and in no other subcluster. Indeed, the only non-trade⁴ area in this subcluster is Typing. Similarly, Subclusters 2.1, 2.2, 2.3 and 2.4 contain only areas described - by Phase B informants - as 'theoretical'. Such an outcome supports the suggestion that the practical-theoretical dichotomy is central to the views of these respondents. It might be noted that, as in Phase B, the associations formed between Subcluster 1.1 - practical - and the theoretical subclusters are, at best, very weak associations - of the order of a Rescaled Distance of 23. This is compatible with the view that

⁴ The term 'non-trade' is used here to indicate that there is no apprenticeship and/or indenture involved.

these respondents portray a very clear separation of the practical from the theoretical in a way that echoes the views of informants in Phase B.

The Dendrogram and the Agglomeration Schedule for Subset 1 indicate that all associations within Subclusters 1.1, 1.2 and 2.2 are formed below a Rescaled Distance of 14, indicating that there is considerable agreement between respondents about which areas belong to each of these subclusters. In some contrast, the associations formed within Subclusters 2.1, 2.3 and 2.4 tend to be at weaker distances, indicating more diversity amongst respondents about the associations formed by the knowledge areas involved.

The core of Subcluster 1.2 is the First Aid-Nursing doublet which forms at the very strong Rescaled Distance of 3. Biology and Medicine, however, associate with that doublet at the weaker level of 13. That is, it appears that this subcluster is formed on the basis of two areas that may be deemed to have a practical or a functional emphasis, but which are not, specifically, skilled trades. It might be noted that, unlike the areas in Subcluster 1.1, the areas involved in this subcluster appear to be characterised by a subject-matter theme - there is some connection between the areas based on the concepts involved.

The core of Subcluster 2.2 is the Counselling-Interpersonal Communication-Psychology triplet which forms at the relatively strong Rescaled Distance of 8 - Philosophy and Sociology associate at the weaker distance of 13. That is, there is some similarity here with the way in which Subcluster 1.2 is formed and, together, these suggest that the basis

for forming these subclusters may relate to a notion of 'subject-matter theme'.

Subcluster 2.4 contains Selling alone. Further, the output shows that the first association formed between this single-component subcluster and any other subcluster is at the very weak Rescaled Distance of 23. That is, these respondents appear to isolate Selling and display little agreement about its location, replicating the tendency displayed by informants in Phase B.

What emerges from the results of this Cluster Analysis is that, across the set of all respondents, there appears to be support for a typology based, essentially, on a practical-theoretical dichotomy and this echoes the outcomes of Phase A and Phase B. Further, there is some evidence to suggest that a second dimension may be in use in the sense that these trade instructors are forming associations on the basis of a 'subject-matter theme'.

It is of particular interest that the dimension 'subject-matter theme' appears not to be applicable to the areas associated with the skilled trades. Common wisdom might suggest, for example, that Mathematics and Physics could be associated strongly with Electronics; or that Art could be associated with Automotive Painting or Commercial Cookery - as emerged from Informant UH001 in Section 5.8. The Classification Task gave respondents the opportunity to bring in other areas to support such associations of this type. Yet, these respondents did not make these associations. None of the respondents chose to bring in, say, Botany to associate with Greenkeeping, or Chemistry with Automotive Painting,

or Metallurgy with Welding. It would seem, therefore, that other, more significant factors are in operation⁵. For example, as portrayed in Phase A and Phase B, people from the skilled trades share the social processes of apprenticeship, and it is likely that these are of significance in shaping the views being portrayed here. Sections 7.5.2 to 7.5.8 continue to build an image of these factors.

7.5.2 Respondents grouped by trade area

In order to explore the possibility that the specific experiences of work in the trades are influential in determining trade instructors' views of knowledge and knowing, analyses were conducted on sets of respondents organised by trade area. Thus, 19 subsets were identified and the results are presented, in full, in Appendix Four. Whilst a number of these subsets have less than 8 respondents, Subsets 4A, 4H, 4I, 4M and 4O provide a good cross-section of trade areas and have larger numbers. Thus they are selected for detailed examination here and the results are presented in Figure 7.11.

Figure 7.11
Cluster Analysis results: Trade area

Subset 4A		Applied Electricity respondents (n _{4A} = 14).				
0	Automotive Painting Welding Commercial Cookery Greenkeeping	First Aid Nursing	Mathematics Physics English	Geography History	Counselling Interpersonal Communication	
			Architecture Art	Accounting Economics	Psychology Sociology Philosophy	
14	Electronics Typing	Biology Medicine		Genealogy		
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Selling
25	Major Cluster 1		Major Cluster 2			
					Subcluster 2.4	Subcluster 2.5

5 As will be shown through the next few sections, it is likely that the Classification Task - in the form used in this study - is not sufficiently sensitive to expose the ways in which trade instructors distinguish between knowledge areas based on the skilled trade - that is, areas within Subcluster 1.1. Nonetheless, the outcomes presented so far are, of themselves, a powerful indicator that these trade instructors perceive the range of skilled trades as sharing particular attributes, and that these attributes clearly outweigh any that may be attributed through commonality of subject-matter.

Figure 7.11 (cont)

Subset 4H Commercial Cookery respondents (n _{4H} = 10).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping	Mathematics Physics	Counselling Psychology Interpersonal Communication	Architecture Art	
	First Aid	Biology Geography History Economics English	Sociology Philosophy		
14	Typing Electronics		Nursing		Selling
20		Subcluster 2.1	Subcluster 2.2	Subcluster 3.1	Subcluster 3.2 Subcluster 3.3
25	Major Cluster 1	Major Cluster 2		Major Cluster 3	

Subset 4I Fitting and Machining respondents (n _{4I} = 18).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping Typing Electronics	First Aid Nursing	Physics Mathematics		Counselling Interpersonal Communication
		Medicine Biology	Accounting Economics		Psychology Sociology
14				Selling	Architecture Art
					English Geography History Genealogy
20	Subcluster 1.1	Subcluster 1.2			Subcluster 4.1 Subcluster 4.2
25	Major Cluster 1	Major Cluster 2	Major Cluster 3		Major Cluster 4

Subset 4M ⁶ Hairdressing respondents (n _{4M} = 13).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping	Accounting Economics	First Aid Nursing		Counselling
	Electronics	Mathematics Physics	Biology Medicine	Architecture Art	Geography History
14	Typing			Selling English	Interpersonal Communication Psychology Sociology Philosophy
20			Subcluster 3.1	Subcluster 3.2	Subcluster 3.3 Subcluster 3.4 Subcluster 3.5
25	Major Cluster 1	Major Cluster 2		Major Cluster 3	

⁶ Twelve of the respondents in this subset are female trade instructors. Thus, this subset is substantially the same as Subset 3B

Figure 7.11 (cont)

Subset 4O		Metal Fabrication respondents (n _{4O} = 17).				
0	Automotive Painting Welding Commercial Cookery Greenkeeping Typing Electronics	First Aid Nursing		Physics Mathematics English	Architecture Art Geography History	Counselling Interpersonal Communication Psychology
		Medicine Biology		Accounting Economics		Philosophy Sociology
14			Genealogy	Selling		
20	Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
25		Major Cluster 1			Major Cluster 2	

These results display some considerable similarities. For example:

- Subcluster 1.1 in each of the subsets contains the areas related to the skilled trades. Indeed, except for a small variation in Subset 4H - where First Aid is added - this subcluster is the same as that identified in the results of Subset 1. It is reasonable to describe this subcluster as containing the areas portrayed in Phase B as the practical areas;
- Four of the five subsets contain a subcluster focused on the First Aid-Nursing doublet. In each case, the areas Medicine and Biology are associated with this doublet at a weaker distance, forming something of a subject-matter theme, and this echoes the outcomes for Subset 1 - the set of all respondents;
- In common with Subset 1, each of these subsets contains a subcluster focused on Counselling, Interpersonal Communication, Psychology, Sociology and Philosophy. Again, this appears to be a classification based on a subject-matter theme - as described in Section 7.5.1;
- With the exception of a minor variation in Subset 4M, all of these subsets isolate the area of Selling. The strongest association between the subcluster containing Selling and any other

subcluster occurs at the relatively weak distance of 24. Again, this trend emerged in Subset 1, and appears to replicate the outcomes displayed in Phase B;

- A feature of each of these subsets is that the association between Subset 1.1 and any of the other subsets is, at best, a relatively weak association. Indeed, in each subset, the strongest associations occur with the subclusters containing the First Aid-Nursing doublet. For example, in Subset 4I, Subcluster 1.1 associates with Subcluster 1.2 at the distance of 20. This provides some further support for the proposition that a primary criterion by which trade instructors distinguish knowledge areas relates to the practical-theoretical dichotomy;
- There is a tendency for the associations within Subcluster 1.1 in each subset to be formed at a slightly stronger level than those formed within any of the other subsets. This trend was noted also in Subset 1, and suggests that there is greater agreement about the nature of the areas in Subcluster 1.1 than in any of the other subclusters;
- Whilst these subsets support the practical-theoretical dichotomy as the basis of the dominant typology, none of them provide evidence to suggest that other typologies may be in use. Further, across all of these subsets, the emerging secondary dimension of 'subject-matter theme' appears to apply primarily to theoretical areas and to those areas that might be practical but which are non-trade areas - it appears not to apply to the areas associated with the skilled trades.

Perhaps the most notable difference to emerge from across these results in these subsets involves the location of a restricted range of knowledge areas - Mathematics, Physics, Geography, History, Genealogy, English, Architecture, Art, and Economics. There is diversity between subsets in the ways in which these areas are associated, although some doublets - such as Architecture-Art and Geography-History - appear in each of the sets. Further, it would seem that all of these are areas described by Phase B informants as theoretical. That is, it would seem that, whilst the primary separation of practical from theoretical is relatively well agreed, there is less agreement about the relationships between areas within the theoretical category than within the practical category.

Subset 4H displays some additional differences. For example, unlike the other four subsets noted here, it contains a subset that might be described as containing 'school subjects' - English, Mathematics, Physics, Economics, Biology, Geography, History. A similar subcluster appears in a number of the other subsets - see Appendix Four. It might be argued that there is a glimmer of this in Subcluster 2.3 of Subset 1, and this is taken up in greater detail in Section 7.6.3.

Additionally, Subset 4H has included both First Aid and Typing in the practical subcluster. Neither of these areas relate directly to a trade - in the sense that they do not require completion of an apprenticeship. A number of other subsets exhibit this trend - see Appendix Four - and this is taken up in greater detail in Section 7.6.1. This suggests that the basis for differentiating practical from theoretical is not restricted necessarily to a relationship with apprenticeship but may extend to other

interpretations of 'practical', such as contained in the notions of 'skills' and 'manual' described in Section 3.4.1.

The similarity of outcome across these subsets is of considerable interest. Common wisdom might suggest that trade instructors from Fitting and Machining would hold views similar to those of trade instructors from Metal Fabrication - both deal with the 'subject' of metals and perform in workshops - or that trade instructors from Applied Electricity and Electronics would hold similar views - they are related by a commonality of subject-matter. But the results, here, indicate that trade instructors from seemingly disparate trades - Hairdressing and Metal Fabrication - hold similar views, and that the practical-theoretical dichotomy is central to these views.

These results point, also, to the possibility of at least two dimensions - perhaps, secondary dimensions - that are applicable, particularly, within the theoretical element of the dichotomy. First, there is some evidence to suggest that some trade instructors distinguish knowledge on the basis of 'subject-matter theme' and, second, there is the possibility of a dimension related to a notion of 'school subjects'. It is of note, however, that these dimensions seem not to apply to those areas related to the skilled trades.

There is some indication in the outcomes of Phase B of the study that trade instructors might distinguish between trade areas on the basis of dimensions such as 'soft-hard' and 'more complex-less complex' and 'high-low status'. However, there appears to be little evidence of this in the results of Phase C, and it is likely that the present form of the

Classification Task is not sufficiently sensitive to permit these dimensions to emerge here. Thus, there is the possibility that, under an instrument more sensitive to these dimensions, the sorts of explorations carried out in this study might be applied in a more thorough investigation of the bases upon which trade instructors distinguish between trade areas *per se*. As is the case in the present study, such investigation might begin with an intensive study with a small number of trade instructors.

7.5.3 Respondents organised by industry experience

Another factor with the potential to influence the views that trade instructors hold about knowledge and knowing is the extent of their industry experience prior to entering the instructional role. Analyses were conducted against categories of industry experience, and these are presented, in full, in Appendix Four. The analysis for respondents with the longest experience of industry is selected for examination here, and is compared with those with the shortest experience. Figure 7.12 presents these results.

Figure 7.12
Cluster Analysis results: Industry experience

Subset 5A		Respondents whose industry experience is <6 years (n _{5A} = 11).				
0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Counselling Interpersonal Communication Psychology Sociology	Architecture Art	Accounting Economics Mathematics	
14				History Philosophy English Geography Genealogy	Selling	
20	Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Physics Subcluster 2.3
25		Major Cluster 1			Major Cluster 2	

Figure 7.12 (cont)

Subset 5D		Respondents whose industry experience is >15 years (n5D = 38).			
0	Automotive Painting Welding Commercial Cookery Greenkeeping	First Aid Nursing	Counselling Interpersonal Communication Psychology	Architecture Art	Mathematics Physics English Accounting Economics
14	Electronics Typing	Biology Medicine	Sociology Philosophy	History Geography Genealogy	
20		Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
25	Major Cluster 1	Major Cluster 2			Major Cluster 3

It is noticeable that what appears as Subcluster 1.1 in many of the other subsets occurs as Major Cluster 1 for Subset 5D. That is, as is the case for Subsets 4H and 4M, the association between the subcluster containing the areas related to the skilled trades and all other subclusters is so weak that, essentially, it remains isolated from all other areas and subclusters - these respondents appear to perceive the areas related to the skilled trades as clearly separated from the other areas. Respondents in Subset 5A, however, do not display this isolation to quite the same degree.

Another aspect of the results presented here is that the 'subject-matter theme', as a dimension for organising theoretical knowledge, reappears in both of these subsets - but the associations are slightly stronger in Subset 5A. For example, Subclusters 1.2 and 1.3 in Subset 5A, and Subclusters 2.1 and 2.2 in Subset 5D appear to have parallel subclusters in other subsets - see Section 7.5.1 and Section 7.5.2. However, there appears to be no new evidence that could be said to support the 'school subjects' dimension noted earlier.

Notwithstanding the 'subject-matter theme' dimension that appears to be reflected in these results, the two subsets display differences in the location of areas that are described by Phase B informants as theoretical. The variations echo earlier outcomes and reinforce the apparent lack of a shared perception amongst respondents about the nature of theoretical knowledge. For both subsets, the associations formed within the subclusters containing these areas tend to be weaker than those formed around the skilled trades.

Another difference between the two subsets presented here is that Subset 5A displays Selling associated with three other areas, whilst Subset 5D takes the same position as most of the other subsets, including Subset 1. In general, it might be said that Subset 5D bears a closer resemblance to Subset 1 than to Subset 5A.

It is clear that the respondents in both subsets make a clear separation of the areas related to the skilled trades from other areas - as is the case in Subset 1. It would seem, therefore, that the basis for this separation is established early in the career of the trade instructor - even before they gain substantial experience of the industry. This would support the indications from Phase A and Phase B that apprenticeship is highly significant in the process of developing these views - apprenticeship is the experience common to all of the trade instructors in the sample and occurs early in the career of the tradeworker/trade instructor.

There is some evidence to suggest that Subsets 5A and 5D differ in the strength of the associations for areas relating to the skilled trades. For example, the evidence presented here would support the suggestion that

the longer the experience of industry the stronger the commitment to the separation of the trades from other areas. That is, the dimensions that underpin the practical-theoretical dichotomy appear to be enhanced by longer experience of the trade. The evidence presented here serves to point to this phenomenon, and there is a place for some more detailed investigation of these dimensions in later research.

Whilst the evidence from these subsets reinforces the practical-theoretical dichotomy as central to the views of these trade instructors, there is little to indicate the emergence of any new typology.

7.5.4 Respondents organised by instructional experience

The extent of instructional experience is another factor with the potential to influence the views that trade instructors hold about knowledge and knowing. Whilst the results for all subsets in this group are presented in Appendix Four, Figure 7.13 presents the results for those respondents with the longest instructional experience and those with the shortest instructional experience.

Figure 7.13
Cluster Analysis results: Instructional experience

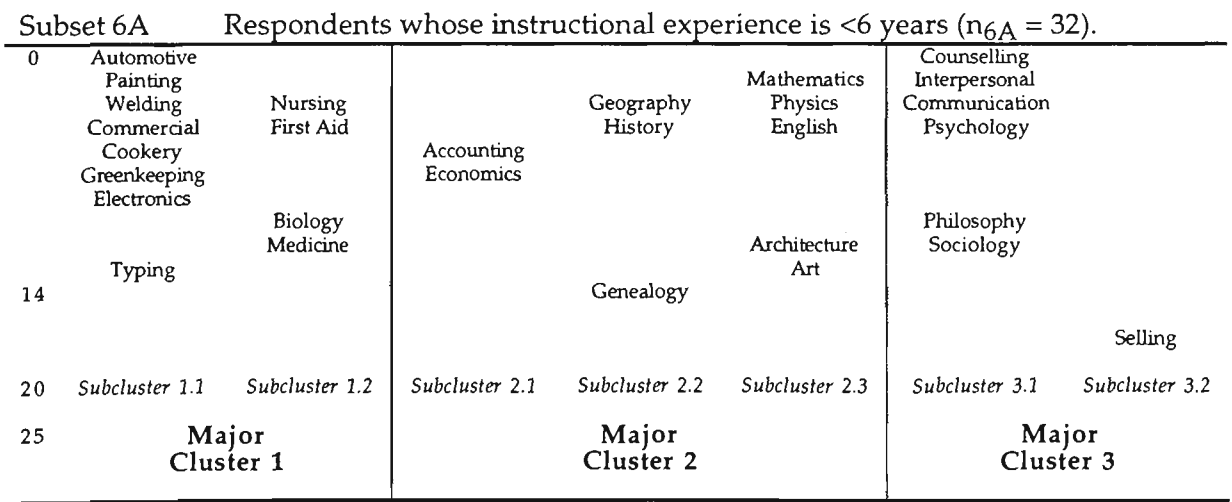


Figure 7.13 (cont)

Subset 6D		Respondents whose instructional experience is >15 years (n _{6D} = 25).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping		Nursing First Aid	Geography History	Interpersonal Communication Psychology Counselling	Mathematics Physics English	
14	Electronics Typing Selling		Biology Medicine	Genealogy	Architecture Art	Philosophy Sociology	Accounting Economics
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5
25	Major Cluster 1		Major Cluster 2				

The results indicate that these subsets have five subclusters in common, and the trends displayed in many of the earlier subsets continue. That is, there appears to be considerable agreement amongst respondents about the practical-theoretical dichotomy as the primary basis for distinguishing between knowledge areas, and about the separation of the skilled trades from other areas. Further, there appears to be some use of the dimension 'subject-matter theme' as a way of distinguishing between areas, particularly those described by Phase B informants as theoretical. However, there appears to be no new evidence here of the use of the dimension 'school subjects' beyond that noted in Section 7.5.2.

Earlier, it was noted that there was some lack of agreement about the location of areas such as Mathematics, Physics, Geography, History, Genealogy, English, Art, and Economics. This tendency continues in the results presented here. Also, there appears to be a difference between the subsets in the composition of Major Cluster 1. However, the association formed between Subcluster 1.1 and Subcluster 1.2 in Subset 6A occurs at the Rescaled Distance of 23, and in Subset 6D at the Rescaled Distance of 24. That is, the associations are very weak, and this is in keeping with the outcomes for Subset 1.

In sum, it would appear that these subsets do not support the proposition that trade instructors views vary according to the length of instructional experience. That is, the resolve to maintain a significant separation of the areas associated with the skilled trades from other areas does not diminish in any significant way with instructional experience. The results lend support to both the nature and form of the practical-theoretical dichotomy as the primary point of separation for the knowledge areas, and also to the 'subject-matter theme' as a secondary dimension for separation, particularly within the theoretical category.

7.5.5 Respondents grouped by industry/instructional experience

Closely related to the subsets in Sections 7.5.2 and 7.5.4 are subsets formed by grouping respondents on the basis of long industry experience/short instructional experience and, conversely, short industry experience/long instructional experience. The results of these analyses are presented in Figure 7.14.

Figure 7.14
Cluster Analysis results: Industry/instructional experience

Subset 7A		Respondents whose industry >> instructional experience (n7A = 12).			
0	Automotive Painting Welding Commercial Cookery Greenkeeping	Counselling Interpersonal Communication Psychology	Nursing		
	Electronics Typing First Aid	Philosophy Sociology Genealogy	Biology Medicine	Accounting Economics	Geography History Mathematics Physics English
14		Selling			Art Architecture
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Genealogy Subcluster 2.3
25	Major Cluster 1		Major Cluster 2		

Figure 7.14 (cont)

Subset 7B Respondents whose industry << instructional experience (n7B = 8).				
0	Automotive Painting Welding Greenkeeping Commercial Cookery	Typing Electronics Art	Accounting Economics	Mathematics English History Geography Physics
14				Counselling Interpersonal Communication Psychology Sociology Genealogy Philosophy Medicine Nursing Biology First Aid
20		Subcluster 2.1	Selling Subcluster 2.2	Subcluster 2.3
25	Major Cluster 1		Major Cluster 2	Major Cluster 3

These subsets display some differences in the formation of subclusters. For example, whilst Subset 7A continues the trend of forming a single subcluster of practical areas - in particular, the skilled trades - Subset 7B separates them into two subclusters - Major Cluster 1 containing only the skilled trades and Subcluster 2.1 containing areas that might be considered to be non-trade but practical areas⁷.

Both subsets show a tendency to organise some areas by 'subject-matter themes' - particularly theoretical areas - as occurred in earlier subsets. For example, in Subset 7A, Subclusters 1.2, 2.1 and 2.2 appear to display this tendency, and in Subset 7B, the areas within each of Subcluster 2.2 and Major Cluster 3 appear to be related through subject-matter themes. Further, in Subset 7B, Subcluster 2.3 displays what might be interpreted as a 'school subjects' grouping, as emerged earlier in Subset 7.5.2. This, however, appears not to occur as strongly in Subset 7A.

⁷ It is possible that the location of Electronics in the practical, but non-trade, grouping is based on the use of the terms 'Industrial Electronics' and 'Radio and Television' as the titles for apprenticeship-based, indentured trades, and 'Electronics' as a generic term that might be applied to recreational courses or to the subject area in general.

It is noticeable that Architecture does not appear in any of the subclusters in Subset 7B. In a sense, this supports the notion that respondents here are making a primary separation of practical from theoretical and then organising the theoretical areas according to two dimensions - school subjects and subject-matter themes. If Architecture is judged not to be practical - that is neither trade nor non-trade practical - and, clearly, it is not a school subject, then it can be accommodated only within the subject-matter themes. None of the subject-matter themes formed in these subclusters appears to be a suitable location for Architecture and, thus, it is omitted - a clear option given in the instructions for the Classification Task.

Care must be taken in interpreting these results, for the subset populations are not large. However, it is noticeable that the Dendrogram and Agglomeration Schedule within Subset 7A indicate that the associations within Subcluster 1.1 form at the Rescaled Distance of 10, but those for Subcluster 2.3 are of the order of 21. That is, the respondents in this subset display both one of the strongest agreements about the 'practical' areas and one of the weakest agreements about the 'theoretical' areas. Conversely, the Dendrogram and Agglomeration Schedule for Subset 7B suggest that the associations within the equivalent subsets are formed at approximately the same distance - both form at a Rescaled Distance of 14. That is, the respondents of Subset 7B tend to diverge from those of Subset 1 by displaying a slightly weaker agreement about the practical areas and a stronger agreement about the theoretical areas. Further, these respondents tend to separate the practical category trade and non-trade areas.

These results are, perhaps, the strongest indication so far that the views that trade instructors hold are formed early in their experience of the trades, and that they remain reasonably firm across the experiences of both the trade and the instructional settings. But, these results indicate, also, the possibility that differences may develop in situations where instructional experience is significantly longer than industry experience. Subset 7B displays some divergence from Subset 1, particularly in the way it separates the practical areas, in its use of 'school subjects' as a way of organising some of the theoretical areas, in the somewhat stronger level of agreement about the location of areas within the theoretical groupings, and in the slightly stronger agreement about the practical areas. Subset 7A tends to display a slightly more emphatic version of the outcomes of Subset 1. It would seem that there is a place for a more highly focused investigation of the differences exposed here, perhaps in a follow-up research effort.

7.5.6 Respondents grouped by industry setting

Earlier, and on the basis of the argument presented in Phase A, it was proposed that the distinctly different industry bases of the two TAFE regions - as presented in Section 4.6.1 - may influence the views that trade instructors hold. The argument was based, at least in part, upon the notion that the focus of the trade instructor's work is the formal trade preparation of apprentices in their local region, and that significant differences in these contexts could have some influence on trade instructors' views. The results of the analysis of the Classification Task results for respondents grouped by this dimension are presented in Figure 7.15.

Figure 7.15
Cluster Analysis results: Industry setting

Subset 2A Respondents from the Illawarra region (n_{2A} = 67);
and

Subset 2B Respondents from the ACT region (n_{2B} = 65).

0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing	Architecture Art	Counselling Interpersonal Communication Psychology	Mathematics Physics	
		Biology Medicine	Geography History	Philosophy Sociology	English	
14			Genealogy		Accounting Economics	
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Selling Subcluster 2.4
25	Major Cluster 1		Major Cluster 2			

What emerges here is that the results for the two subsets are identical with each other and, consequently, also are identical with the results for Subset 1 - the set of all respondents. That is, there appears to be little in these data to support the notion that trade instructors' views vary with the nature of the dominant industry setting to which their work as trade instructors is directed.

There is a need for caution in the interpretation of these results, for the makeup of the responses varies between regions. For example, Figure 7.01 indicates no responses were received from the Automotive Painting and Panel Beating trade areas in the Illawarra region. Further, a larger number of responses was received from Bricklaying, Applied Electricity, Fitting and Machining and Metal Fabrication in the Illawarra region than the ACT region. The influence of these variations is countered, at least in some part, by the lack of any significant differences between the views expressed by respondents from these different trade areas - as displayed in Section 7.5.2.

7.5.7 Respondents grouped by gender

From Phase A of the study, there emerged the question of whether differences may exist between the views held by male and female trade instructors. The results of the Cluster Analysis performed on the data provided by these two subsets of respondents are presented in Figure 7.16.

Figure 7.16
Cluster Analysis results: Gender

Subset 3A Male respondents (n _{3B} = 119).									
0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing	Architecture Art	Counselling Interpersonal Communication Psychology	Mathematics Physics				
		Biology Medicine	Geography History	Philosophy Sociology	English				
14			Genealogy		Accounting Economics				
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3		Selling	Subcluster 2.4	
25	Major Cluster 1		Major Cluster 2						

Subset 3B Female respondents (n _{3B} = 13).									
0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics	Accounting Economics	First Aid Nursing	Architecture Art		Geography History		Counselling	
	Typing	Mathematics Physics	Biology Medicine		Selling English			Interpersonal Communication Psychology Sociology Philosophy	
14						Genealogy			
20			Subcluster 3.1	Subcluster 3.2	Subcluster 3.3	Subcluster 3.4		Subcluster 3.5	
25	Major Cluster 1	Major Cluster 2	Major Cluster 3						

The results of the Cluster Analysis for the set of male trade instructors - Subset 3A - is identical with that of Subset 1. As noted in Figure 7.06, the vast majority of trade instructors in this sample are men, and it is not unexpected that the results for this subset are identical with those for the sample as a whole.

As noted in Section 7.5.2, the results for the set of female respondents are conflated with those for Hairdressing - Subset 4M. As given in Figure 7.16, there appears to be a *prima facie*, case to suggest that these differ from the earlier results. However, the Dendrogram and Agglomeration Schedule indicate that, if the Rescaled Distance at which major clusters are considered is relaxed from 20 to 22⁸, the results for this subset become substantially the same as those for Subset 3A - and, thus, for Subset 1. That is, the differences displayed by Subset 3B reside primarily in a small difference in the strength of associations formed rather than in the nature of those associations.

At the Rescaled Distance of 22, the subset of female respondents differs from Subset 3A in only two respects. First, the knowledge area English is associated with Selling rather than with the Mathematics-Physics doublet. Second, Subcluster 3.2 and 3.3 remain separate subclusters rather than combining to form a single subcluster as in Subset 3A - a possible explanation for this is that, given that the majority of them are from Hairdressing, these respondents are making a particular identification with the creative aspects of Art and Architecture and that this is an example of a 'subject-matter theme' linked to the trade area of the respondents.

It should be noted that the population of Subset 3B is, essentially the same as that of Subset 4M. It is a small subset - 13 respondents - and care must be taken in interpreting these results. However, it would appear that there is little in the evidence presented here to support a finding

⁸ As indicated early in Section 7.5, the researcher is required to determine the distance at which to accept a cluster solution. Relaxing the Rescaled Distance from 20 to 22 alters the strength of the associations but does not alter the nature of the associations - they look the same but are at a weaker level of agreement.

that there are significant differences in the views presented by male and female trade instructors. given the outcomes of Section 7.5.2, such a result is expected.

7.5.8 Respondents organised by level of educational qualifications

The final factor on which to compare results is the level of educational qualifications. Here, respondents who completed a bachelor degree were compared with those without a bachelor degree, and the results are presented in Figure 7.17.

Figure 7.17
Cluster Analysis results: Educational qualifications

Subset 8A		Respondents without a Bachelor degree (n8A = 100).					
0	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing	Architecture Art	Counselling Interpersonal Communication Psychology	Mathematics Physics		
		Biology Medicine	Geography History	Philosophy Sociology	English		
14			Genealogy		Accounting Economics		
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Selling	Subcluster 2.4
25	Major Cluster 1		Major Cluster 2				

Subset 8B		Respondents with a Bachelor degree (n8B = 32).					
0		Mathematics Physics English	First Aid Nursing	Counselling Interpersonal Communication Psychology	Architecture Art		
	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Accounting Economics	Biology Medicine	Philosophy Sociology	Geography History Genealogy		
14		Selling					
20	Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2			
25	Major Cluster 1		Major Cluster 2		Major Cluster 3		

As might be expected, Subset 8A - a large subset - is identical with Subset 1 in all respects. The results for Subset 8B are almost identical with

Subset 1 and, consequently, with Subset 8A. The only difference appears to be the location of Selling in Subset 8B. However, what emerges from an examination of the Dendrograms and the Agglomeration Schedules is that the strength of agreement amongst respondents in Subset 8B about the location of areas within Subcluster 1.2 and within Major Cluster 3 is stronger than in Subset 8A and in the majority of the equivalent subclusters in the earlier subsets. For example, the associations for Subcluster 1.2 tend to occur before the Rescaled Distance of 14, and in Major Cluster 3 the associations form before the Rescaled Distance of 8. Further, the strength of association for Subcluster 1.1 in Subset 8B - the subcluster of practical areas - is slightly weaker than for Subset 8A and the majority of equivalent subclusters in earlier subsets - of the order of 15. That is, respondents in Subset 8B appear to be less resolved about the practical areas and more resolved about the theoretical areas than most other respondents.

These results indicate the possibility that a difference may exist between the two subsets. Whilst the respondents in both subsets make a clear separation between the areas associated with the skilled trades and all other areas, Subset 8B tends to diverge slightly from the outcomes of Subset 1 and Subset 8A tends to replicate Subset 1. To the extent that the difference can be supported by the evidence presented here, it derives from a slight weakening in agreement about the 'practical' subcluster, and a strengthening of agreement about two of the 'theoretical' subclusters. This outcome resembles that for Subsets 7A and 7B, as presented in Section 7.5.5, and suggests that the process of studying for a degree increases the emphasis on subject-matter as a basis for distinguishing between knowledge areas.

The evidence generated in this Phase of the study provides a pointer to such an outcome but does not establish it as a finding, particularly as the effects appear to be quite weak - three years at university seems to generate but a minor attenuation of the views of trade instructors about knowledge and knowing. This is an area worthy of more detailed investigation at a later stage.

7.6 Emerging Directions

One of the purposes of Phase C of the study is to explore the extent to which the emerging typology of Phase B - based on the practical-theoretical dichotomy - holds its form and its position under the weight of further evidence. Presentation of the outcomes of this exploration began in Section 7.5 with the results of the cluster analyses conducted on the data generated by the Classification Task. The results appear to support the practical-theoretical dichotomy as central to the views of these respondents. In organising the knowledge areas in the Classification Task, it seems that a large number of respondents - taken both as a group and in subsets - first determined which areas are practical and which are theoretical - the terms are used here in the same sense as that generated in Phase B.

Whilst these results present little to suggest the emergence of other typologies, they suggest that, beyond the practical-theoretical dichotomy, it may be possible to identify other aspects of the emerging typology. In this section, the outcomes of the further exploration of the data generated by the Classification Task are presented. This is achieved by considering the results as a whole - rather than on the basis of subsets -

and blending into these considerations descriptors that respondents applied to the most salient of the groupings.

7.6.1 A focus on the practical

In the results presented in Section 7.5, the centrality of the practical-theoretical dichotomy is exhibited most clearly. Under the practical element of the dichotomy, the most clear and frequent pattern to emerge is related to the skilled trades - Automotive Painting, Welding, Commercial Cookery, Greenkeeping and Electronics - but including, also, Typing. It is displayed clearly in Subset 1 - the set of all respondents - and Figure 7.18 shows the extent to which this pattern appears in the subsets generated from the set of all respondents. Here, 27 of the 36 subsets contain subclusters based on this practical grouping.

Figure 7.18
Subsets containing the practical grouping
N=27

Subsets containing trade areas subcluster	Subsets containing trade areas + Typing subcluster			Subsets containing trade areas + Typing + First Aid subcluster	Subsets containing trade areas + Typing + First Aid + Art subcluster	Subsets containing trade areas + Typing + other areas subcluster
n=1 4Q	n=21			n=2	n=2	n=2
	1	4D	5D	4H	4C	4F
	2A	4I	6A	7A	4K	4R
	2B	4M	6B			
	3A	4O	6C			
	3B	5A	6D			
	4A	5B	8A			
	4B	5C	8B			

The descriptors that respondents used to describe the primary attributes of this practical grouping are presented in Figure 7.19.

Figure 7.19

Descriptors of the practical groupings (Includes frequency)			
12	The trades	2	Objective outcomes but needs the
8	Practical areas		subjective feelings of the person
8	Vocational outcomes	2	Technical essentials
5	Productive applications	2	Absolutely necessary for society
5	Useful outcomes	2	Skills relating to the needs of people
4	Structured knowledge	2	Motor skills are at the core
4	Real knowledge that is useful	2	Applied and job specific areas
4	Career skilled trades	2	Knowledge used by the person to do
3	Concrete ideas that can be applied		something real
3	Natural knowledge	2	About doing something useful
3	Skills that can be learnt from	2	They all have system in them
	observation and practice	2	Inventive and practical areas
3	Hands on knowledge	2	All about how to do things regardless of
3	All different but all trades		what you are doing
3	Knowing how not knowing facts	2	Serve real needs of people

Together, these descriptors provide an image of the nature of practical knowledge portrayed by these trade instructors and, it would seem, the image is very much in keeping with that portrayed by informants in Phase B - particularly as presented in Section 6.4. Also, it is an image that reflects many of the indications generated by Phase A. For example, the notion of practical knowledge as resulting in useful, tangible outcomes clearly is in evidence. There is a theme relating to the notion that practical knowledge is not independent of the knower but rests on a relationship between knower and knowledge. There is some reflection of the notion that to acquire practical knowledge requires that the knower become engaged with the knowledge, particularly through observation - of an expert - and practice. Further, very few of these descriptors focus on subject-matter. Rather, they portray practical knowledge in terms of 'usefulness' and 'tangible outcomes' and, in general, tend to support the notion of an ambience of pragmatism-functionalism that emerged in Phase B.

Of the remaining nine subsets in Figure 7.19, six contain this same grouping modified only by the transposition of Typing and/or Electronics to a different subcluster. In these subsets there is support for

the suggestion that some respondents distinguish between areas within the practical category using a trade - non-trade dimension. Clearly, Typing is a non-trade area in the sense that it is not related to apprenticeship and/or indenture; Electronics is related to the skilled trades through apprenticeship and/or indenture in Industrial Electronics and Radio and Television - but there is no apprenticeship program with the title Electronics *per se*. The possibility of a separation between trade and non-trade areas is raised in Subset 7B where, for example, the areas Electronics, Art and Typing are identified as practical, but are not located in the same subcluster as the areas related to the skilled trades.

There is evidence to suggest that some respondents identify the Nursing-First Aid doublet as practical but non-trade. For example, as displayed in Figure 7.20, a number of subsets associate the subcluster containing this doublet more closely with the practical grouping based on the skilled trades than with any theoretical groupings. Typically, the areas Medicine and Biology - described by informants in Phase B as theoretical - join this doublet at a somewhat weaker level and their association with the Nursing-First Aid doublet suggests that these respondents are forming the associations in the sense that Bishop (1979) portrays the possibility that institutionalised knowledge may provide support to operational knowledge. There are several other groupings that support this kind of connection between institutionalised knowledge and operational knowledge. For example, in Subsets 4E and 4G, Electronics is supported by Physics and Mathematics and, in Subsets 4G, 4P and 7B, Selling is supported by Accounting and Economics - and, perhaps, Mathematics. It might be recalled that Informant UH001

adopted a similar stance in his response to the Classification Task - see Section 5.8.

7.6.2 Subject-matter themes

The grouping based on the Nursing-First Aid doublet also lends support to the notion of subject-matter themes as the basis for associating knowledge areas. As noted in Section 7.5, respondents appear to form groupings of knowledge areas based on the extent to which they perceive the concepts involved in the areas to be related. Figure 7.20 presents the two themes that appear most frequently across the subsets - and the subsets in which they appear.

Figure 7.20
Subject-matter themes by Subsets

Theme 1 ⁹ <i>First Aid, Nursing, Medicine, Biology</i>			Theme 2 <i>Interpersonal Communication, Counselling, Psychology, Sociology</i>		
Subsets containing Theme 1			Subsets containing Theme 2		
<i>As Practical</i>	<i>As Theoretical</i>	<i>With other areas</i>			<i>With other areas</i>
1	3B	4P	1	5B	4B
2A	4B	4Q	2A	5C	4C
2B	4E	7B	2B	5D	4G
3A	4G		3A	6A	4H
4A	4J		3B	6B	7A
4I	4M		4A	6D	7B
5B	4R		4I	7A	
5C	5A		4M	7B	
6A	5D		4N	8A	
6B	6D		4R	8B	
6C	8B				
8A					
4N					
4O					

As noted earlier, a very strong association is evident between First Aid and Nursing. In eight of the subsets it represents the strongest paired association, and it occurs in 28 of the 36 subsets, including 25 instances where it forms a complete subcluster with Biology and Medicine -

⁹ As noted above, a good proportion of respondents associate this theme more closely with practical groupings than with theoretical groupings.

Theme 1. In 14 of these it holds its strongest linkage with areas described as practical. Figure 7.21 displays descriptors applied by informants to this grouping.

Figure 7.21
Typical descriptors of Theme 1

<ul style="list-style-type: none"> • Medical areas • Health related • Health work • Deal with physical wellbeing • What you need to know to look after physical health • Related to living things • Health and wellbeing 	<ul style="list-style-type: none"> • Practical non-trade • Para-trades • Physical health areas • Related to blood • Knowledge about the body • Practical health sciences • Knowledge of human health • Using biology to do something
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Whilst most of these descriptors portray an emphasis on the 'theoretical' concepts and the subject-matter of the areas, others highlight methods and the nature of the outcomes, as appears in the respondents' descriptors for the trade-related, practical areas.

Another subject-matter theme to emerge from the results presented in Section 7.5 is based on Counselling, Interpersonal Communication, Psychology and Sociology - Theme 2. These areas are associated within 26 subsets, including 20 as a complete subcluster. Further, Counselling, Interpersonal Communication and Psychology occur as a triplet in four other subsets, including one as a complete subcluster. Figure 7.22 presents descriptors applied by respondents to the areas in Theme 2.

Figure 7.22
Typical descriptors of Theme 2

<ul style="list-style-type: none"> • About communication • Knowledge about interaction between people • Social knowledge • Subjective and not measurable • Focus on language • About life's social processes 	<ul style="list-style-type: none"> • High level thinking processes • Cultural knowledge • Knowledge about communication • Knowledge for persuasion • New age theories • How people's minds work • Vague
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These descriptors tend to focus on the concepts and subject matter, as in Theme 1. However, some descriptors venture beyond this to descriptions of the trade instructors' views of such knowledge - 'vague', 'subjective', 'not measurable' - and to locate it clearly within the category of 'theoretical knowledge'.

Beyond these two themes there are several doublets and triplets that tend to recur across the subsets and which support the notion of subject-matter themes as a dimension underpinning respondents views:

- Accounting and Economics occur as a strongly associated pair across a large number of subsets, though only once as the strongest paired association. When subclusters are extracted using a Rescaled Distance of '20', the Accounting-Economics doublet appears in 31 subsets, including four as a complete subcluster (of two elements). In 23 instances the Accounting-Economics doublet appears in moderate association with Mathematics, including in Subset 1 - the set of all informants;
- A very strong association is evident between Physics and Mathematics. It represents the strongest paired association in eight of the 36 subsets. When subclusters are extracted using a Rescaled Distance of '20', the Mathematics-Physics doublet occurs in 34 of the 36 analyses. In 27 of these instances it appears as part of a Mathematics-Physics-English triplet;
- Art and Architecture are strongly associated in 30 subsets, including five as a complete subcluster when subclusters are

extracted using a Rescaled Distance of '20'. On 17 occasions the Art-Architecture doublet appears associated with the Geography-History-Genealogy triplet, including ten as a complete subcluster;

- Geography and History are associated in 29 subsets, including two as the most strongly paired association. When subclusters are extracted using a Rescaled Distance of '20' the Geography-History doublet is associated with Genealogy on seven occasions, including three as a complete subcluster. Further, the Geography-History-Genealogy triplet is associated with Art and Architecture on 17 occasions, including ten as a complete subcluster.

Because these areas did not form independent groupings - typically, they appear within larger groupings - it is not possible to distil sets of typical descriptors that apply exclusively to these areas. However, it appears that the basis upon which they are associated relates strongly to the nature of their subject matter.

It appears that the respondents in this phase of the study form such strong links between the elements within each of these doublets/triplets that they seem to present as a single entity - a binary condition. But this does not suggest that one of the elements could have been omitted from the list of areas within the Classification Task, for there is good justification for the inclusion of each element - see Section 4.6.3. Rather, it is to suggest that, in the views held by these trade instructors, similarity in subject-matter between the areas is a strong basis upon which to form associations.

7.6.3 School subjects

Another pattern to emerge - primarily under the theoretical element of the practical-theoretical dichotomy - relates to the notion of 'school subjects' as a dimension underpinning the ways in which respondents perceive the organisation of these knowledge areas.

Figure 7.23
Subsets displaying 'school subjects' subclusters

Knowledge areas related to the school subjects subcluster	Subsets containing a school subjects subcluster	Subsets containing a school subjects + Architecture* subcluster	Subsets containing a school subjects + Accounting* subcluster	
Physics	4H	4A	1	14R
Mathematics	4P	4C	2A	5B
English	7A	4G	2B	5C
Geography		4K	3A	5D
Economics		4O	3B	6B
History		4Q	4I	6D
Art		5A	4M	8A
		6A		

* It is likely that the inclusion of Architecture and Accounting is a consequence of the binary condition between Art/Architecture and Economics/Accounting noted above.

The typical descriptors presented by respondents to groupings based on these areas are presented in Figure 7.24.

Figure 7.24
Typical descriptors of 'school subjects' groupings

<ul style="list-style-type: none">• School subjects• Basic school knowledge• Basic education• General schooling• General education• Traditional knowledge• Core subjects	<ul style="list-style-type: none">• Introductory education• Prerequisite knowledge• Compulsory subjects• Pure subject matter• General understanding• Objective knowledge that doesn't need the person
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It might be noted here that the descriptors tend to focus not on the subject matter or concepts involved in the areas, nor on the nature of the outcomes of the application of knowledge from these areas. Rather, they focus on the notion of foundational knowledge deriving from the

social setting of schooling. It is interesting that no link is established with vocations and these areas appear not to relate directly to jobs and skills required for work. The associations between the groupings based on these areas and those containing the skilled trades are extremely weak - of the order of a Rescaled Distance of 25. There is some echo here of Bishop's notion of distance between institutionalised knowledge and operational knowledge, particularly in relation to schooling.

7.6.4 A place for Selling?

Selling was notable not for the strong associations it forms but for the fact that, in general, it fails to make strong associations. In 16 of the 36 subsets including Subset 1 - the set of all informants - Selling appears without any associations below the Rescaled Distance of '20'. In the subsets where it appears associated with other 'knowledge areas' below this distance there appears to be two main patterns, as depicted in Figure 7.25.

Figure 7.25
Subsets displaying Selling subclusters

Subsets containing Selling as an independent, single-element subcluster		Subsets containing a subcluster based on Selling with Psychology and Interpersonal Communication		Subsets containing a subcluster based on Selling with Accounting and Economics
1	4N	4C	7B	4B
2A	4R	4K	8B	4E
2B	5B	4O	4Q	4J
3A	5C	4P	5A	4K
4A	5D			6C
4D	6A			7A
4H	6D			
4L	8A			

In one of these patterns, Selling appears associated with Interpersonal Communication and Psychology - and, occasionally, with several other areas. In the other pattern, Selling appears with Accounting - and,

occasionally, with Economics¹⁰ and Mathematics. These patterns seem to be of similar style to those noted earlier in which institutionalised knowledge is positioned in support of areas that can be considered as operational knowledge - in the sense described by Bishop (1979). On four occasions Selling is associated with only one or two other areas - such as English.

Figure 7.26 provides typical descriptors for Selling - or the grouping within which Selling is located.

Figure 7.26
Typical descriptors of Selling

Selling as a separate subcluster	Selling associated with Interpersonal Communication and Psychology	Selling associated with Accounting
<ul style="list-style-type: none"> • Not really knowledge • Rip off • Bullshit • Left over • Doesn't belong 	<ul style="list-style-type: none"> • Language and thinking • Obvious • Oral communication • Power of speech • Interaction between people • Persuasion skills 	<ul style="list-style-type: none"> • Manipulating people • Retailing • Commerce • Money jobs • Part of every job • Budgets and finance • Book-keeping

In the descriptors of the first column there is some echo of the outcomes of Phase B in which some of the informants called into question Selling as worthy of consideration as valid knowledge, and in which Selling was portrayed as crossing a knowledge - non-knowledge boundary. In the second column, the descriptors tend to focus more on subject matter and concepts and in the third column it appears that the descriptors tend to focus on vocational applications of the areas.

¹⁰ As presented by Informant AP002 in Phase B - see Section 5.5.

7.7 Reflections on Method

As noted in Section 7.1, the primary purposes of this phase of the study are to explore the extent to which the typology that emerged from the earlier phases would hold its position under the weight of evidence from a larger number of trade instructors, and whether any further typologies might emerge from this evidence. The burden of capturing data fell upon the Classification Task, identified and developed in Phase B for use in this phase of the study. For these purposes, it would seem that the Classification Task was both appropriate and adequate.

There are several points that might be highlighted about the use of the Classification Task in this phase of the study. First, the response rate of 62% is quite good, and senior staff within both TAFE institutions declared surprise that trade instructors had responded so strongly to an 'academic' project. In part, this may be attributed to the attractiveness of this form of survey. Indeed, it would seem that, to these respondents, the Classification Task was something of a curiosity as a form of mass survey. As noted in Section 4.6.3 and 6.7, the Classification Task was selected because its attributes were judged to be those most likely to be received well by trade instructors. It is acknowledged, however, that the satisfactory response rate is due to other factors, including the intensive efforts of the researcher to engage with potential respondents.

Second, the Classification Task captured data sufficient in quality and quantity for the primary purposes of this phase of the study, but served, also, to expose areas worthy of further investigation. For example, it provided preliminary insights into between-subset differences. In its present form, the Classification Task was not able to shed sufficient light

on these differences to enable reliable and informed conclusions to be reached. It would seem that it is too 'coarse' to elicit insights into the differences that trade instructors might perceive between the various trade areas *per se* - as noted in Section 7.5.2 and as exemplified by informants in Phase B. Whilst it did indicate that trade instructors perceive the skilled trades as separated from other areas - notably, those considered to be theoretical - the Classification Task did not generate insights into perceptions about what makes one trade area different from another. Given the value of the Classification Task as a survey instrument in this context, it would seem worthwhile exploring other forms of this instrument for this more fine-grained investigation. For example, Evans (1970a, 1970b)¹¹ used a form of classification task to investigate categorising behaviour of young high school students. He presented them with 340 items to be classified, and used a form of latent partition analysis to analyse the data. It resulted in the development of 17 underlying factors to account for the ways in which the respondents distinguished between the items. However, for the present study, it is likely that a survey of this form - with a large number of items - would have been unacceptable to the trade instructors, primarily because of the detail and magnitude of the task. Further, prior to its use in this study, there was no evidence to suggest that the process of representing views through a construction activity such as the Classification Task would be so compatible with the ways in which trade instructors work. Under more controlled conditions, and with the insights generated by the present study, Evans' approach may prove to be quite successful.

¹¹ Evans current work focuses on the development of a model to represent the interactions between trade instructors and their subject matter in TAFE as it is enacted in the teaching of specific theoretical concepts in the TAFE classroom.

Third, the data generated by the Classification Task was not easy to analyse. A substantial portion of the data was treated with computerised statistical tools. It required detailed coding of the data and the formation of a data management system to enable the data to be used as input to the Cluster Analysis routine. Further, the output from the Cluster Analysis needed interpretation and it was not, simply, a matter of transferring the output into a 'Results' chapter in the thesis or attaching it as an appendix. Rather, the process required the researcher to establish appropriate parameters, and the output of the statistical analyses was useful only when considered in the light of an in-depth understanding of the context, and the large amount of data that was not amenable to such computerised analysis. That is, as is the case in most qualitative studies, the interpretation of the data from the Classification Task relied heavily on the sensitivity of the researcher to what was salient, and the clarity of the framework within which the researcher worked. It required the development of insights through consideration of the totality of the data and iterative processes of sifting, sorting, selecting and organising.

7.8 The Next Step

As the study has progressed theoretical development has occurred. The position that began to emerge in Phase A has evolved, steadily, across these seven chapters. It would seem that, in general terms, the outcomes of Phase C of the study resonate with and elaborate those of Phase B which, in turn, expand upon those of Phase A.

There are several points about the contribution of Phase C that might be highlighted at this point. First, the evidence serves to enhance, rather than diminish, the position of the major typology that emerged in Phase B. The developments in relation to subject-matter themes and school subjects appear to be refinements of that typology rather than new typologies, and the practical-theoretical dichotomy remains central to the views of the respondents and informants in this study. Taken as a whole, the position appears to be that these trade instructors portray views that are essentially pragmatic and functionalist.

Second, whilst the influence of the skilled trades appears to be very strong, beyond the views represented in this primary dichotomy it seems that these trade instructors vary in ways that might be expected to emerge from any such group of respondents. There appears to be no single factor, or set of factors, that underpins these views or accounts for the diversity represented in outcomes such as the 'subject matter themes', the 'school subject themes' or the doublets and triplets that were identified. In a sense, the emergence of these 'common sense' outcomes in both Phase C and the Semantic Taxonomy Interviews of Phase B provides some confirmation and support for the validity of the Classification Task as an instrument.

The third point to note is that these trade instructors portray practical knowledge as the epitome of knowledge. Practical knowledge is characterised by its references within the skilled trades. Further, their views of the social processes by which what counts as valid knowledge is acquired reflect the influence of apprenticeship.

Fourth, it would seem that the trades are a primary point of reference, and the views held by these trade instructors about knowledge and knowing are established early in their careers as tradeworkers. Later experiences - such as the experiences of university education and the instructional role - seem to have but a small attenuating effect on these views - the fundamental tenets that determine what counts as valid knowledge and apposite ways of knowing are firmly established.

The next step in the development of this study is to provide a capstone for the argument that has developed through the efforts of the first three phases of the study, and to offer some speculation about the implication of the outcomes of this study for the work of trade instructors - particularly, the curriculum and instructional formulations for training in the skilled trades. This is the focus of Chapter Eight.

Chapter Eight

Consolidation Speculation and Reflection

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Chapter Eight

Consolidation Speculation and Reflection

My ideas are candidates for others to entertain, not necessarily truth, let alone Truth, but as positions about the nature and meaning of a phenomenon that may fit their sensibility and shape their thinking about their own inquiries.

(Peshkin¹)

8.1 Introduction to the Chapter

This is the final chapter of the thesis. It serves as capstone to a process of research and reporting that has been both reflexive and cumulative. Each of the preceding chapters makes a contribution to the development of the theoretical position of the study, and much of what might be said here already has been exposed. But there is a need for this chapter to serve three main purposes. First, this chapter responds to the three primary research questions - not in the sense that it restates the evidence of the main findings or gives a serial overview of each chapter, but in the sense that it 'draws a thread through the main points of the earlier chapters' (Lewins 1993: 49). This is a process of consolidation in which the researcher offers conclusions - constructions that result from the exercise of inference and informed judgment; formulations based on the findings, information, evidence and conclusions generated across the several phases of the study.

¹ Peshkin (1985: 280)

Second, this chapter undertakes some speculation about the implications of this research effort for both the future practice of training in the skilled trades and future research into the views that trade instructors hold about knowledge and knowing.

Third, this chapter offers some reflection on the evolution and process of the study. This takes on significance in a study such as this because the imperative of a strong degree of reflexivity meant that the study did not progress along a predetermined course. Rather, each phase responded to the outcomes of earlier phases, and the study tacked between theoretical development and empirical investigation. It is appropriate, therefore to highlight not only the limitations of the study but also aspects of the process that were significant in shaping the study and its outcomes.

At the risk of contravening what might be expected in a typical concluding chapter, reference is made to a small amount of research not considered in earlier parts of the thesis. This 'new material' is introduced to support some of the speculative process that is part of this chapter.

8.2 The Structure of the Chapter

The first two sections of this chapter - Sections 8.1 and 8.2 are these introductory sections. The chapter then is organised into three main parts - Sections 8.3, 8.4 and 8.5 - reflecting the three purposes noted in Section 8.1: a consolidated response to the primary research questions; some speculation; and some reflection. The final section contains some final commentary that brings the thesis to a close.

8.3 Consolidation

An early focus of this study was the distillation of three primary research questions:

- *Do trade instructors use frameworks (that is, do they hold systems of beliefs, values, attitudes and feelings) that might, potentially, guide their approach to knowledge and knowing?*
- *What are the main typologies involved in the views held by trade instructors about the nature of knowledge and knowing?*
- *To what extent do these views embody characteristic ways of presenting or perceiving reality - perhaps canons or rules?*

The questions guided the study through theoretical and empirical explorations of the views that trade instructors hold about knowledge and knowing. These views have been exposed progressively as the study moved through its several phases. Now, in the final phase of the study, it is appropriate to provide a consolidated response to the research questions, and this is the focus of this section.

It would seem that the trade instructors in this study perceive 'practical' knowledge as the essence of what constitutes valued and valid knowledge. This is a concept that has breadth and complexity. Essential characteristics of practical knowledge are captured in terms such as 'craftsmanship'². That is, practical knowledge is a concept that extends well beyond that which derives from, or informs the performance of uncomplicated technical skills. To these trade instructors, valid and

² It is acknowledged that the term 'craftsmanship' has gender implications and that, normally, a gender inclusive term would be more appropriate. However, the term is used here because it conveys the strength of the traditions that foster these characteristics of practical knowledge.

valued knowledge enables the tradeworker to perform with mastery, excellence and proficiency across a variety of settings, and within the full tutelary spirit of the trade. It outcrops in the tangible processes, materials and outcomes of the trade and these act as the primary referents for what counts as valid knowledge, and practical knowledge is justified in terms of the extent to which it supports observable, useful and tangible outcomes. A truly knowledgeable person is able to recognise most situations as belonging to a class, governed by rules and routine. There are few exceptions. Problem-solving and uncertainty characterise the realm of the less knowledgeable novice. Thus, practical knowledge fosters certainty of outcome, is agreed across the community of tradeworkers, and is judged against criteria established by the collectivity.

One of the ways in which the trade instructors of this study portray their views about knowledge and knowing involves the use of contrast - as illustrated in the basic practical-theoretical dichotomy that appears so frequently and prominently within their discourse. Here, theoretical knowledge is depicted as having no determining referents related to the processes, materials and outcomes of the skilled practice of the trade. It is, essentially, meaningless, impotent and without justification. However, the positioning of theoretical knowledge in such contrast with practical knowledge does not deny a theoretical aspect to practical knowledge. Indeed, the trade instructors in this study acknowledge a place for postulation and generalisation within their own processes. But it is valid only to the extent that it informs, derives from, and is inseparable from the processes of the trade. This is a notion of completeness - perhaps, holism - that pervades what is portrayed by

these trade instructors as valued and valid knowledge and emerges from the nature of the practical processes and materials of the trade. As such, it encompasses the range of aspects that constitute good practice - including concepts of 'good work' and 'correct method', the way in which the elements of the trade interact, and the relationship between the tradeworker and the job. It involves command of the inherited wisdom of the trade. There is a strong notion that the knowledge that is brought to bear on the performance of work in the skilled trades requires an understanding of a complete and complex 'whole'.

The trade instructors in this study portray the process of acquiring valid and valued knowledge as integral to what constitutes valid knowledge. Here, knowledge that is passed down from expert to novice in a form of lineal descent, preserves and fosters the rules implicit in the notion of 'craftsmanship' - a process exemplified in the institution of apprenticeship. This involves not simply the imparting of the technical information and skills of the trade but includes quasi-cultural aspects that underpin the relationship between the tradeworker and the work of the trade, the interactions within the community of tradeworkers, and the social relationships between tradeworkers and those outside the trade. Through apprenticeship, tradeworkers participate in a collectively shared process of socialisation and, it would seem, this leads to views of knowledge that have a sense of being standard, part of a pattern and of a certain type.

This position derives from the propensity of these trade instructors to use the skilled trades as a point of reference. There are many skilled trades, and it is not intended to suggest that there is no basis for

differentiating between them³. Rather, it is to suggest that the trade instructors of this study identify strongly with attributes exhibited across the set of skilled trades and that this is sufficient to set the trades apart from other areas. When asked to consider knowledge and ways of knowing, the trade instructors in this study portray a strong commitment to a typology based on the practical-theoretical dichotomy. They display considerable - perhaps, overwhelming - agreement about the place and nature of this typology, and about several related aspects of knowledge and knowing. To these trade instructors, the epitome of knowledge exists in the skilled trades, and its attributes separate it clearly from other knowledge. The study exposed, also, what appear to be extensions or lower-order aspects of this typology - 'subject matter themes', 'school subjects' and doublets and triplets that represent strong associations. However, it would seem that these are little more than manifestations of the idiosyncrasies that might be expected to emerge from any group of respondents. Their emergence in the data serves to illustrate the general validity of the research approach.

The prominence of the trade as a source of identity leads trade instructors to consider educational processes, and to make educational judgements more in terms of what counts as valid and valued within the skilled trades and the community of tradeworkers than in regard to the practices of the TAFE institution or the principles and theories of Education. Trade instructors appear to place more value on the rules of the trade than the 'rules' that might, normally, be associated with an educational position - they seek to conform to the norms that derive

³ In Chapter Seven it was noted that the tendency of the trade instructors in Phase C of the study to portray the skilled trades as an undifferentiated group is a function of the processes and methods of that phase of the study which did not elicit from respondents between-trade differences.

from the nature and practices of the trade. This is illustrated most clearly in the range of rule-like elements that emerged from the study, and Figure 8.01 provides a sample of these.

Figure 8.01
Rule-like elements

Criteria for judging valid knowledge:
<ul style="list-style-type: none">• Sound basic knowledge is demonstrated in terms of practical things you can do;• Substantial basic knowledge is validated by the real things you can do.
The nature of valid knowledge:
<ul style="list-style-type: none">• Our knowledge is about understanding the whole thing;• Your knowledge is there to be seen;• Knowledge is organised by the functions and roles you perform.
Sources of valid knowledge
<ul style="list-style-type: none">• Practical knowledge comes from the procedures and materials of the trade;• The main dimension is the person: knowledge is not external.
Processes for acquiring valid knowledge
<i>Trial-and-Error and Self-Learning</i>
<ul style="list-style-type: none">• Test it, try it, see if it works ... just keep trying 'til it works;• You learn it through your experiences because you get used to self-evaluation and self-correcting;• You don't teach it outright ... you put the kid [apprentice] into the position where he can experience it too.
<i>Experience and Intuition</i>
<ul style="list-style-type: none">• If you've got this trade wisdom you can work it out;• A good tradesman has both the hard trade knowledge and perception of the overall feel and form.

In respect of their interactions with apprentices, trade instructors carry particular notions of the relationship between instructor and student. It is clear that, within the trade, their status as qualified tradeworker bestows on them both license and obligation to induct novices into the trade. It establishes not only their specialist knowledge and their skills but also their having completed the social rite that signifies their passage from novice to expert. But the knowledge and skills are associated more with the collective than with the individual, and this brings with it responsibility for passing on the knowledge - including the lore and the rules - to the new generation of tradeworkers.

The study exposed the importance to trade instructors of the autonomy that they exercise in the practice of their trade. This appears to carry across to the instructional role, and one of the dimensions that emerges from the views of these trade instructors is the notion of autonomy-control. Trade instructors seek to maintain the same kind of autonomy in the instructional role that they enjoyed under the status of qualified tradeworker. This is a form of autonomy captured by terms such as 'independent', 'licensed', 'unsupervised' or, even, 'franchised'; and it includes thinking and acting for oneself, making decisions, bringing thoughtful action to bear on a situation, and being in control of one's activity. But it is not the form of autonomy captured by terms such as 'the right to be self-determining', 'the right to be self-regulating' or 'the right to be self-governing' - terms frequently associated with professions such as law and medicine.

The techniques, services and products that constitute the work of the trade, and which skilled tradeworkers are able to perform at the level of 'expert', appear to be the source of this form of autonomy. They give rise to the knowledge that sustains the trade, and it would seem that tradeworkers place significant value on knowledge that derives from these sources. This knowledge is not of an abstract or theoretical form; it is not knowledge expressed in terms of theoretical logic, hypothesis, supposition or principles independent of facts and phenomena. It is knowledge expressed in terms of accepted practice and technique. It includes a sense of custom, and is inclined to action rather than speculation. It is very much practical knowledge, characterised by a focus on whole tasks - a product or a service in complete form.

The tendency of the domain of each of the skilled trades to be reasonably defined and bounded - a traditional structural feature of work in the skilled trades - leads trade instructors to perceive valued and valid knowledge not only as that which leads to certainty and routineness of outcome but also as bounded and context-dependent; these trade instructors perceive the natural order of knowledge as characterised by a degree of boundedness. They differentiate their knowledge from other knowledge and this creates a situation in which, under the bureaucratic setting of the TAFE college, the environment of the trade departments in TAFE takes on an enclave-like character. This enables the trade instructors to work to a set of norms and rules that relate more strongly to the trade than to general education, and this is exhibited in particular patterns of behaviour. For example, it was noted that Heads of Department play something of a gatekeeping role, protecting the enclave from the influence of the bureaucratic patterns of the organisation - the notion of *paterfamilias*. Also, it was noted that the settings of the smaller campuses were more conducive to harmony and an environment in which the trade instructors could establish identity and culture and maintain autonomy in the practice of their work than those of the larger campuses.

Apprenticeship is of critical importance in a number of other senses. It is the process of socialisation into the trade and the mechanism through which the tradeworkers gain their status. Such status applies not only within the occupation but also beyond work into adult and family life. Apprenticeship is the process through which control is maintained over access to, and use of the valued knowledge and skills of the trade, and it represents the process by which knowledge and skills are passed from

person to person. The most recent developments in the practice of the skilled trades are altering some of the traditional features of training in the skilled trades - for example: the institution of apprenticeship is no longer the only route to the status of qualified tradeworker; multiskilling is becoming common place; and the introduction of restricted licenses now permits a tradeworker to practice elements of another trade. The findings of the present study suggest that such changes stand in some contrast with the views expressed by the trade instructors of this study, and pose a significant challenge to the epistemic tranquillity that has characterised the culture of work in the skilled trades, and the processes of training for the skilled trades.

8.4 Speculation

There are two main areas in which it is appropriate now to offer some informed speculative comment. First, there is a place to consider the implications of the outcomes of this study for training in the skilled trades, for it was here that the study began. Second, there is a place to offer suggestions about the kinds of research efforts that might now be pursued, using the outcomes and processes of this study as points of departure.

8.4.1 Implications For Training In The Skilled Trades

The most visible expression of the ways in which knowledge is conceptualised within vocational education and training is in the selection of content and the formulation of objectives within the training curriculum. It is here that the views of knowledge and knowing that prevail within the institutions are made available for

public scrutiny. One of the stimulants for the present study was the identification of a tension between these formulations and the ways in which trade instructors view knowledge and knowing. Thus, the point has been reached where it is appropriate to speculate about some of the sources of this tension.

In reviewing the approaches to curriculum development within TAFE in Australia, Laird (1986) suggests that the predominant approach involves an instructional systems model based firmly on the use of behavioural objectives⁴. Here, the taxonomic approach of Bloom (1956) to the organisation of knowledge has been central⁵ - 'an approach which is sympathetic to the extreme view of how behavioural objectives should be used in education' (Laird 1986: 133). In essence, it is a means-ends model of curriculum design that assumes that clear educational ends, or objectives, of a course can be pre-determined and that, in the light of such information, appropriate means for achieving those objectives then can be chosen. It might seem that a curriculum development model such as this is highly appropriate for the skilled trades, for it focuses on the tangible processes and materials of the trade. This would lead to curriculum and instructional formulations that harmonise with the views expressed by trade instructors throughout this study. Yet, it is these curriculum and instructional formulations that appear to cause such concern for trade instructors.

⁴ Finch and Crunkleton (1989) note a similar tendency in other countries.

⁵ By the end of the 1960's, the Bloom taxonomy had been so strongly established in the environment of vocational education and training curriculum development that it was possible to compare training curricula using the Bloom taxonomy as a calibrating framework or scale (Bennett 1969). This same position continues today, as exemplified in the recent publication by the Australian Council for Training Curriculum (ACTRAC) in *Guidelines for Competency Based Module Development* (1994).

In a context separate from the present study, Ducker and Johnstone (1993) report an analysis of the curricula of twenty six trade courses from TAFE in the ACT and in New South Wales. The analysis was designed to assist in the portrayal of the ways in which course objectives, as presented in the training curriculum documents, could predispose programs to particular modes of assessment and, thus, encourage particular kinds of learning outcomes for apprentices. Following Bennett (1969), the analysis used the Bloom taxonomy as the scale by which to analyse and compare the trade curricula. The first point to note is that the analysis shows that the curriculum documents present course objectives separated into 'theory' objectives and 'practical' objectives. In some part, the purpose of this separation is related to the administrative need to allocate facilities - particularly workshops and lecture rooms - and resources such as teaching hours. The separation of 'theory' and 'practical' is achieved by the use of the Bloom domains as an organising framework for course objectives. Here, curriculum developers present objectives under the cognitive domain - as 'theory' objectives - and under the psychomotor domain - as 'practical' objectives. That is, the knowledge identified from detailed study of work in the skilled trades - through 'instructional system' methods such as task analysis - is presented in training curriculum documents as comprising two major segments - 'theory' and 'practical'. Clearly, this is in some contrast with the views expressed by trade instructors in this study - indeed, it is, in many ways, the antithesis of their position. It seems to be founded on an assumption of an asymmetrical dependence of operational knowledge on institutional knowledge and ignores the notion that the knowledge of the skilled trades might be considered as a more complete whole,

organised by the processes, materials and outcomes of the trades - as portrayed by the trade instructors in the present study.

It might be speculated that one of the effects of separating 'theory' from 'practical' within the public presentations of the courses - the curriculum documents - is that the separation is maintained across all the educative activities of the program. For example, theory classes are separated from practical classes, and theory objectives are tested separately from practical objectives. Thus, trade knowledge is projected as existing in segments - the 'theory' and the 'prac' referred to by the trade instructors in the present study. This reduces the opportunities for 'theory' to be integrated with, or to inform 'practical' in any systematic and directed ways. It establishes theoretical knowledge as a category separated from practical knowledge, and presents it as an entity with at least the same value and prominence as practical knowledge.

The separation of 'theoretical objectives' from 'practical objectives' seems to be a construction more compatible with the views that institutionalised knowledge is of greater value than operational knowledge, and that the most appropriate guide for the organisation of knowledge is by subjects rather than by the ways in which knowledge is used in the workplace. It is interesting to note that, in considering the organisation of knowledge for the purposes of curriculum design more generally, by far the most commonly accepted structure is that of the traditional academic disciplines. Whilst some of the theoretical perspectives that have been established in the field of Education provide views of knowledge as organised through different ways of knowing

about, or inquiring into phenomena⁶, and some other theoretical perspectives describe the organisation of knowledge in terms of the genesis of its logical complexity⁷, 'many institutions uncritically accept an epistemology based on the academic disciplines when an alternative epistemology might be more appropriate' (Conrad and Pratt 1983: 26). In vocational education and training, there is little to suggest that variations on the dominant model - such as provided by, say, problem-based learning approaches⁸ - have been adopted to any significant extent. Yet, it might be postulated that, as an instructional approach, problem-based learning is more compatible with the views expressed by the trade instructors in this study.

A second point to note from the analysis by Ducker and Johnstone is that, by weighted value⁹, the stated objectives of the trade curricula are, predominantly, from the lower levels of the Bloom cognitive domain¹⁰ - 89% of the objectives of the trade courses relate to the cognitive domain; the remaining 11% of the objectives are classified as 'practical'¹¹ and are not organised by any obvious taxonomy¹². Thus, in relation to the skilled trades as a point of reference, the objectives appear

⁶ See, for example, Phenix (1954) - also noted above.

⁷ See, for example, Piaget (1952).

⁸ See, for example, Davison and Smith (1987).

⁹ The objectives presented in the curricula were weighted, primarily as a guide to assessment and teaching emphasis.

¹⁰ In the typical analysis for a trade course in the sample of twenty six courses, approximately 68% of the objectives - by weighted value - are at the Bloom cognitive levels Knowledge and Comprehension, and common amongst these are objectives relating to the action terms 'define', 'name', 'list', and 'explain'. At the Bloom level Application are some 17% of the objectives, and a further 4% could reasonably be described as relating to the Bloom levels Analysis, Synthesis and Evaluation.

¹¹ This represents the declared 'weighted value' of the practical objectives as expressed in curriculum documents rather than a teaching time allocation.

¹² Ducker (1992a) presents a tentative classification scheme for these 'practical' objectives within the existing trade courses. Other schemes include those of Harrow (1977), Harmon (1969) and Field (1984).

as lists of segmented and tenuously-related parts. In essence, they ignore the web of relationships inherent in the work of the skilled trades, including relationships between expert and novice, between the tradeworker and the job, between tradeworkers, and between tradeworker and the community that consumes the outcomes of the work of the skilled trades.

The ways in which the Bloom taxonomic classification of objectives has been applied within trade course curricula, including the tendency to focus on lower-order cognitive objectives, leads to an emphasis on 'bits of tasks' and does little to enhance the notion of competent and complete performance as portrayed in the notion of 'craftsmanship'; also, instruction and assessment tends to focus on the observable minutiae that make up the task rather than on larger and more coherent units of performance that relate more closely to the processes and practices of skilled work. The essence of work in the skilled trades has not been captured in the stated objectives, with the consequence that what the documents present as being taught and learnt in trade courses is removed from the context of the workplace. Further, the history of TAFE institutions predisposes the knowledge formulations to styles that mimic school subjects and the traditional disciplines. That is, the development of TAFE under the shadow of general education¹³ has led TAFE curriculum developers to use this as a model for instructional and curriculum approaches. It has not been established that this is the appropriate approach, and the evidence of this study provides a basis for calling it into question. In terms of the position noted throughout this study, trade instructors are likely to perceive significant differences

¹³ See, for example, Ducker (1991, 1992a).

between their views of what counts as valid knowledge and how valid knowledge is organised and presented, and those of the instructional and curriculum formulations of the TAFE institutions. Indeed, trade instructors faced with implementing these curriculum and instructional formulations may well believe that they have no feeling for these formulations and that they do not represent the knowledge and ways of knowing that they have come to value through their experiences of the skilled trades.

8.4.2 Future Research

Whilst this study draws on research, theories and literature from a variety of sources, it remains, essentially, an exploratory study. It charts a course towards an understanding of the views held by trade instructors about knowledge and knowing, seeking to uncover some of the patterns and major influences rather than to reach a simple 'end-point'. Clearly, there is a place to continue the work of the study *per se*, but in its progress so far it has exposed a number of opportunities for further research. First, this study provides clear indications that trade instructors hold views that separate knowledge and ways of knowing in the skilled trades from other areas - as illustrated, most emphatically, in the strength of the practical-theoretical dichotomy as the basis for the dominant typology. Beyond this, the study raises the possibility that trade instructors also may hold views about between-trade differences. Some evidence of this emerged in Phase A, where it was suggested that trade instructors might perceive differences between trades based on variations in the specific materials and procedures of the respective trades. In Phase B, the study exposed the possibility that these perceptions about differences might arise from dimensions such as

'hard-soft', 'simple-complex' and 'high status-low status'. However, this study did not seek to pursue the issue in depth and, as noted in Section 7.5.2 and Section 7.7, there is a place for more research - the views of trade instructors about differences in the knowledge base of the several skilled trades.

Second, the study suggests that the process of apprenticeship is highly influential in shaping the views and the practices of trade instructors. From this study - and, indeed, from the work of scholars such as Mealyea and Gleeson - it would appear that the experience of apprenticeship leads trade instructors to perceive their relationship with students - apprentices - as characterised by quasi-kin notions as well as those that arise from the more obvious expert-novice relationship, and that this is related to the views that trade instructors hold about knowledge and knowing. Despite the fact that trade instructors perform their role in an institutionalised, educational setting, the relationship appears not to mimic that which might pertain in, say, university or school. Rather, it would seem that the social processes of apprenticeship lead trade instructors to perceive the relationship somewhat differently, and it is here that opportunities for further research arise - the nature of the relationship between the trade instructor and the apprentice in the formal instructional setting.

A third opportunity for further research also arises from the indications that the views that trade instructors hold about knowledge and knowing are shaped, in considerable part, by their experience of the process of apprenticeship. The study indicates that, whilst significant aspects of their views are established early in their careers, trade instructors are

influenced by some of the other social factors they encounter over time. These factors appear to have an attenuating effect on the views that trade instructors hold in respect of the place of the practical-theoretical dichotomy in the dominant typology. For example, in Section 7.5.8 it was suggested that the experience of university study may temper the strength of the perceived separation between the elements of the practical-theoretical dichotomy; in Section 7.5.5 it was suggested that long experience of the instructional role - particularly when combined with short experience of industry prior to entering the instructional role - also may generate views that differ from the dominant position. But it is notable that the effects appear to be quite modest - the primary typology remains firmly in place. Thus, further research might explore which factors are, indeed, influential, the extent to which such factors modify the views that trade instructors hold about knowledge and knowing, and the nature of the differences fostered by these factors - the influence of selected social factors on the views of trade instructors about knowledge and knowing.

A fourth opportunity for further research emerges from the earlier comments that this study is, essentially, a study of men. The small amount of exploratory work that involved women indicated that they might hold views about knowledge and knowing that, in large part, are identical with those of the male trade instructors. In the light of the emerging evidence about women's ways of knowing, it would seem appropriate to pursue study of the views of women who are tradeworkers and who have served an apprenticeship.

8.5 Reflections

At the closing point of this study, it is appropriate to reflect on the research framework of the study for it, too, developed as the study progressed. This involves both taking a broad reflective view of the research approach and considering the limitations of the study.

8.5.1 On Method

This study began in observations made by the researcher about an apparent tension between the views held by trade instructors and the curriculum and instructional formulations with which they work in the TAFE setting. It did not begin with an interest in a particular theoretical framework. The early efforts of the study were facilitated by both the scholarly context within which the researcher worked and an expedition into the existing literature about trade instructors. This helped to move unfashioned apperceptions to more substantive questions amenable to intensive investigation. Three research questions emerged: Do trade instructors use frameworks or systems of beliefs, values, attitudes and feelings that might guide their approach to knowledge and knowing? What are the main typologies that underpin these frameworks? Do the views of trade instructors embody characteristic ways of presenting or perceiving reality? These questions guided the research effort through the systematic search for understandings of the ways trade instructors subjectively experience their world - perceive, plan, feel, value, construe. It involved clarifying, authenticating and uncovering meaning embedded in the forces of the cultural process, and understanding how those being studied interpret and give meaning to their situation.

An early methodological question to be resolved by this study related to an appropriate research paradigm to inform the work. In recent times there have emerged analyses of the nature of knowledge, but primarily in the context of the mainstream sectors of education such as schools and universities¹⁴. In large part these have been of a theoretical or philosophical nature, with relatively few empirically-supported studies that focus on the implications of differing conceptions of knowledge. Whilst such analyses provide valuable insights into the social origins of modes of thought they provide little methodological direction for research in the field. Further, the study of the epistemologies of groups of knowledge practitioners is at a relatively immature stage of development, and has not yet been clearly defined. Given also that vocational education and training in Australia has not formed part of 'mainstream education', it was not surprising that the researcher was unable to discover many substantial analyses, theoretical or empirical, of the role different definitions of knowledge might play in vocational education and training generally or, more specifically, in training for the skilled trades.

It is the case that, despite its meagre volume and intensity, a considerable amount of the research into vocational education and training has been conducted within the empirical-analytical research paradigm and, it might be argued, like the course of research in Education, there has been some tendency for qualitative approaches to be dominated by quantitative methods modelled on the natural sciences. This has circumscribed not only the research methods adopted but also the questions asked and the interpretations produced. However,

¹⁴ As examples of these analyses, see Nencel and Pels (1991), Woolgar (1988), Musgrave (1987).

within and about the Sociology of Education, qualitative approaches have displayed noticeable development - historical markers of this development are provided by the works of scholars such as Young (1971), and point to what is now a growing literature in the area. Research within this research paradigm has the potential to create new knowledge partly because of the different perspectives it provides on what questions are worth asking and what methods are considered worthy methods for the pursuit of valid knowledge in the field. It is within this research context that this study was framed, and it was for these reasons that such attention was given to methodological development throughout the study. But, it remains the case that such a paradigm often is perceived as 'alternative' in nature and, perhaps, unproven.

The study promoted theoretical development by tracking a path between theoretical considerations and empirical investigation. It began with the attempt to systematise existing theories, research and literature and this gave rise to some early and tentative directions in terms of both methodological and theoretical development. First, it reinforced the decision to anchor the study in qualitative and exploratory method, involving grounded investigation of trade instructors views. That is, the study did not - and could not - simply operationalise a set of existing concepts and test them against the views of the population of trade instructors. It needed to be a theory-generating rather than a theory-testing study. Second, it helped to clarify some of the assumptions that underpin the study. For example, the study is predicated on the propositions that understandings of how the realities of the social world are built and sustained derive from seeing the world as its members see

the world, and that the active and interpretive role that humans take in the construction of the worlds they inhabit gives them the ability to make sense of these worlds. Third, this early exploration of existing theories, research and literature established something of a theoretical platform from which to launch more empirically-supported inquiry.

From here, the study moved to an intensive, in-depth study with a small number of trade instructors, reflecting back onto the theoretical development that had occurred in the earlier phase, and generating some basis for the formulation of a position grounded in constructs more clearly relevant to trade instructors views of knowledge and knowing. This illuminated the way into the next phase of the study. For example, the Semantic Taxonomy Interviews led the way into Phase B - the first substantial contact with trade instructors. It was on the basis of the outcomes of this instrument, and the theoretical development that they produced that it became clear that the Classification Task might be an appropriate instrument for communicating with trade instructors. Its development and use in the intimate setting of a small number of trade instructors enhanced both theoretical development and methodological direction, including the use of the Classification Task in Phase C - communication with a large number of trade instructors.

At each of the major decision points in the study, the researcher was faced with selecting an appropriate route for the study. That is, as the study unfolded it exposed research options which required the researcher to choose a direction. Inevitably, some potential research opportunities were not followed - although these have been noted in a number of places in the thesis. Whilst this created a dilemma for the

researcher, it was, essentially, an indication of the good health of the research approach that it could uncover these opportunities.

The final complexion of the study derives from the interaction of these elements in a process of exploration and tacking. Across these several phases of the study, the emerging theoretical position grew and the outcomes of the earlier phases helped to shape and direct the study. Thus it is that, to some considerable extent the conclusions and the limitations of the study have been dealt with *en courant*.

8.5.2 On Limitations

Throughout this thesis opportunities have been taken to locate the study in its research and organisational contexts, and to point to its limitations. Some of these limitations derive from the fundamental assumptions upon which the study rests. For example, in Chapter Two it was noted that the study is compatible with a paradigm in which it is assumed that what counts as valid knowledge is open to question. The study makes clear that it is open to an interpretation in which knowledge is perceived as neither absolute nor arbitrary but emerges from the shared experiences of social groups. Social factors and influences are considered to be related rather than logically independent of one another, and the relation becomes more the focus of study than the factors *per se*. Whilst the study was premised on such assumptions, it is also the case that the outcomes support these fundamental positions. As noted in Sections 8.3 and 8.5.1, assumptions underpin every research effort and have a determining effect on the complexion of the study; they become a limitation to the extent that they are not exposed and explored.

Second, it is clear that this study is in an area for which the established research framework is weak, and there was little in the prevailing research context that could have supported the development of formal and prescient hypotheses as a starting point. Thus, this study needed to progress through a process of exploration that involved a strong degree of reflexivity. This may be seen as both a limitation and a strength. It is a strength in that it directs the study, clearly, to focus more on theoretical development than on theory testing; it is a limitation in the sense that the referents against which to judge the direction of the study, its method and its outcomes are more difficult to discern. However, as described in several places throughout the thesis, measures were incorporated to maintain theoretical rigour and control in the study, in keeping with recognised approaches to qualitative research.

Whilst the sample of trade instructors who contributed to this study is drawn from a good cross section of trade areas, and it is of reasonable size, it is clear that the study did not attempt to sample in such a way that the outcomes can be generalised to the population of all trade instructors. Indeed, the nature of the research, and its basis in qualitative and exploratory method, takes the study in a somewhat different direction. Thus, in conventional terms, the generalisability of the outcomes of the study might be judged as being a limitation of the study. Nonetheless, the study provides some compelling evidence that the views portrayed by these trade instructors are widespread, particularly because of their origins in the practice of the skilled trades and the social processes of apprenticeship.

The study is, essentially, a study of men for very few women are included in the sample. This is more a reflection of the composition of the populations of tradeworkers and trade instructors in Australia than of any deliberate or inadvertent bias in the selection of the sample. Also, it might be noted that, throughout the study, the use of terms such as 'craftsmanship' reflects both this inherent gender composition of the population and the traditions that appear to underpin the views expressed by these trade instructors. Whilst it is interesting to note that, as presented in Chapter Seven, there emerged no significant differences between the views of male and female trade instructors, this study can offer no conclusions in respect of notions of gender.

8.6 A Concluding Comment

Commonly, the discourse of a concluding chapter includes climactic terms such as 'findings', 'results', 'consequences', 'importance', and 'culmination'. But if the concerns expressed in this study about the adequacy of the theoretical frame of reference provided by existing research, theories and literature are to be heeded, the outcomes of this single study must be considered to be somewhat tentative. Finality, in this form of research, is much more a pause and, perhaps, a juncture in an ongoing and evolving process than it is an objectified verdict, proclamation or denouement.

All the ideas, the methods, and the data used in, or generated by this study are presented in this thesis; the researcher has presented his attempt to construe the processes, transactions and outcomes of the study. It is reasonable, now, that readers decide for themselves how they will construe what tradies know about what tradies know.

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Appendices

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Appendix One

Semantic Taxonomy Interview

The purpose of this appendix is to describe the more procedural aspects of the Semantic Taxonomy Interview, as used in this study.

The Semantic Taxonomy Interview is a primary data-gathering instrument in Phase B of the study, and Section 4.6.2 provides further detail about the selection and use of the technique in the study.

The Semantic Taxonomy Interview has been refined into a well-described protocol containing three basic elements. Following Spradley (1980), Figure A1.01 summarises these elements.

Figure A1.01
Main elements of the Semantic Taxonomy Interview protocol - after Spradley (1980)

Explicit Purpose	Explanations	Questions
When the researcher and the informant meet together the informant has an incomplete idea of the purpose of the interview. The researcher must make it clear and be prepared to remind the informant of the purpose.	In order to establish and maintain trust and openness between researcher and informant the researcher must be prepared to offer continual explanation to the informant.	The first kind of question employed is a category-seeking question of the form 'What kinds of X are there?' or 'What kind of thing is X?'
Because the interview needs to have direction and purpose the researcher runs the risk of being perceived as authoritarian and the interview an interrogation.	Explanations include the nature of the research project ('I'm interested in how trade instructors perceive knowledge'), the procedures for recording data ('Do you still agree to my recording this interview?'), and the kinds of questions being asked ('I'd like to ask you a different kind of question').	The second kind of question is an attribute-seeking question of the form 'What is the difference between X and Y?' or 'Are there any other kinds of X?' or 'What are the parts of X?', where categories X and Y have been provided by the informant.
Thus the researcher needs to maintain 'restrained control' of the interview, directing it sensitively towards the targeted elements of the informant's knowledge.	Also, since the informant's 'native language' is an important source of data, the researcher must explain this need to the informant ('I'm interested in what <u>you</u> have to say and what <u>you</u> think').	The third kind of question seeks descriptive evidence about the attributes and categories ('Could you describe your experience of X?'; 'If you were talking to an apprentice how would you describe Y?').

The following procedure was adopted for conducting Semantic Taxonomy Interviews with the selected trade instructors:

- The considerations associated with gaining access to the data (see Section 4.4 and 5.3 for details) led the researcher to place great emphasis on making personal contact with potential informants. Thus, after approval had been gained from the institutions' authorities, the researcher's first contact with potential informants in Phase B was through 'corridor contact'. After the idea had been 'floated', the researcher then moved to formalise the contact.

- Interview appointments - at times and places convenient to the instructors - were made. In seeking an appointment the researcher reiterated the purpose of the research project, the use to be made of the interview data, and the anonymity and confidentiality being guaranteed. The researcher assured the instructor that participation was on a voluntary basis. All of the trade instructors approached agreed to be interviewed and all of the instructors acceded to the request to allow the interviews to be audio-taped.
- At the beginning of the interviews the researcher again reiterated the use to be made of the interview data, the anonymity and confidentiality being guaranteed, and the voluntariness of all responses.
- In order to establish the domain under investigation, the researcher began the interviews with the following introductory statement:

Let me try to build a context for these interviews. Firstly, I am interested in your views and what you have to say - and in your language. It doesn't matter whether it's sophisticated or crude, it's you and your views that are of importance here.

Secondly, I will probably structure the interviews so that the early parts will focus on very broad, global ideas and then I'll move to an exploration of the detail. At any time we can have an open, general discussion.

Thirdly, I'm interested in your ideas about knowledge. How do you think about knowledge? What is knowledge? Where does it come from? How do we get knowledge? How is it organised? Are there different types of knowledge? I stress, it's your views about knowledge that are of importance.

You should feel free to give examples to support your answers, to backtrack or just to add something if it occurs to you as we talk. You can question me about why I have asked something or seek clarification of the question - and, of course, you may refuse to answer a question.

You are a tradesman and you're a member of a community; you're an instructor and you've been a student; you pursue lots of interests and deal with many facets of life. How do you think about knowledge - what images do you have about knowledge?

- Typically, the formal, audio-taped interviews took between 60 and 90 minutes. However, this should be seen in the context of a much broader range of contact between researcher and informant. For example, the researcher frequently joined informants for morning tea or lunch, typically along with the informants' colleagues. Also, after the formal interviews, less formal discussion ensued, perhaps for another 90 minutes. A good deal of that contact has remained after the completion of the study and, for most of these informants, the researcher has become something of a 'sounding board' for issues with which they are dealing in the workplace.
- The results of the Semantic Taxonomy Interviews were returned to the informants in the Postnate Interviews, together with the outcomes of the Classification Task.

Appendix Two

Classification Task

As noted in Section 4.6.3, the purpose of this appendix is to describe the more procedural aspects of the use of the Classification Task as a research method.

The Classification Task was used to gather data in two phases of the study - the intensive study of a few informants in Phase B, and communication with a large number of informants in Phase C. Details of the development of the Classification Task are presented in Section 4.6.3 and 6.7.

A2.1 Phase B

After the results of the Semantic Taxonomy Interviews indicated the potential of the Classification Task as a data-generating instrument, it was administered to all Phase B informants, using the following procedure:

- Appointments - at times and places convenient to each informant - were made by telephone. Before seeking an appointment the researcher reiterated the purpose of the research project, the use to be made of the Classification Task data, the anonymity and confidentiality being guaranteed, and the voluntariness of all responses. All of the informants agreed to participate, and all of the informants acceded to the request to allow the attendant interviews to be audio-taped.
- The researcher delivered the Classification Task (Knowledge Areas and Instructions Sheet) to each informant one day prior to the agreed appointment time.
- Informants presented their classifications to the researcher, together with explanations of the bases upon which they had formed them. The researcher probed for clarification, and the interview was audio-recorded.

A2.2 Phase C

The Classification Task was the primary data gathering instrument used in Phase C - as described in Section 4.6.3 and Section 6.7. For this phase, the following procedure was adopted:

- After formal approval had been obtained to undertake the study, the researcher made frequent visits to teaching departments, primarily to become a 'familiar face'. This process was facilitated by the Heads of Department, and included joining groups for morning tea or lunch and at functions such as end-of-term barbecues.
- Through the Heads of Department, small groups of potential respondents were assembled for a briefing by the researcher. This involved elaborating on the points described in the Instruction Sheet and responding to questions from the potential respondents. The meetings took place in the trade instructors' own workplaces and, typically, lasted for at least 45 minutes. Often, discussion ensued for longer periods, but usually with individuals or a small number of trade instructors.
- Where an individual was not able to attend a group meeting, an appointment - at time and place convenient to the individual - was made by telephone, and the researcher presented the same introduction to the individual.
- Each potential respondent was issued with a package containing the Cover Letter, the Instruction Sheet printed on an A3 sheet with one side blank, the knowledge areas printed on blue firm card, and a stamped, addressed envelope - as presented in Figures A2.01, A2.02 and A2.03.

Figure A2.01
Cover Letter for the Classification Task in Phase B

Dear Trade Instructor

I seek your assistance in a research project about trade training. I am undertaking the project as a doctoral student with the University of Wollongong. Prior to this study, my background included both the electrical trade and TAFE teaching, and now I am involved in the formal preparation of TAFE instructors.

I am aware that it is only in very recent times that trade training has started to receive significant research attention. In this project I have chosen to pursue one of the many important aspects of this area, but it is an aspect that depends heavily on obtaining the views of the people at the 'chalkface' - the trade instructors. My intention is to represent the views of trade instructors in a thesis about trade instructors' knowledge.

There are several phases to the full study. The first phase was an intensive study with a small number of trade instructors, and I was highly encouraged by the outcomes. In this, the second major phase, I seek the views of a large number of trade instructors. I would greatly appreciate your contribution and ask that you carry out the task described in the accompanying document.

All responses will be held in the strictest confidence, and no individual will be identifiable through any of the reporting processes. I have coded the papers only so that I can locate your response in case you want to discuss the exercise with me or I want to clarify something with you. If you wish to remain anonymous you can remove the code. There is no compulsion to participate in this project. However, the focus of the study is the views that trade instructors hold and your participation in this research effort would be valued greatly.

I have provided an Instructions Sheet that describes what to do. If, at any stage, you need to clarify something, want more information, or just want to chat about what I'm doing please contact me:

Colin Ducker
<06> 258 6156

PO Box 1
Belconnen 2616

I offer my thanks to you in anticipation of your contributing to this project.

Colin Ducker

Figure A2.02
Instruction Sheet for Classification Task in Phase C

Step 1:	Read these instructions. If you have any concerns or confusions, please phone me on <06> 258 6156.
Step 2:	<p>The blue card contains the titles of 26 'knowledge areas'. Your job is to arrange them into groups. All the 'knowledge areas' you put in one group should be like each other in some important way, and different from those in other groups.</p> <p>There are no 'right' or 'wrong' answers to this - it's <u>your opinion</u> that is important. You choose the kinds of groups and you may have as many or as few groups as you wish. 'Knowledge areas' may be classified into more than one group - the blank spaces on the card are for this purpose. You can have 'leftovers' if you wish.</p> <p>If there are any 'knowledge areas' not listed but which you think are more representative of a particular group than those that have been provided, feel free to add them. This is intended to be a very open task.</p>
Step 3:	Once you have formed your groups using the cut-up card, draw/write/stick them onto the other side of this A3-size sheet. You may wish to make it into a diagram showing how the groups 'fit together' or relate to each other. This is your classification scheme.
Step 4:	Put a title and a few words or sentences on each <u>group</u> to describe its main characteristics and indicate what makes the group different from others. This is a most important step because it gives me the reasons for your groupings.
Step 5:	Complete the following details:
<p>What is your trade area? _____</p>	
<p>If you completed an apprenticeship, what was its duration (in years)? 2 / 3 / 4 / 5 / 6</p>	
<p>How many years did you spend in industry before you became a full-time TAFE instructor (Exclude the period of your apprenticeship)? ()</p>	
<p>How many years have you been a full-time TAFE instructor? ()</p>	
<p>Which of the following qualifications have you completed? Please name them and indicate whether you completed the qualification before/after entering TAFE.</p>	
<p>() Trade _____ Before/After</p>	
<p>() Certificate or Associate Diploma _____ Before/After</p>	
<p>() Degree (other than an Education degree) _____ Before/After</p>	
<p>() A postgraduate degree/diploma _____ Before/After</p>	
<p>() A teaching diploma or degree or its equivalent _____ Before/After</p>	
<p>() Other _____ Before/After</p>	
Step 6:	<p>Feel free to write down any ideas, extra information and suggestions that you think might be helpful. In fact, the more you explain to me the better the outcome. Mail the lot back to me in the stamped addressed envelope provided.</p>

Figure A2.03
Knowledge Areas for Classification Task in Phase C

Accounting	Greenkeeping
Architecture	History
Art	Interpersonal Communication
Automotive Painting	Mathematics
Biology	Medicine
Commercial Cookery	Nursing
Counselling	Philosophy
Economics	Physics
Electronics	Psychology
English	Selling
First Aid	Sociology
Genealogy	Typing
Geography	Welding

These are the titles of the 26 'knowledge areas'. Cut them out and use them to help create your groups. Use the blanks to make duplicates or add new 'knowledge areas'.

Appendix Three

Data Management in Phase C

A3.1 Data Codes

The data for Phase C derived from administration of the Classification Task to 215 trade instructors. The coding scheme used to prepare data for entry to a data file is displayed in Figure A3.01 and Figure A3.02.

Figure A3.01
Informant codes by region and by trade area

Region	Trade Area	Informant Code
ACT	Applied Electricity	001 to 004
	Automotive Engineering	015 to 019
	Automotive Painting	022 to 024
	Bricklaying	•
	Butchery	031 to 032
	Cabinetmaking	035 to 037
	Carpentry & Joinery	038 to 040
	Commercial Cookery	045 to 047
	Fitting & Machining	052 to 055
	Foundry	•
	Greenkeeping	072
	Graphic Arts (Printing)	073 to 079
	Hairdressing	080 to 087
	Industrial Electronics	093 to 098
	Metal Fabrication	102 to 106
	Panel Beating	119 to 120
	Plumbing	121 to 125
	Refrigeration	126 to 128
	Upholstery	132
Illawarra	Applied Electricity	005 to 014
	Automotive Engineering	020 to 021
	Automotive Painting	•
	Bricklaying	025 to 030
	Butchery	033 to 034
	Cabinetmaking	•
	Carpentry & Joinery	041 to 044
	Commercial Cookery	048 to 051
	Fitting & Machining	056 to 069
	Foundry	070 to 071
	Greenkeeping	•
	Graphic Arts (Printing)	•
	Hairdressing	088 to 092
	Industrial Electronics	099 to 101
	Metal Fabrication	107 to 118
	Panel Beating	•
	Plumbing	•
	Refrigeration	129 to 131
	Upholstery	•

Figure A3.02
Data Coding Scheme

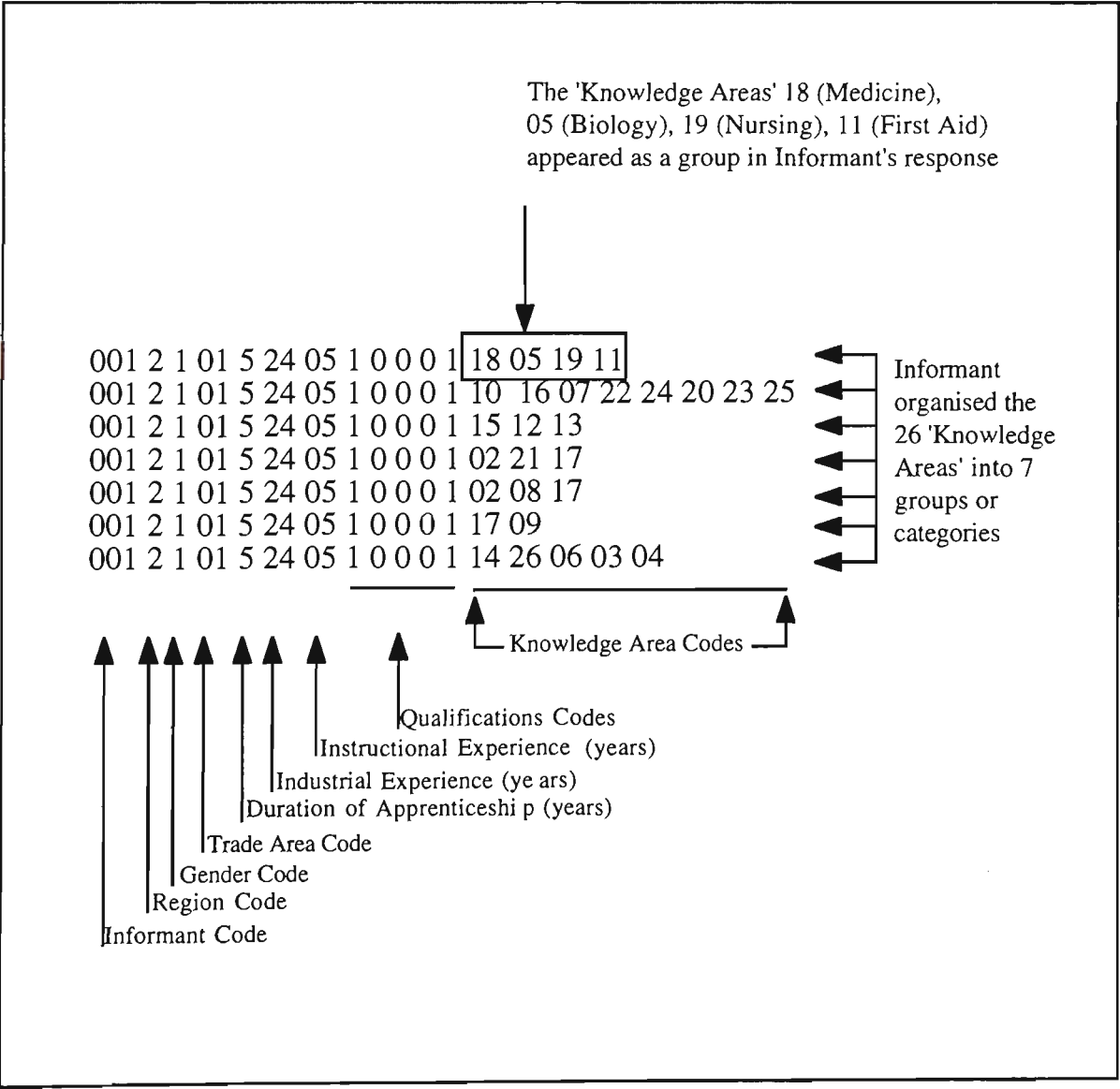
Column in data file	Entry		Code
1 - 3	Informants	See Figure A301 for details	001 - 132
5	Region	Illawarra	1
		Australian Capital Territory	2
7	Gender	Male	1
		Female	2
9 - 10	Trade Area	Applied Electricity	01
		Automotive Engineering	02
		Automotive Painting	03
		Bricklaying	04
		Butchery	05
		Cabinetmaking	06
		Carpentry and Joinery	07
		Commercial Cookery	08
		Fitting and Machining	09
		Foundry	10
		Greenkeeping	11
		Graphic Arts (Printing)	12
		Hairdressing	13
		Industrial Electronics	14
		Metal Fabrication	15
		Panel Beating	16
		Plumbing	17
		Refrigeration	18
		Upholstery	19
12	Duration of apprenticeship	Years	1 - 9
		Did not complete apprenticeship	0
14 - 15	Industry experience	Years	00 - 99
17 - 18	Instructional experience	Years	00 - 99
20	Trade qualification	Yes	1
		No	0
22	Para-professional qualification	Yes	1
		No	0
24	Professional qualification	Yes	1
		No	0
26	Teaching qualification	Yes	1
		No	0
28	Other qualifications	Yes	1
		No	0
>30	Knowledge areas from Classification Task	Accounting	01
		Architecture	02
		Art	03
		Automotive Painting	04
		Biology	05
		Commercial Cookery	06
		Counselling	07
		Economics	08
		Electronics	09
		English	10
		First Aid	11
		Genealogy	12
		Geography	13
		Greenkeeping	14
		History	15
		Interpersonal Communication	16
		Mathematics	17
		Medicine	18
		Nursing	19
		Philosophy	20
		Physics	21
		Psychology	22
		Selling	23
		Sociology	24
		Typing	25
		Welding	26

A3.2 Data File

To manage the data, a file was developed that could accept all appropriate data in a single file, and was sufficiently flexible for data to be extracted in a variety of forms and for use with a variety of analytical techniques. The file was a universal 'front end' file that permitted secondary manipulation of the data - for example, the Cluster Analysis statistical procedure required a matrix-input format.

In the format adopted, each category or grouping of 'knowledge areas' presented by an informant generated a line of data. Thus, an informant who presented seven categories in free format generated seven data lines in the data file. All dimensional information and categories were recorded in this format in the data file. An annotated example of data entry is presented in Figure A3.03.

Figure A3.03
Data file format and data coding system for Classification Task data.



In total, 132 useable responses were returned and the mean number of categories presented per informant was 6.4 (mode = 5); thus the data file contained 850 lines of data. The mean number of 'knowledge areas' per category was 4.8 (mode = 4); thus each line of data in the data file contained the 12 dimensional information entries together with entries for each of the (mean) 4.8 'knowledge areas'. The data file contained 14280 entries varying in length from one digit to three digits.

A3.3 Coded Data

001 2 1 01 5 24 05 1 0 0 0 1 18 05 19 11
001 2 1 01 5 24 05 1 0 0 0 1 10 16 07 22 24 20 23 25
001 2 1 01 5 24 05 1 0 0 0 1 15 12 13
001 2 1 01 5 24 05 1 0 0 0 1 02 21 17
001 2 1 01 5 24 05 1 0 0 0 1 02 08 17
001 2 1 01 5 24 05 1 0 0 0 1 17 09
001 2 1 01 5 24 05 1 0 0 0 1 14 26 06 03 04
002 2 1 01 4 05 10 1 0 0 0 0 01 23 08
002 2 1 01 4 05 10 1 0 0 0 0 12 15 02
002 2 1 01 4 05 10 1 0 0 0 0 26 09 21 02 04
002 2 1 01 4 05 10 1 0 0 0 0 05 18 19 11
002 2 1 01 4 05 10 1 0 0 0 0 10 16 07 22 24 20 02 03 23
003 2 1 01 5 28 05 1 1 0 1 1 04 06 09 14 26 11 19 25
003 2 1 01 5 28 05 1 1 0 1 1 05 10 13 17 21 02 18
003 2 1 01 5 28 05 1 1 0 1 1 07 16 20 22 24 03 12 15
003 2 1 01 5 28 05 1 1 0 1 1 01 08
003 2 1 01 5 28 05 1 1 0 1 1 23
004 2 1 01 4 05 03 1 1 0 1 0 26 14 04
004 2 1 01 4 05 03 1 1 0 1 0 25 09 19 06
004 2 1 01 4 05 03 1 1 0 1 0 21 01 18 02
004 2 1 01 4 05 03 1 1 0 1 0 10 13 15 17 21 08 03
004 2 1 01 4 05 03 1 1 0 1 0 13 12 15 24
004 2 1 01 4 05 03 1 1 0 1 0 20 22 24 10
005 1 1 01 4 11 11 1 1 0 1 1 02 26
005 1 1 01 4 11 11 1 1 0 1 1 04
005 1 1 01 4 11 11 1 1 0 1 1 14
005 1 1 01 4 11 11 1 1 0 1 1 03
005 1 1 01 4 11 11 1 1 0 1 1 10 07 11 17
005 1 1 01 4 11 11 1 1 0 1 1 01 08 16 23 25
005 1 1 01 4 11 11 1 1 0 1 1 06
005 1 1 01 4 11 11 1 1 0 1 1 05 12 13 15 18 19 20 21 22 24 09
006 1 1 01 4 11 05 1 1 0 1 1 08 01
006 1 1 01 4 11 05 1 1 0 1 1 04 25 26
006 1 1 01 4 11 05 1 1 0 1 1 13
006 1 1 01 4 11 05 1 1 0 1 1 15
006 1 1 01 4 11 05 1 1 0 1 1 02 03
006 1 1 01 4 11 05 1 1 0 1 1 09
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006 1 1 01 4 11 05 1 1 0 1 1 05 19 18 11
006 1 1 01 4 11 05 1 1 0 1 1 14
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006 1 1 01 4 11 05 1 1 0 1 1 07 16 20
006 1 1 01 4 11 05 1 1 0 1 1 22
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006 1 1 01 4 11 05 1 1 0 1 1 10
007 1 1 01 4 09 01 1 1 1 1 0 01 08 10 16 17 23
007 1 1 01 4 09 01 1 1 1 1 0 05 07 10 11 12 16 18 19 22
007 1 1 01 4 09 01 1 1 1 1 0 25 10
007 1 1 01 4 09 01 1 1 1 1 0 09 17 21 10
007 1 1 01 4 09 01 1 1 1 1 0 02 03 10 13 15 17
007 1 1 01 4 09 01 1 1 1 1 0 03 04 10
007 1 1 01 4 09 01 1 1 1 1 0 23 22 10
007 1 1 01 4 09 01 1 1 1 1 0 26 02 10 21 17
008 1 1 01 5 06 23 1 1 0 1 1 02 21 17 03 13 10

008 1 1 01 5 06 23 1 1 0 1 1 11 04 03 06 25 09 14 26
 008 1 1 01 5 06 23 1 1 0 1 1 18 12 05 19 16
 008 1 1 01 5 06 23 1 1 0 1 1 24 15 20
 008 1 1 01 5 06 23 1 1 0 1 1 07 22 16 23 01 08
 009 1 1 01 5 22 08 1 0 1 1 1 04 03 21 17
 009 1 1 01 5 22 08 1 0 1 1 1 06 03 17 15 16
 009 1 1 01 5 22 08 1 0 1 1 1 09 21 17
 009 1 1 01 5 22 08 1 0 1 1 1 14 17 03 08 21 05
 009 1 1 01 5 22 08 1 0 1 1 1 25 10 17 16 03
 009 1 1 01 5 22 08 1 0 1 1 1 26 21 09 01 03
 009 1 1 01 5 22 08 1 0 1 1 1 23 24 16 08
 009 1 1 01 5 22 08 1 0 1 1 1 15 12 10 03 13 02 16
 009 1 1 01 5 22 08 1 0 1 1 1 18 19 11 07 20 22 16 24
 010 1 1 01 5 21 20 1 0 0 1 1 07 16 22 24
 010 1 1 01 5 21 20 1 0 0 1 1 03 08 10 17 20 21
 010 1 1 01 5 21 20 1 0 0 1 1 01 02 05 12 13 15 18
 010 1 1 01 5 21 20 1 0 0 1 1 04 06 09 11 14 19 25 26
 010 1 1 01 5 21 20 1 0 0 1 1 23
 011 1 1 01 4 08 12 1 0 0 1 1 04 06 09 14 26 11 19 25
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 013 1 1 01 4 12 17 1 0 0 1 0 20 22 24 10
 014 1 1 01 4 08 03 1 1 0 1 1 04 03 06 14 02 16 17
 014 1 1 01 4 08 03 1 1 0 1 1 06 03 04 05 14 20 22 24 19 16 17
 014 1 1 01 4 08 03 1 1 0 1 1 09 17 18 21 26 16
 014 1 1 01 4 08 03 1 1 0 1 1 11 05 09 14 19 26 16 07 17
 014 1 1 01 4 08 03 1 1 0 1 1 14 02 03 04 06 19 16 17
 014 1 1 01 4 08 03 1 1 0 1 1 25 01 08 09 14 16 17
 014 1 1 01 4 08 03 1 1 0 1 1 26 02 03 09 17 19 21 16
 015 2 1 02 4 11 04 1 0 0 0 0 01 23 08
 015 2 1 02 4 11 04 1 0 0 0 0 12 15 02
 015 2 1 02 4 11 04 1 0 0 0 0 26 09 23 17 02 04
 015 2 1 02 4 11 04 1 0 0 0 0 05 18 19 11
 015 2 1 02 4 11 04 1 0 0 0 0 10 16 07 22 24 20 02 03 23
 016 2 1 02 5 17 04 1 0 0 0 1 17 01 08 02
 016 2 1 02 5 17 04 1 0 0 0 1 23 22
 016 2 1 02 5 17 04 1 0 0 0 1 10 17 15 03 13 05 21
 016 2 1 02 5 17 04 1 0 0 0 1 15 03 02 13 12 24
 016 2 1 02 5 17 04 1 0 0 0 1 04 25 26 14 09
 016 2 1 02 5 17 04 1 0 0 0 1 16 20 21
 016 2 1 02 5 17 04 1 0 0 0 1 18 19 11 07 22 05 21
 016 2 1 02 5 17 04 1 0 0 0 1 02 03 17 09 13
 017 2 1 02 4 08 04 1 1 0 1 0 07 16 22 24
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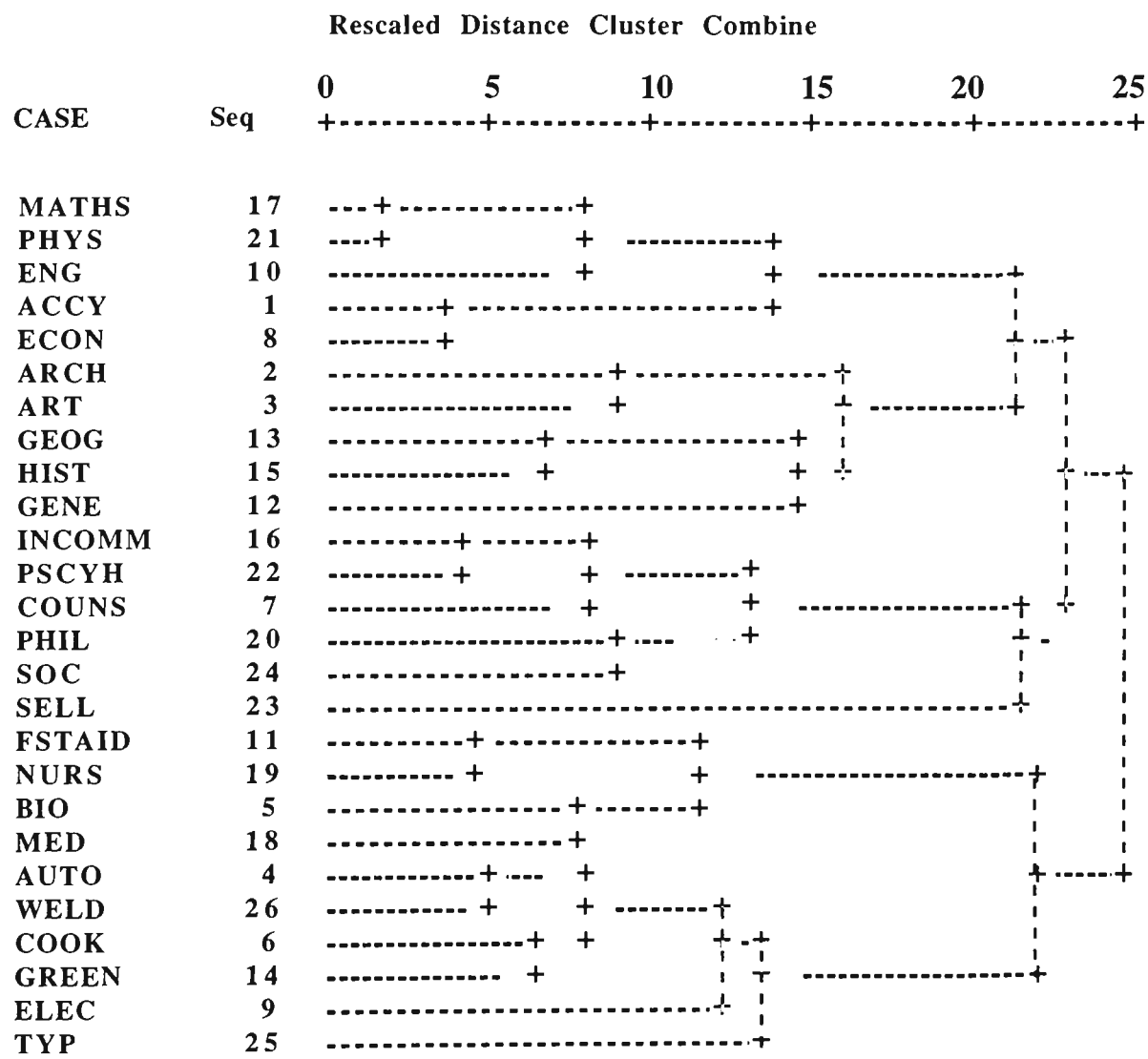
Appendix Four

Cluster Analysis

A4.1 Dendrograms and Agglomeration Schedules

The Cluster Analysis procedure produces output in two major forms. The central form is the Dendrogram, a diagrammatic representation of the major associations present in the categories formed by respondents. Figure A4.01 presents an example of Dendrogram output.

Figure A4.01
Annotated example of a Dendrogram output



The output from this computerised process was transformed into a more manageable form by determining from the Dendrogram the main typology and its components. For example, in the sample Dendrogram of Figure A4.01, the main typology is a dichotomy comprised of two major clusters - Major Cluster 1 contains those knowledge areas listed between FSTAID and TYP, and Major Cluster 2 contains the knowledge areas between MATHS and SELL. In turn, at the Rescaled Distance of 20, Major Cluster 1 comprises two separate subclusters - Subcluster 1.1 contains AUTO, WELD, COOK, GREEN, ELEC, and TYP; Subcluster 1.2 contains FSTAID, NURS, BIO, and MED. A similar separation into subclusters can be made for Major Cluster 2. This typology and its components then may be represented in diagrammatic form, as displayed in Figure A4.02.

Figure A4.02
Main typology, major clusters and subclusters of the sample Dendrogram of Figure A4.01

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
Automotive	First Aid	Mathematics	Architecture	Interpersonal	Selling
Painting	Nursing	Physics	Art	Communication	
Welding	Biology	English	Geography	Psychology	
Commercial	Medicine	Accounting	History	Counselling	
Cookery		Economics	Genealogy	Philosophy	
Greenkeeping				Sociology	
Electronics					
Typing					

It is in this form that the output from the Cluster Analysis is presented in Chapter Seven.

The Dendrograms are supported by Agglomeration Schedules that present, in numerical, tabular form, the cluster hierarchy for that analysis. Figure A4.03 presents an example of an Agglomeration Schedule.

Figure A4.03
Sample Agglomeration Schedule

HIERARCHICAL CLUSTER ANALYSIS						
Agglomeration Schedule using Average Linkage (Between Groups)						
Stage	Clusters Combined		Coefficient	Stage Cluster 1st Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	17	21	-123.000000	0	0	10
2	1	8	-112.000000	0	0	18
3	16	22	-111.000000	0	0	18
4	11	19	-108.000000	0	0	14
5	4	26	-107.000000	0	0	9
6	6	14	-100.000000	0	0	9
7	13	15	-98.000000	0	0	19
8	5	18	-94.000000	0	0	14
9	4	6	-92.000000	5	6	15
10	10	17	-92.500000	0	1	18
11	7	16	-91.500000	0	3	16
12	2	3	-89.000000	0	0	20
13	20	24	-88.000000	0	0	16
14	6	11	-76.000000	8	4	23
15	2	12	-45.500000	12	19	21
16	1	2	-31.559999	18	20	24
17	7	23	-30.600000	16	0	24
18	4	5	-29.250000	17	14	25
19	1	7	-26.316668	21	22	25
20	1	4	-18.762501	24	23	0
21	1	4	-18.762501	24	23	0

The value of the Agglomeration Schedule is the assistance it gives to the interpretation of the Dendrogram. For example, it presents the value of the distance between the two most dissimilar points of the clusters being combined at each stage and, by examining these values, it is possible to gain an idea of how dissimilar are the clusters being merged. Further, the 'coefficients' column provides guidance on how many clusters are needed to represent the data - when the increase between two adjacent steps becomes large, as is the case from Stage 14 to 15 in Figure A4.03.

Agglomeration Schedule indicates the order in which clusters form, thus indicating the hierarchy of clusters. The combination of Dendrograms and Agglomeration Schedules permits not only the identification of the major typology, the major clusters and the subclusters but also which knowledge areas, if any, are perceived by respondents as being central to a particular subcluster - in a sense, which areas characterise the subcluster. For example, in Figure A4.01, it might be noted that Subcluster 1.2 contains four areas. From the output it is possible to determine that the First Aid - Nursing doublet is the core of this subset, and that the other areas are associated with the doublet - and with each other - only at weaker distances.

A4.2 Cluster Analysis Results

Figure A4.04
Cluster Analysis results: All respondents

Subset 1: All respondents (n1 = 132).

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	Mathematics Physics English Accounting Economics	Selling

Figure A4.05
Cluster Analysis results: Industry setting

Subset 2A: Respondents from the Illawarra region (n2A = 67).

Subset 2B: Respondents from the ACT region (n2B = 65).

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	Mathematics Physics English Accounting Economics	Selling

Figure A4.06
Cluster Analysis results: Gender

Subset 3A: Male respondents (n_{3A} = 119).

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	Mathematics Physics English Accounting Economics	Selling

Subset 3B: Female respondents (n_{3B} = 13).

Major Cluster 1	Major Cluster 2	Major Cluster 3				
		Subcluster 3.1	Subcluster 3.2	Subcluster 3.3	Subcluster 3.4	Subcluster 3.5
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Mathematics Physics Accounting Economics	First Aid Nursing Biology Medicine	Architecture Art	Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	English Selling

Figure A4.07
Cluster Analysis results: Trade area

Subset 4A: Applied Electricity respondents (n_{4A} = 14).

Major Cluster 1		Major Cluster 2				
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art Mathematics Physics English	Accounting Economics	Geography History Genealogy	Interpersonal Communication Psychology Counselling Sociology Philosophy	Selling

Subset 4B: Automotive Engineering respondents (n_{4B} = 7).

Major Cluster 1	Major Cluster 2		
	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Interpersonal Communication Psychology Counselling Sociology Philosophy Selling	Geography History Genealogy Accounting Economics Mathematics Physics English Art Architecture

(Figure 4.07 continued)

Subset 4C: Automotive Painting respondents (n_{4C} = 3).

Major Cluster 1			Major Cluster 2		
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing First Aid Art	Accounting Medicine Selling	Biology Physics Geography Mathematics Architecture English	Interpersonal Communication Psychology Counselling Sociology Philosophy History Nursing	Economics	Genealogy

Subset 4D Bricklaying respondents (n_{4D} = 6).

Major Cluster 1					Major Cluster 2	
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 1.4	Subcluster 1.5		
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing	Interpersonal Communication Psychology Physics Mathematics English Accounting Economics	Genealogy	Selling	Medicine Biology	Remaining areas did not form associations before RD20.

Subset 4E Butchery respondents (n_{4E} = 4).

Major Cluster 1		Major Cluster 2				Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	
Automotive Painting Welding Commercial Cookery	Architecture Art	First Aid Nursing Medicine Biology	Greenkeeping Geography History Genealogy	Electronics Physics Mathematics	Typing English Interpersonal Communication Psychology Sociology Philosophy Selling	Accounting Economics

Subset 4F Cabinetmaking respondents (n_{4F} = 3).

Major Cluster 1	Major Cluster 2
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing Nursing Medicine Counselling Accounting Selling	<div>Subcluster 2.1</div> <div>Interpersonal Communication Psychology Physics Mathematics English First Aid Biology Sociology Art Philosophy History Economics</div> <div>Subcluster 2.2</div> <div>Architecture Geography Genealogy</div>

Subset 4G: Carpentry and Joinery respondents (n_{4G} = 7).

Major Cluster 1			Major Cluster 2		
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Typing	Accounting Economics Selling	Electronics Physics Mathematics	First Aid Nursing Biology Medicine	Architecture Art History English Geography	Interpersonal Communication Psychology Counselling Sociology Philosophy Genealogy

(Figure 4.07 continued)

Subset 4H: Commercial Cookery respondents ($n_{4H} = 10$).

Major Cluster 1		Major Cluster 2			
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Typing First Aid Electronics	Economics English Mathematics Physics Biology Geography History	Genealogy Medicine Accounting	Interpersonal Communication Psychology Counselling Sociology Philosophy Nursing	Architecture Art	Selling

Subset 4I: Fitting and Machining respondents ($n_{4I} = 18$).

Major Cluster 1		Major Cluster 2	Major Cluster 3	Major Cluster 4	
Subcluster 1.1	Subcluster 1.2			Subcluster 4.1	Subcluster 4.2
Automotive Painting Welding Commercial Cookery Greenkeeping Typing Electronics	First Aid Nursing Medicine Biology	Accounting Economics Physics Mathematics	Selling	Architecture Art English Geography History Genealogy	Interpersonal Communication Psychology Counselling Sociology Philosophy

Subset 4J: Foundry respondents ($n_{4J} = 2$).

Major Cluster 1				Major Cluster 2
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 1.4	
Automotive Painting Welding Commercial Cookery Electronics Typing Physics Accounting Economics Architecture	Interpersonal Communication Psychology Counselling Philosophy Selling	Art History Genealogy Sociology	Greenkeeping Geography Mathematics English	Nursing First Aid Biology Medicine

Subset 4K: Greenkeeping respondents ($n_{4K} = 1$).

Major Cluster 1		Major Cluster 2		Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	
Automotive Painting Welding Commercial Cookery Electronics Typing Art First Aid Greenkeeping	Architecture Geography Mathematics Physics English	Nursing Biology Medicine Genealogy Interpersonal Communication	Psychology Counselling Selling Accounting Economics	Philosophy Sociology History

Subset 4L: Printing respondents ($n_{4L} = 7$).

Major Cluster 1								Major Cluster 2
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 1.4	Subcluster 1.5	Subcluster 1.6	Subcluster 1.7	Subcluster 1.8	
Automotive Painting Welding Commercial Cookery Typing Greenkeeping	Electronics	Nursing Biology Medicine	Architecture Art	Counselling	Genealogy	Accounting Economics Mathematics Physics English Interpersonal Communication Psychology First Aid	Selling	Philosophy Sociology History Geography

(Figure 4.07 continued)

Subset 4M: Hairdressing respondents ($n_{4M} = 13$).

Major Cluster 1	Major Cluster 2					Major Cluster 3
	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art	English Selling	Geography History Genealogy	Interpersonal Communication Psychology Counselling Sociology Philosophy	Accounting Economics Mathematics Physics

Subset 4N: Industrial Electronics respondents ($n_{4N} = 6$).

Major Cluster 1				Major Cluster 2	
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 1.4	Subcluster 2.1	Subcluster 2.2
Automotive Painting Welding Commercial Cookery Greenkeeping Typing	First Aid Nursing Medicine Biology	Electronics Accounting Economics Physics Mathematics	Selling	Architecture Art English Geography History Genealogy	Interpersonal Communication Psychology Counselling Sociology Philosophy

Subset 4O: Metal Fabrication respondents ($n_{4O} = 17$).

Major Cluster 1			Major Cluster 2		
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Typing Electronics	First Aid Nursing Medicine Biology	Genealogy	Accounting Economics Physics Mathematics English Selling	Architecture Art Geography History	Interpersonal Communication Psychology Counselling Sociology Philosophy

Subset 4P: Panel Beating respondents ($n_{4P} = 2$).

Major Cluster 1		Major Cluster 2		Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	
Automotive Painting Welding Commercial Cookery Electronics Architecture Greenkeeping	Typing Selling Accounting Economics	Interpersonal Communication Sociology	Psychology Counselling Nursing Biology Medicine First Aid Genealogy	Philosophy History Geography Mathematics Physics English Art

Subset 4Q: Plumbing respondents ($n_{4Q} = 5$).

Major Cluster 1		Major Cluster 2		Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	
Automotive Painting Welding Commercial Cookery Electronics Greenkeeping	Typing Selling Accounting Economics Mathematics Physics English	Nursing Biology Medicine Genealogy First Aid	Psychology Counselling Interpersonal Communication Sociology	Philosophy History Art Architecture Geography

(Figure 4.07 continued)

Subset 4R: Refrigeration respondents (n _{4R} = 6).						
Major Cluster 1	Major Cluster 2					Major Cluster 3
	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5	
Selling	Typing	First Aid Nursing Biology Medicine	Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Architecture Art	Accounting Economics Mathematics Physics English	Interpersonal Communication Psychology Counselling Sociology Philosophy	Geography History Genealogy

Subset 4S: Upholstery respondents (n _{4S} = 1).						
Major Cluster 1	Major Cluster 2	Major Cluster 3	Major Cluster 4	Major Cluster 5	Major Cluster 6	
Subcluster 1.1	Subcluster 1.2					
Greenkeeping Electronics Typing English Accounting Mathematics Physics Geography First Aid	Biology Medicine Economics	Sociology	Selling	Psychology	Interpersonal Communication	Automotive Painting Welding Commercial Cookery Counselling Philosophy Architecture Art History Nursing Genealogy

Figure A4.08
Cluster Analysis results: Industry experience

Subset 5A: Respondents whose industry experience is <6 years (n _{5A} = 11).						
Major Cluster 1	Major Cluster 2		Major Cluster 3			
	Subcluster 2.1	Subcluster 2.2	Subcluster 3.1	Subcluster 3.2	Subcluster 3.3	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Interpersonal Communication Psychology Counselling Sociology	Architecture Art History Philosophy English Geography Genealogy	Accounting Economics Mathematics Selling	Physics	

Subset 5B: Respondents whose industry experience is 6 - 10 years (n _{5B} = 55).						
Major Cluster 1		Major Cluster 2				
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art History Geography Genealogy	Accounting Economics Mathematics Physics English	Interpersonal Communication Psychology Counselling Sociology Philosophy	Selling	

(Figure 4.08 continued)

Subset 5C: Respondents whose industry experience is 11 - 15 years ($n_{5C} = 28$).

Major Cluster 1			Major Cluster 2		Major Cluster 3	
Subcluster 1.1	Subcluster 1.2	Subcluster 1.3	Subcluster 2.1	Subcluster 2.2	Subcluster 3.1	Subcluster 3.2
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art	Accounting Economics Mathematics Physics	Geography History English Genealogy	Interpersonal Communication Psychology Counselling Sociology Philosophy	Selling

Subset 5D: Respondents whose industry experience is >15 years ($n_{5D} = 38$).

Major Cluster 1	Major Cluster 2				Major Cluster 3
	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Interpersonal Communication Psychology Counselling Sociology Philosophy	Architecture Art History Geography Genealogy	Accounting Economics Mathematics Physics English	Selling

Figure A4.09

Cluster Analysis results: Instructional experience

Subset 6A Respondents whose instructional experience was <6 years ($n_{6A} = 32$).

Major Cluster 1		Major Cluster 2			Major Cluster 3	
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 3.1	Subcluster 3.2
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Nursing First Aid Biology Medicine	Accounting Economics	Geography History Genealogy	Mathematics Physics English Architecture Art	Interpersonal Communication Psychology Counselling Philosophy Sociology	Selling

Subset 6B Respondents whose instructional experience was 6 - 10 years ($n_{6B} = 52$).

Major Cluster 1		Major Cluster 2				
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Nursing First Aid Biology Medicine	Accounting Economics Mathematics Physics English	Geography History Genealogy	Architecture Art	Interpersonal Communication Psychology Counselling Philosophy Sociology	Selling

Subset 6C Respondents whose instructional experience was 11 - 15 years ($n_{6C} = 23$).

Major Cluster 1		Major Cluster 2		
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Nursing First Aid Biology Medicine	Architecture Art Geography History Genealogy Philosophy Sociology	Accounting Economics Mathematics Physics English	Interpersonal Communication Psychology Counselling Selling

(Figure 4.09 continued)

Subset 6D Respondents whose instructional experience was >15 years (n _{6D} = 25).						
Major Cluster 1		Major Cluster 2				
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	Subcluster 2.4	Subcluster 2.5
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Selling	Nursing First Aid Biology Medicine	Geography History Genealogy	Architecture Art	Interpersonal Communication Psychology Counselling Philosophy Sociology	Accounting Economics Mathematics Physics English

Figure A4.10
Cluster Analysis results: Industry/instructional experience

Subset 7A: Respondents whose industry >>instructional experience (n7A = 12).				
Major Cluster 1		Major Cluster 2		
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3
Automotive Painting	Interpersonal	Nursing	Accounting	Architecture
Welding	Communication	Biology	Economics	Art
Commercial Cookery	Psychology	Medicine		Geography
Greenkeeping	Counselling			History
Electronics	Philosophy			Genealogy
Typing	Sociology			Mathematics
First Aid	Selling			Physics
				English

Subset 7B: Respondents whose industry << instructional experience (n7B = 8).			
Major Cluster 1	Major Cluster 2		Major Cluster 3
	Subcluster 1.2	Subcluster 2.1	
Automotive Painting	Commercial Cookery	Accounting	Interpersonal
Welding	Typing	Economics	Communication
Greenkeeping	Electronics	Selling	Psychology
Architecture	Physics		Counselling
Art			Sociology
			Medicine
			Nursing
			Biology
			First Aid

Figure A4.11
Cluster Analysis results: Educational qualifications

Subset 8A: Respondents without a Bachelor degree (n _{8A} = 100).					
Major Cluster 1		Major Cluster 2			Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	Subcluster 2.3	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	First Aid Nursing Biology Medicine	Architecture Art Geography History Genealogy	Interpersonal Communication Psychology Counselling Philosophy Sociology	Mathematics Physics English Accounting Economics	Selling

Subset 8B: Respondents with a Bachelor degree (n _{8B} = 32).				
Major Cluster 1		Major Cluster 2		Major Cluster 3
Subcluster 1.1	Subcluster 1.2	Subcluster 2.1	Subcluster 2.2	
Automotive Painting Welding Commercial Cookery Greenkeeping Electronics Typing	Mathematics Physics English Accounting Economics Selling	First Aid Nursing Biology Medicine	Interpersonal Communication Psychology Counselling Philosophy Sociology	Architecture Art Geography History Genealogy