

CHAPTER 1

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

How predictable is the future? Milsted (1995:208) tells of the British social scientist T. Baron Russell writing in 1905 that ‘(in a hundred years) trade disputes will have disappeared because all the workers will be practically their own employers . . . the workers in every industry being paid, not by fixed wages, but by a share in the produce of their labour.’ Milsted also tells us that forty years later the chairman of IBM, Thomas Watson contended ‘. . . there is a world market for about five computers!’ (1995:110)

In a similar vein Flewelling, at a lecture given at the University at Buffalo in New York, recounted the prediction by Dr Marvin Cetron and Thomas O’Toole of Forecasting International who in 1983 wrote in *Encounters with the Future: Forecast of Life in the 21st Century*, that ‘(there) will be shorter workweeks...25 hours by (the year) 2000. Flexible schedules will be the rule, with two or three people sharing a job and arranging their shifts’ (Flewelling n.d.:4).

Given the eminence of their authors, it is likely that at the time they were given these predictions were taken with a high degree of credibility, but history has shown them not only to be incorrect but also almost the opposite of what occurred. So, why were these predictions so inaccurate?

Historically, predictions such as these have not just been attempts to create a mood of optimism about the future, they also were based on a genuine belief that they could

come true (Hawke 2000:2-3). Management science, at the time these predictions were made, generally was based on the Taylorist premise that predictability in the workplace can be attained through systematic analyses, sound business planning and clear strategic goals and objectives (Pfeffer & Sutton 2000:2; Underwood 2002a:14-17, 2002b:xiii).

Work related training has also been underpinned by such thinking. Vestibule training, for example, was a concept created in the 1800s which saw training centres set up close by to factories and workshops. Here employees were taught the skills and knowledge they needed to perform the tasks required of them in the nearby workplaces. And, at the time, this concept was successful. Because of the relative lack of complexity in the tasks undertaken by many 19th century employees, and the immediacy of their learning, newly gained skills and knowledge were easily transferable to the workplace thereby leading to the notion that training in one environment was capable of resulting in competence in another. Such a concept continues to provide the framework for much of what is referred to today as the competency-based approach to vocational education and training (VET).

Competency-based training (CBT), whether employed as part of a VET system or independently in an organisation, is centred on the design of training and assessment processes that seek to identify the skills needs of individuals and teams, and the means by which these are firstly achieved through training and then replicated on the job. And while it is a concept that has achieved popularity around the world as a central plank in training reform it has, of recent times, been challenged.

Studies into the complexity of the work environment as a whole, and the surety of predictions made about what occurs there and how these may or may not be prepared for, has seen the question of such predictability emerge. Studies into the complexity sciences, and in particular of the nature of complexity and chaos and their relationship to work and management, have investigated the notion that actions of individuals and groups can be predicted and therefore prepared for. The outcomes of these studies question the notion that the skills and knowledge required of individuals in today's workplace can be predicted thereby challenging the central platform upon which all competency-based training is developed.

The basis of these studies is that while work environments in the past were viewed as essentially stable and controlled and therefore enabled certain skills and knowledge to be easily learned and transferred, the typical workplace is seen today as significantly chaotic and complex, and may be described as volatile, turbulent, rapidly changing, uncertain, and facing ever-increasing risk (Fulmer 2000:9). It is also unpredictable. These studies therefore raise the question of whether or not the current approach to training, founded in many ways on that which was devised in the 19th century, is today relevant and appropriate.

The study described in this thesis investigates this question and presents a grounded theory (Glaser & Strauss 1967; Strauss & Corbin 1998, Dick 2005) of the relevance of the complexity theories to the application of competency-based training (CBT) in work environments that are described in the terms used by the complexity theorists. This study specifically sought to address the following research question:

What impact do the complexity theories have on the way in which competency-based training is conducted in Australia?

Of specific interest to this study are the following questions:

- Are the complexity theories relevant to Australian workplaces?
- In environments that could be characterised as complex and chaotic, what skills and knowledge do individuals apply?
- Where and how are these skills and knowledge gained?
- Could such skills and knowledge be gained through the processes of competency-based training?

Given that the current purpose of competency-based training is that it ‘develops the skills, knowledge and attitude required to achieve’ effective workplace performance (ANTA 2003e; DEST 2005), this study examined contemporary theories regarding complexity in the workplace and their relevance to the way in which competency-based training is conducted in Australia.

1.2 PURPOSE OF STUDY

The purpose of this study was to investigate the emerging theories about the complex nature of the workplace and the impact these have on the way in which competency-based training is conducted in Australia. This study was limited to the way in which CBT is applied in Australia for two reasons:

- Despite differences in its application, the Australian approach is very similar to the way in which CBT is used to underpin vocational training in other countries (such as the United Kingdom, New Zealand and South Africa) who are applying this approach on a national level.
- The rationale behind the adoption of this approach in these countries differs markedly thereby raising many more issues requiring investigation than would be possible in a study of this kind.

The aim was therefore to define, understand, map and analyse the experiences of Australian research participants in their own voices and build on research undertaken by Houghton (1998) that centred on complexity and chaos as it applies to an alternative view of the foundations of educational enquiry in general. Unlike Houghton, however, this study was not concentrated on the classroom but on the workplace in which students and former students apply their newly learned skills and knowledge.

This study also built on a 2002 report presented to the Australian government's Department of Employment, Science and Training (DEST) by the Australian Chamber of Commerce and Industry (ACCI) and the Business Council of Australia (BCA). Detailed in this report (the *Employability skills for the future*) is an extensive study into the generic skills and knowledge required by industry for the future. While this report acknowledged that employers find it difficult to predict the exact nature of the skills required for future employability, it concluded that there is a perceived need in the workplace for skills that are predictable and based on core or generic employability skills that can be transferred across settings but which could be continually adapted and upgraded to meet emergent needs of the workplace (ACCI & BCA 2002). The study detailed in this thesis sought to better explain what these

'predictable' skills are and how they may be taught using the competency-based approach to training.

Limiting this study, however, is the suggestion by McIntyre (2000), Holland and Leggett (2000), Jorgensen and Warring (2000), Chappell (2003) and research by the Australian Centre for Organisational, Vocational and Adult learning (in OVAL 2003) that the concept of how learning occurs on the job is not yet sufficiently well understood to describe clearly the links between vocational training, higher education, and the needs of the workplace. In accepting this, the need was clear in a study of this type to also address the notion that learning on the job is an important area of research in order to fully understand competency-based training. In doing so it was possible to more accurately reveal the purpose of competency-based training and the way in which competence (i.e., that upon which the training is based) is defined, gained and applied in the workplace. This allowed for an investigation into the current definition of competence and the degree, if any, to which it embraces complexity and unpredictability in the workplace.

From this a theoretical heuristic was developed as a guiding framework for investigating and illustrating the impact that the complexity theories have on a competency-based approach to the needs of those who work there. Emerging from this was the notion that while workplace achievements are the outcome of someone doing something 'competently', competence itself is an emergent phenomenon that changes and grows as one learns and reflects on what one needs to know and do, reflects on what one actually knows and can do, and reflects on what one has done and the knowledge that underpinned it.

In short, from this study emerged the proposition that competency-based training could be looked at not only as a means of training others to perform certain skills and knowledge in contexts that are stable and predictable (as in vestibule training), but also as a means of guiding and shaping future individual and collective learning and the shared understanding that underpins individual and collective competence (Sandberg 2000a). Such competence, it is found, must emerge if organisational goals and objectives are to be achieved in unpredictable, complex and chaotic conditions that the complexity theorists suggest characterises the workplace. It is contended that this is possible even though, as the ACCI and BCA report suggests, the exact nature

of the skills and knowledge needed to achieve these goals and objectives may not be known at the time the training was designed or conducted.

1.3 BACKGROUND

A project similar to this study was recently completed across Denmark, the United Kingdom, The Republic of Ireland, Sweden and The Netherlands (and described in Svensson, Brewster, Heraty, Larsen, Hoogendoorn, Kjellberg, Madsen, Morley & Tregaskis 2002) aimed at defining the environment in which work-related learning took place. It was undertaken with a view to gaining the perspective of those who work in such environments and was based on the contention similar to that put forward by Sandberg (2000a, 2000b) that when it comes to individual and collective competence it is their understanding of the work and its context and the environment in which it is performed that informs how tasks and activities are carried out, not the way in which they were trained. The Svensson et al. study presented a concise picture of the nature of competence in the complex environments that they studied and recommended training solutions to address issues that arise there.

Similar to that conducted by Svensson et al., the study described in this thesis explored the skills and knowledge individuals and teams apply in a context underpinned by a way of thinking about management and organisational development that has become increasingly popular over the last decade. Such a way of thinking centres on a workplace that is more and more characterized as possessing complex systems and patterns of work that border on chaos and instability. In doing so, this study investigated the traditional approach to competency-based training and its potential application in arguably new and novel contexts.

Where such contexts arise is in the relationship between competency-based training, the workplace for which students of a CBT program are reportedly prepared, and the complexity sciences. These sciences investigate the 'nonlinear or unpredictable interaction of systems within the global system in which there are still elements of predictability' (Underwood 2002a:2) and studies of this phenomenon have given rise to a number of theories about what we do in the workplace and how we do it.

Emerging from these is a description of a workplace that, in being torn between the challenges of doing things according to predetermined plans and rules and of changing direction at the drop of a hat to keep up with customer demands and innovative competitors (Haeckel 1999), becomes in itself a self-organising and transformative phenomenon (Stacey 2001).

This is not a new perspective of the workplace. Over twenty years ago Milton, Entekin and Stening stated that a 'job is not an entity, but a complex interrelationship of tasks, responsibilities, interactions, incentives, and rewards' (1984:171). While Milton et al. were leading towards a discussion on job satisfaction, contemporary theorists such as de Geus (1999), Haeckel (1999), Senge (1999, 2006), Stacey (2001), Snowden (2002), Stacey, Griffin and Shaw (2002), Underwood (2002a, 2002b), Boulton and Allen (2003) Kurtz and Snowden (2003) and the OVAL Research Working Paper 03-12 (OVAL 2003) offer a broader picture of organisational complexity that shapes and models interactions between employees and between them and their clients, and the overall environment within which the organisation exists.

Fulmer (2000:59), in exploring this phenomenon within some of the world's most successful companies, asks why it is that organisations such as Microsoft and Hewlett Packard are able to retain their coherence when faced with continuous and turbulent change while others cannot. His answer, mirroring that of the complexity theorists noted above, is that the progress achieved by the whole of an organisation is greater than that achieved by the sum of its parts, and that even within the larger system that may itself remain relatively stable there are smaller systems that continually adapt and evolve over time to meet challenges as and when they arise.

In describing this Holland (1995:1) gives the example of a self-organising and continually growing entity (in his example a city) being like a 'standing wave in front of a rock in a fast-moving stream.' While the basic elements of the entity are continuously changing, the entity itself remains, and not only remains but grows. As a result in turbulence there is stability, and in stability there is constant change.

Why and how this phenomenon affects organisational life is the focus of much scientific and business research today with the result that a new way of thinking about management and organisational development is emerging. The impact that theories

regarding this phenomenon have on the way in which people are trained to exist and thrive within such an environment was the primary focus of this study. Of importance was the extent to which the current definitions and approaches to competency-based training remain appropriate in the light of such theories and, if it was found that they do not, what alternatives are needed if trainers are to create strategies that meet the needs of individuals within workplaces that are increasingly being recognised as complex and, at times, chaotic.

Having said that, the many and varied views on what complexity is and what it means to the workplace are in themselves a study in complexity (Stacey 2001). While the concept is by now quite familiar to management texts, the definition of what it means and how such theories can be harvested for use in organisational development are varied and quite often at odds with each other.

For example, while the purist complexity thinkers such as Stacey (2001, 2004, pers. comm. 16 January) and Snowden (2002, 2004, pers. comm. 20 February) condemn the attempts by the management writers to systematise complexity, Haeckel (1999), Underwood (2002a, 2002b) and Boulton and Allen (2003) wonder how it can be seen as anything but systematic albeit complex. Such complex patterns in the workplace had been observed by the researcher in a wide variety of environments and contexts since the early 1970s. As a management trainer and educator, and later as a policy developer within the Australian vocational education and training (VET) system, he wondered why, for example, some organisations could be successful when their staff had received little or no formal training while other organizations declined or ceased trading altogether even though they had extensive training programs

He looked at organisations such as the Mitsubishi motor car company in Adelaide, South Australia, and wondered why, when an organisation such as this could spend hundreds of thousands of dollars every year in staff training and be such a strong supporter and leader of the Australian VET system, it would still find itself nudging its way towards bankruptcy. He would then look at organisations such as Semco in Brazil where, in less than seven years and with no formal staff training program, the company went from \$US35 million in sales per year to \$US160 million (Semler 2001:xi). The relationship between training and organizational success did not appear to the researcher to be as fixed or as clear as some were arguing.

He of course knew from studies on motivation by, amongst others, Maslow and Herzberg, and Mayo's experiments at the Western Electric Company at Hawthorne in 1924 (all of which are described in Milton et al. 1984:58-84 and 245-246) that success in any endeavour is not based only on what is done *by* an organization but also what is done *to* those within its employ. The researcher had read within their work the phenomenon that people generally are more content and productive when they are forming the close interrelationships that bond them both physically and spiritually to their work and to individual and higher order goals and objectives. Such bonding appeared to him to be a natural phenomenon while its opposite, the fragmentation of the workforce through external influences, seemed to be forced and unnatural.

The more he studied this the clearer it became that the relationship between what happened *within* an organisation and what happened *to it* had a significant impact on whether or not training of any kind was successful, but not in the ways he expected. Throughout this research study it became clear that despite what happens *to* an organisation those within it frequently would rise stronger and better if given, not simply the skills and knowledge but also, and perhaps more importantly, the opportunities and the motivation to learn and to apply what they learned. And when these opportunities were not presented, or at least not grasped by the individuals and teams concerned, then learning would decline and corporate failure would commence. This, the researcher found in thinking about it, was very much along the lines of the self-organizing universe celebrated in the works of Ilya Prirogine (as described in Waldrop 1993, Kauffman 1995, Stacey, Griffin & Shaw 2000, and Stacey 2001) and Kauffman (Waldrop 1993; Kauffman 1995). As a result he began to wonder if the complexity theories had any relevance not only at the macro levels of the universe or the micro levels of genes (as described by Kauffman), but also to human activities within the framework of work-related training and learning.

1.4 THE RESEARCH GAP

The researcher's interest in this phenomenon peaked when he also began to wonder why learning and individual/corporate growth appeared to continue long after formal,

and even informal, training had stopped. In briefly scanning the literature prior to this study he could find no explanation for this. What he did find, however, were suggestions to the contrary. For example, statistics quoted in the literature include those that report how individual skills become outdated within a short time of being learned and that, without use or practice, people will generally forget around 25% of what they know within 6 hours and 33% within 24 hours (James 2001). He also considered research by Brinkerhoff and Gill (1994), building on the work of others such as Tannenbaum and Yukl (Tannenbaum & Yukl 1992, cited in Brinkerhoff & Gill 1994:4-6) which contended that only 5% of those undertaking training off-the-job found that what they have learned could be applied when they returned to their workplace.

Looking more closely at it the researcher found that these figures didn't refer only to externally delivered training either: Boshyk (2000:6-7), for example, records an incident where an analysis of an organisation's MBA program showed that at its conclusion respondents to his study felt that only 50% of the knowledge gained during the program was appropriate to current organisational problems. Four years later only 25% of respondents in Boshyk's study felt that the training was applicable and after six years this figure had been reduced to 12.5%. A similar study reported in Pfeffer and Sutton (2000:3) found that 73% of MBA graduates surveyed said that they used the skills learned during their studies only 'marginally or not at all'.

While Pfeffer does not give us the names of the organizations studied, Boshyk does. And from this it appeared that, from the figures, little of the training discussed in Boshyk's study had been relevant to the longer-term needs of either the trainees or the organisations for which they worked. Yet the organizations studied were at the time of Boshyk's research, and continue today to be, relatively successful in their fields. To the researcher this underlined the fact that even though, as described in Boshyk's study, the training received by these staff was of little relevance to their needs, the organizations in which they applied their skills and knowledge prospered anyway. This highlighted the *what* of this phenomenon but not the *why*.

Looking at the situation on a national level, in Australia at least this phenomenon is repeated. For example, recent statistics from the Australian Bureau of Statistics (2002a; 2002b) show that between 2001 and 2002 only 49% of organisations in

Australia provided formal training for their staff and only 71% provided informal training (ABS 2002a). At the same time, however, productivity actually grew over this period (ABS 2002b). Not only did productivity grow but over this period the number of organisations filing for bankruptcy – an indicator of business productivity and confidence – fell by 7.18% (Hall Chadwick Press Release 2004).

Therefore, for the researcher the dilemma remained: If the figures given in the studies conducted by Brinkerhoff and Gill, James, Boshyk and the others were accurate, why is it that the evidence appeared to show something different – that people not only remembered what they were taught, but they also transformed their knowledge into action that saw a continued, if not an increased, level of productivity and individual/corporate achievements?

In considering all this data the researcher found both contradictions and confusion. If, for example, in studying the Australian situation through the ABS statistics, less than half of the organisations provide formal training to their staff, and if (considering the studies by Brinkerhoff and Gill, Tannenbaum and Yukl, James and Boshyk) after a short period participants forget much of what they learned, and if (based on the studies of Boshyk and the others) much of what they had learned was inappropriate to their workplace anyway, then the trends that showed business confidence and productivity to be rising appeared to contradict the notion that it was training that was the cause. Therefore, if training was not the cause, then what was? Not finding a satisfactory answer to this question, the researcher set out to conduct this study.

Drawn from such flimsy evidence, the conclusion that training is not the cause of organizational success is tenuous at best and misleading at worst. During this research study it was found that there is a great deal of literature that presents the argument that training, done well, does give rise to positive organizational outcomes. Where the literature is at its best in highlighting the success of training in the achievement of organizational outcomes, however, is in that presented by trainers and educational specialists. The Vocational Education database (VOCED), for example, contains many hundreds of pieces of literature describing a causal link between training and successful organizational outcomes, but with no exception that this researcher could find, these were all authored by trainers or researchers employed by or for training institutions or the national training system.

But this was only arguing the case from one point of view. On reviewing a wider range of literature, especially that describing the work of Senge, Drucker, Peters and de Geus (amongst others), all well known for their insightful (but not always universally accepted) dialogues on modern business practices, the researcher could find no support to these claims. The skills that managers and staff apply in achieving business success were well described in the writings of these authors but how these were achieved was not. This lack of a balanced view of any link, causal or otherwise, between training and organizational outcomes suggested to the researcher that either its discovery is of little or no interest to business authors, or it is just not there.

At this point the main corpus of literature reviewed was that which addressed training in a generic sense. In turning his attention to vocational training, and in particular competency-based training, it was clear to the researcher that there is a significant amount of literature on the subject, and more lately on issues concerning skills shortages and the knowledge gap being left by an ageing workforce.

Organisations such as the Australian Centre for Organisational, Vocational and Adult Learning (OVAL), for example, are addressing issues concerning training and how it may better meet the needs of a work-centred learning paradigm within the framework of the national VET system (see, for example, OVAL 2003). The contentions put forward in their literature, however, appear to support workplace learning only as an extension of work-related training rather than as recognition of the skills and knowledge that are deductively learned regardless of whether or not formal or informal training played a role in this. This is a critical point put forward by the complexity theorists who contend that learning is a natural part of working therefore it will occur whether or not training is carried out.

What appears to be missing from literature such as that presented by OVAL is the link between learning as a phenomenon that emerges naturally within the workplace and the potential for trainers to influence this learning, not as a natural extension of a single training event but as a series of events that adapt and transform themselves in parallel to the needs of the trainees. It was around the question of how this occurs that the researcher built the framework for this study.

While little appears to remain uncovered about how learning either on or off the job occurs, what is mostly missing from the literature is an answer to the questions of *when* it occurs and how trainers can help instigate or enhance such learning. What the researcher felt was missing was research into training, and especially competency-based training, as a means of helping individuals and teams to create new knowledge and understanding at that point in time when they need it the most – in the workplace that is today being described as complex and chaotic. Of interest to the researcher was how trainers can best prepare themselves, and their programs, to meet such a need.

While there is ample literature on the benefits and processes of trainers and teachers encouraging individuals to enjoy the discovery of learning in a structured and controlled environment (i.e., the training or classroom), the concept of learning to learn in the workplace and in particular learning to learn what one doesn't yet know, and learn it in unpredictable and complex working environments, receives little mention at all in the texts reviewed before and during this study.

Of note is the lack of empirical or ethnographic literature that describes, in their own voices, how the concepts described in the complexity theories impact on the way in which individual training and learning is experienced. In fact, aside from Chappell (2002) few educational researchers acknowledge the work carried out by the complexity theorists. As a result much of the literature is centred on training aimed at fixed and predictable outcomes that could be achieved in environments (i.e., workplaces that are influenced by job characteristics, social relationships, corporate culture etc.) that are stable and predictable.

Such environments, however, are not described by the complexity theorists as sufficiently stable and controlled as to allow fixed and predictable outcomes. They are, according to these theorists, volatile and constantly changing and the researcher was therefore concerned that if training is aimed at stable and controlled environments, what impact does it have on environments that are anything but? That much of this training is conducted in large organizations where such links are far more difficult to ascertain, and concerns in the main new skills for frontline employees and supervisors, can potentially explain why such evidence is not found. But, regardless, to the researcher the fact that the evidence is not apparent in the literature is a concern because of the uncertainty about whether or not such a lack of

evidence is because this claim is unprovable or simply because the evidence has never been sought. Either way in preparing for this study the researcher could find no evidence of where this question had been addressed.

This is not to say that, in the literature, there are no examples of the successes achieved in training. As was noted above there are, but even though previous research appears to have not ventured further than the achievement of training outcomes as opposed to organisational outcomes, the hypothesis supporting this study is that competency-based training *does* have an important part to play in the achievement of work-related goals and objectives at all levels of an organization. And while it is fashionable to give primacy of concentration on training outcomes as a measure of training success, this study did not because the way in which CBT is currently undertaken in Australia these are based on learning objectives that are generally of more relevance to the trainer than they are to the organisation or individual trainees concerned. Moreover, aside from the quality assurance aspects (e.g., the correct recording and reporting of achievements), the achievement of these objectives above all others is the focus of measurement by the bodies set up by the Australian government (such as the Australian Qualifications Training Council) to monitor and control the quality of such training. This study therefore concentrated on what respondents state, from their experience, occurs in the workplace in the achievement of organizational outcomes, and how they have addressed the learning needs found there. In particular, concentration throughout this study is of workplaces reflecting the characteristics put forward by the complexity theorists and how individuals and teams create and apply the skills and knowledge they need to achieve the various objectives they seek to achieve there.

1.5 RESEARCH PROBLEM AND HYPOTHESIS

Throughout the literature it is clear that in Australia competency-based training is predominantly carried out as part of the national VET system, therefore any study into CBT cannot divorce itself from at least a cursory glance at the system as a whole and its constituent elements (e.g., competency-based assessment, competency-based training, the development and use of national training packages).

A review of the literature relevant to this system (the 'system', in this case including not only CBT but also to the processes for accrediting training providers and auditing the quality of national training packages and subsequent training and qualifications frameworks), however, and of research into training in general found that despite the wide range of research into and evaluations of individual sections of the system, there appears to be little evidence of any research or evaluations carried out by the major research establishments (e.g., the National Council for Vocational Education and Research) of the system as a whole. Nor does there appear to be an acknowledgement of that which has been conducted by non-government supported institutions or other research bodies (Smith 2004, pers. comm. December).

While the underpinning definitions of competency-based training and assessment (as given in ANTA 2003e) are that they enable the achievement of work-related goals and objectives, this lack of research suggests that these definitions have never been proved by those research establishments generally charged with conducting such studies, nor does it appear that the findings of others have been given their due. Where attempts have been made at such research (see, for example, Docking 1997, Hager 1997, Ferrier & Anderson 1998, Selby Smith, Hawke, McDonald & Selby Smith 1998, Hobart 1999, Smith 2001, and Schofield & McDonald 2004), in the main this has been fragmented and predominantly not always of the subject itself but of research carried out by others. This means that after nearly a decade and a half of operation, the achievements of this system are still unclear.

Admittedly, a significant amount of research has been carried out into training at all levels (one of the richest sources being the vocational education – VOCED – database of the National Council for Vocational Education and Research – the NCVER – which can be found at <http://www.ncver.edu.au/publications/search.html>), but reviews carried out of this research have seen doubts raised about the quality and rigour of the methods used in some instances when gathering the data and the conclusions reached as a result of its analysis. One such review by C. Selby Smith, Hawke, McDonald and J. Selby Smith (1998) questions how effective such research has been or, in fact, whether or not it has had any influence at all on decisions made on or about CBT in general and the national VET system in particular.

Another review, by Robinson and Thomson (1998), concluded that the lack of generalisability in case studies and the poor response to and lack of validation of surveys has, in their opinion, seen research conclusions made on limited case study data and unverified (and possibly unverifiable) survey results. Moreover, they claim that a close look at the literature concerning vocational training reveals that very little rigorous research has been carried out into, or reported on, competency-based training from the point of view of the practitioner or the organisation in which it is applied, a point supported by Comford (2000). While the reason for such limiting research may be, as Schofield and McDonald (2004) admit, because answers to the broader questions have never been asked, this does not excuse the fact that a lot of effort and resources have been employed to develop and maintain a system of training for which there remains no widely accepted proof that such an investment has been worthwhile.

In pondering these issues, and not being satisfied with what he found in the available literature, the importance of the research question raised at the beginning of this chapter became much clearer to the researcher. In searching for an answer to this question, however, it was also clear that he had to turn away from the traditional, training-centred research approach and look more closely at the theories concerning complexity and the modern workplace to at least shade, if not begin to fill, the gap in our knowledge about their impact on competency-based training and its ability to achieve workplace outcomes.

1.6 IMPORTANCE OF RESEARCH

While acknowledging that there is a substantial body of work in which training and learning towards competence off-the-job is discussed, this study only concerned itself with the impact that competency-based training has on learning that occurs on-the-job both naturally and as a result of a CBT intervention. Of particular importance was the role played by the creation, management and use of knowledge in learning within complex and chaotic environments. This built on the research carried out by Pfeffer and Sutton (2000:243), professors of organisational behaviour at Stanford University, who found that organisational success depends more on how well managers can turn knowledge into action than it does on knowing what it is that they must do.

Having said that, knowledge used versus knowledge possessed is a concept that is not often discussed in the literature, and outside of that which specifically addresses knowledge management, the role of knowledge in learning both as an act and as a construct also is rarely mentioned. Emphasis, in this research, was therefore given to the way in which knowledge underpins competent performance not just in periods of stability and workplace equilibrium but also in chaotic and unstable environments, and how the search for ‘knowable’ skills and knowledge can potentially enhance the definition and practical application of competence and competency-based training in complex environments.

This research was not aimed solely at uncovering evidence of new phenomena, rather it aimed to provide another view of an existing phenomenon through the voices and words of those who, having attended competency-based training programs and subsequently been assessed as competent against the appropriate standards, found the need to learn or create additional knowledge to effectively do their job. Of importance is that these voices reflected not simply what others believe such training should include but the competence that individuals and teams tell us they need at that point in time at which they need it the most. In doing so, this study revealed the gaps in our current understanding of ways in which training can potentially support the learning that individuals do naturally in a workplace that may be characterised as complex and chaotic, and in pursuit of goals and objectives that are important to them and the organization for which they work. In uncovering these gaps the way in which future research and application may make CBT more meaningful to both trainees and their organisations, in stable and complex environments, was also revealed.

1.7 RESEARCH DESIGN FOR THE STUDY

In pursuing these aims, interviews, observation and focus groups were used to gather data for examination using the processes of Thematic Analysis. Also conducted was a review of literature concerning training systems, workplace complexity theories, organisational behaviour and modern business management. Such literature was drawn from a diverse range of sources including academic and professional journals

and reports, ANTA-sponsored reviews, popular literature written for the mass market, and specialist books, magazines and newspapers.

In conducting this research the following constraints were identified:

- Because of the contemporary and emergent nature of studies into complexity and its relationship to organisational practices and workplace learning, a wide range of views had to be canvassed to form a balanced picture of the complexity studies and the impact these may potentially have on competency-based training. The most fruitful theories about this phenomenon, however, have only arisen in the past 3-4 years therefore the time available to analyse this research for its relevance to this study is limited by the late availability of the data and the submission date of this thesis.
- Due to time limitations this thesis is not a broad ranging investigation into all of the issues underpinning the potential of competency-based training to provide skills and knowledge for individuals in complex environments. It is of the experiences of a limited number of respondents who work in such environments and their observations of the issues as experienced by them in their workplaces.
- Little, if any, literature describes competency-based training as it is applied in both the national VET system *and* in public or private organisations for the purpose of achieving goals and objectives important to either. Where it exists such literature covers only that training carried out within the national VET system therefore a wider range of literature had to be canvassed to build a balanced picture of where and how CBT is applied not just in Australia but also overseas, and the issues and challenges that are faced in doing so.
- Little, if any, widely available VET research includes important perspectives on the question of how competency-based training benefits organisations (private or public) in which or for whom training programs using this process are conducted. Much is written on the purported benefits of training per se, but not on the competency-based approach. In particular,

missing from contemporary literature are the views of workplace trainers, organisational policy makers, and business managers who both demand the training and evaluate its worth to their organisation.

- While literature on the complexity theories, addressed from both an academic and practical points of view, are widely available concerning experience and knowledge gained overseas, there has been little research carried out in Australia. As a result the experiences described in the North American, European and British literature are assumed to be just as valid in Australia, however this assumption will be tested.

Because of these limitations, to achieve the aims of this research it was necessary to piece together disparate pieces of the overall puzzle and from this develop the clearest possible picture of the impact that the complexity theories have on the application of CBT in Australia.

In this study competency-based training was examined from a philosophical and historical perspective and how the landscape within which it is currently being applied is traversed. Supporting this is a number of models developed by the author and others over the past decade that potentially can describe the phenomenological processes of training and learning as they occur formally and informally in a workplace characterised as complex and chaotic. These models have particular relevance to this thesis because they not only describe the processes of training as they may relate to on-the-job learning and individual/organisational growth, but also have the potential to situate the learning undertaken by individuals across the continuum from stable and controlled environments to those characterised as complex and chaotic.

1.8 STRUCTURE OF THE THESIS

The following is a broad overview of the thesis, chapter by chapter:

- ***Chapter One:*** In this chapter an overview of the research problem and the method used to investigate it are presented. It overviews the broad field of

study, any limitations on the field of research, and provides definitions of key terms to be used throughout the thesis.

- **Chapter Two:** This chapter describes the literature reviewed to build a picture of the research supporting current theories regarding the complexity theories, their impact on workplaces, and competency-based training as it is applied in Australia.
- **Chapter Three:** The major method used in this research is presented in this chapter. Included is a description of the overall research design along with the techniques employed in gathering and analysing the data.
- **Chapter Four:** In this chapter the results of the research are presented along with an analysis of the data gathered and its relevance to the research questions.
- **Chapter Five:** The conclusions drawn from the research findings and their implications for competency-based training are detailed in this chapter. Also detailed are implications for current theory and practice, and for future research.

1.9 KEY DEFINITIONS AND TERMS

Throughout this thesis a number of terms will be used that may be familiar to readers but not always in the context to be used here. While most terms used in competency-based training are well known and commonly accepted, those that may differ slightly to help establish the researcher's position in regard to this research, are detailed below:

- **Australian Standards Framework (ASF)** – An eight level framework used to define the different levels of work that exist in most professions or vocations. The ASF provides a framework against which competency standards can be set to describe whole functions, their level in relation to other functions, and to recognise others with which they have a superior/subordinate relationship, for example supervising versus being

supervised. In the development of competency standards, a functional analysis will define the skills and knowledge employed in the workplace and, when analysed against the ASF, an appropriate level may be attributed to them. This is the first step in the creation of a National Training Package for any sector or industry (the second and third steps being the defining of an assessment methodology and the alignment of the standards against the appropriate AQF qualification respectively).

- ***Australian Qualifications Framework (AQF)*** – A system of nationally-recognised qualifications used in Australian schools, vocational training establishments, and universities. At its lowest level is the Senior Secondary Certificate of Education and at its highest is a Doctoral Degree. For the purposes of this thesis only the vocational qualifications will be focus when referring to the AQF. These are an eight level set of qualifications used to recognize competence at skills and knowledge that are typically applied on the job. These skills and knowledge are found detailed in National Training Packages and the qualification appropriate to them is supposed to align with the ASF however, as found in the literature, this is not always the case. Some groups will begin their standards development with the AQF qualification and work backwards from there.
- ***Capability*** – The presumed or implied ability to apply a certain level of competence in the future. This is an important definition given that complexity theorists suggest that the predictability that underpins the competency-based approach to training contradicts their conclusions. Capability, on the other hand, implies but does not predict a future ability.
- ***Chaos*** – Throughout this thesis the term chaos will be used to describe a system or process whose long term behaviour is unpredictable and in which tiny chance changes at any point can result in unforeseen outcomes.
- ***Competence*** – Skills and knowledge that are at the level required for the competent performance of certain functions within the workplace (e.g., the individual has the necessary *competence* to perform the task).

- **Competency** – Behaviour (i.e., the application of certain skills and knowledge) that is at the level described in the competency standards (e.g., the individual displays *competency*). The definitions given by the National Assessor and Workplace Trainer’s Board (NAWTB 1998:135) imply that competency describes the skills and knowledge that are required in the workplace even though this may differ to what is detailed in the competency standards. According to the NAWTB a successful assessment against the standards results in the determination that one is competent in the workplace, not competent only insofar as it is described in the competency standards. The problem with this definition is that such standards may, over a period of time, remain the same while the actual skills and knowledge required of a competent individual in the workplace can change – if only (as the complexity theorists state) because they have been applied. Therefore, competence against the standards will become progressively more meaningless as the gap between the standards and the workplace widens. Furthermore, the skills and knowledge an individual applies on-the-job may need to be used in different ways depending on the circumstances and situations with which she/he is confronted. Therefore, it is wrong to imply that being competent against one set of standards includes being competent against every application of the skills and knowledge described there. Where issues concerning actual versus predetermined competence appear in this thesis these will be noted and discussed in the context in which they arise.
- **Competencies** – Competence in more than one vocational or professional area. (e.g., at driving a forklift *and* at loading and storing furniture.)
- **Competency-Based Assessment (CBA)** – The assessment of evidence to determine a person’s current abilities against a given set of standards or competencies (NTB 1995; Rutherford, 1995a:2). This definition differs from that given by the NAWTB (1998:135) in which is stated that assessment is a process of ‘collecting evidence and making judgements’. This study will show that because competence is situationally relational and specific to environments and contexts that are unpredictable and ever-

changing, a competency-based assessment as traditionally described (by the NAWTB) is not a process but a snapshot of an individual's skills and knowledge at only one point in time. For example, a person's competence at driving a motor-car is, under the traditional definition, something that can only be ascertained at the time the assessment is carried out, and is therefore only correct at the time of the assessment. What she/he does either before or after the assessment may be something entirely different altogether. Furthermore the skills and knowledge she/he needed before the assessment, and those needed after the assessment, may also be different to those needed during it. An assessment of capability, on the other hand, assesses only capability and not competence as the definition is given here.

- **Competency-Based Training (CBT)** – Training that results in participants gaining skills and knowledge that are equal to the level of competence required to perform certain functions in the workplace *or* to the standard defined in prescribed competency standards. Curiously, the NAWTB does not give a definition for CBT.
- **Competency Standards** – '(The) specification of the knowledge and skill and the application of that knowledge and skill to the standard of performance required in employment.' (NTB 1992).
- **Competent** (adjective) – A competent person is one who possesses competence as described in the competency standards (e.g., she/he is *competent* and therefore has the required level of *competence*).
- **Complexity** – While most dictionaries provide a definition of complexity similar to that given in the Collins English Dictionary, that is 'the state of being complex' or 'not simple; involved or intricate', it is used throughout this thesis in a different sense. Complexity, in this study, refers to a collection of 'scientific disciplines all of which are concerned with finding patterns among collections of behaviours or phenomena' (Wood 2000:1). In this study the principles of complexity sciences or complexity thinking centre on a transformational teleological approach in which a phenomenon is viewed as a living system that self-organises its identity to formatively

cause itself, 'always with the potential for transformation' (Stacey et al. 2003:128). Knowledge, for example, could be held to be a complex system because simply thinking about itself can cause greater knowledge even though as a concept it remains the same. Such an approach eschews the dominant systems and management thinking because it focuses on non-linearity rather than linearity and unpredictability rather than predictability.

- **Industry** – 'Industry' in this respect, is that which has been defined by the National Training Board (NTB 1992) as generic (i.e., all organisations within a specific vocational range) or explicit (i.e., a single enterprise or organisation). The NTB also defined 'cross industry' as that which contains performance requirements which underpin training that is sufficiently generic to be appropriate to all industries and enterprises, for example training or management.
- **Mayer Key Competencies** – Under the auspices of the National Training Board the Mayer Committee was set up in 1991 to define the skills and knowledge deemed essential for effective participation in 'patterns of work and work organisation' (SQA 2003). Seven competencies were defined: Collecting, analysing and organising information; communicating ideas and information; planning and organising activities; working with others and in teams; using mathematical ideas and techniques; solving problems; and using technology. An eighth competency has in some literature been added (cultural awareness) but this was found neither in the original competencies nor in any ANTA definition. The Mayer Key Competencies (usually shorted to 'key competencies') have attracted significant criticisms for their failure to include cognitive and attitudinal aspects of competence (SQA 2003).
- **National Training Package (NTP)** – A National Training Package is used as the basis for all training within the Australian VET system. It is made up of two parts: one that must be endorsed by the Australian government if it is to be accepted under the AQF, and one that does not. The former includes the competency standards, the assessment pathways, and the

relevant qualification. The non-endorsable element contains the training program by which the qualification is attained.

- ***Recognition of Prior Learning (RPL)*** – Most definitions of RPL suggest it is recognition of learning that has been gained in the past and from a variety of sources. In practice it is generally only formal learning that is recognized (as in credit transfer) thereby ignoring that which has been gained through life and other experiences. In those countries adopting a competency-based approach to vocational training, RPL is simply a process where evidence of competence that does not emerge from the assessor's own observations of the individual, is presented by the person being assessed, is assessed by the assessor and a judgement made as to its relevance to the assessment. In other countries this process is known as Accreditation of Prior Learning (APL), Accreditation of Prior Experiential Learning (APEL), Recognition or Crediting Current Competence (R or CCC), Prior Learning Assessment (PLA), and so on.
- ***Workplace environment*** – This term is employed throughout this study in preference to the more commonly used 'workplace' because it provides a description of a workplace that includes not just the work carried out there but also the characteristics of the tasks undertaken, the social interactions that are carried out during an employee's or team's normal day, the personalities and characteristics of all those with whom the individuals and team interact, and so on. It also includes the influence that prior experience, changing management needs and corporate culture have on the way in which work is performed on a daily basis. The use of this term provides a more holistic image of a workplace and the influences it has on how and where activities are conducted than simply a place where work is done.

Where a different interpretation is needed for these terms an explanation will be given in the text.

1.10 CONCLUSION

In this chapter the foundations for the thesis have been laid. The researcher's interest in the questions underpinning this study were described, the research problem was introduced as were the research questions and hypotheses. Also referred to in this chapter was the importance of this research and the method and techniques to be used in conducting the study.

Introduced in the next chapter will be a review of literature relevant to this research. In particular will be that which describes contemporary thinking in regard to the workplace and the issues central to the application of individual and team skills and knowledge in the achievement of work-related goals and objectives.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

In *The Curriculum*, published in 1918, Franklin Bobbitt urges teachers wishing to design objectives-based curricula to study life ‘so as to discover the ‘abilities, habits, appreciations and forms of knowledge that men need’” (in Curzon 1982:81). Such a philosophy has underpinned all work-related training and education since, and in particular the competency-based approach to training and assessment adopted as part of the reforms to vocational training and education (VET) in Australia. How well the study of life has defined the ‘abilities, habits, appreciations and forms of knowledge’, however, and the impact that the theories about the complexities of life that such a study exposes are at the heart of the question driving the research described in this thesis.

Chapter One identified the research questions central to this study and provided an overview of this thesis. This chapter aims to build on this introduction and present the findings of a review of literature relevant to the study.

Reviewed in this chapter will be contemporary literature describing the complexity theories and in particular the way in which the workplaces and work environments are characterised. This is an important element of this thesis because such workplace and work environments are those for which competency-based training (CBT) activities reportedly provide the appropriate skills and knowledge that enable individuals and teams to demonstrate competence there.

Also reviewed will be literature that describes the way in which competency-based training is applied in Australia. Since this form of training was adopted as part of the national VET system it has been the focus of a great deal of dialogue both in the literature and at public fora. The aim of this review, however, is not to examine the way in which CBT is applied as part of the reforms carried out into vocational education and training, although by necessity in Australia this cannot be ignored altogether. Reviewed instead will be the impact that the complexity theories have on the processes of competency-based training per se with a focus on the literature describing these theories and the application and use of competency-based training whether it is practiced as part of the national VET agenda or not.

2.2 BACKGROUND AND LITERATURE REVIEW

That the current media debate on skills shortages and industrial relations reform is achieving wide coverage is not surprising given the considerable attention generated in recent years on the relationship between the nationally endorsed training agenda and workplace productivity. Insofar as competency-based training goes, a significant amount of research has been carried out by industry groups (into the needs of employers - see for example ACCI & BCA 2002) and professional researchers of the role played by CBT in the reform of publicly-sponsored training and assessment. Much of this can be found in, for example, the National Council for Vocational Education and Research (NCVER) publications library. Here the importance of CBT to VET reform and ways in which it is practiced in technical and further education (TAFE) institutions and non-TAFE environments (e.g., public sector and private registered training organisations) are well documented and described (see for example Freeland 2000, Dumbrell, de Montfort and Finnegan 2002, and NCVER 2002).

As a concept, much has been written about competency-based training since its introduction in the early 1990s as part of the national training reform in Australia. In defining the scope of literature to be reviewed for this thesis it was found, however, that some of the most prominent writings, particularly that of academics such as Gonczi, Hager, and Athanasou and which has been widely quoted in other literature, emerged prior to 1997 – prior to the introduction of National Training Packages and

the emergence of the Australian system as we now know it. In fact some of the most significant literature of the 1990s was released prior to 1995 when responsibility for this system as a whole was taken over by the Australian National Training Authority (ANTA). This means that literature written prior to this time is by its nature of a concept that was emerging onto the national stage, not of a system that had been operating for any length of time.

The most widely released literature written after this time, on the other hand, was primarily written by or for the major institutions within this system such as ANTA, the NCVER, and the Australian Council for Education Research (ACER). Because the greater bulk of funding for literature produced on the VET system by the NCVER and ACER came from ANTA it could be said that any studies in this area are of a system by key players within that system. This meant that in selecting the literature for this review the researcher had to maintain a sceptical mindset regarding the purpose behind the writing and release of that literature or the actual environment or system it was referring to. Moreover, because of the extent to which previous literature was referred to or quoted in other research it was found that concentrating only on the primary sources presented a far richer view of the concepts under study or the outcomes that resulted. This also meant, however, that a lot of recent writings could be set aside in this study because the data was duplicated in literature released earlier.

In being so selective in the literature reviewed for this study it was easier to see that as a means of supporting VET reform in Australia the way in which CBT has been applied since its introduction has gone through significant changes. Smith E., Hill, Smith A., Perry, Roberts and Bush (1996), for example, point out that in 1994 non-TAFE training establishments provided more CBT courses than did TAFE. Recent studies (see, for example, Smith, E., Pickersgill, Smith, A., & Rusherbrook 2004 and Harris, Simons & Moore 2005) have also shown that TAFE institutions have since then taken on a much greater role in providing training not just for a broad range of individual students but also for large and small organisations across Australia. According to Harris et al. this has enabled TAFE teachers to gain a closer understanding of the needs of their client groups along with a resulting shift in the content and context of training from that which is centred on the training needs as determined by the supplier to those viewed as important by the customer. The desired

outcome of competency-based training, therefore, in this context is no longer the achievement of particular learning outcomes but individuals skilled to a level required by industry (NTB 1992, ANTA 2003e, DEST 2005).

Within the literature reviewed for this study are many claims regarding the success of the VET system (see, for example, Smith 2001, Ferrier 2003, Smith & Keating 2003, Allen Consulting group 2004), however such claims have not gone unchallenged. In a review of the initial approach to CBT Griffin and Gillis (1997), for example, argued that because of the failure by the national training framework to provide an emphasis on the future needs of individuals undertaking such training, improvements to workplace performance had at that time not occurred despite the involvement by the key stakeholders and extensive investment made in the processes. Ling (2000) also noted this concern and contended that a competency-based approach to training was, at the time of his study, static and in his opinion guaranteed education for yesterday and not for the future.

While it could be argued that the studies by Griffin and Gillis, and by Ling, are of the way in which CBT was at the time underpinning a still evolving VET system, later research showed that in an even more mature system little had changed. One such study is that carried out by the Australian Chamber of Commerce and Industry and the Business Council of Australia (in ACCI & BCA 2002) who blame this approach for much of the current skills shortages in Australia. It is also a point that Smith E. et al. (2004) noted in their research which found that nationally recognised training was more appropriate to 'high volume training needs in established companies that are not undergoing rapid change'. The only problem is, as will later be shown, this is a description that could be applied to just about every organisation be it private or public therefore what Smith et al. were really saying is that CBT as it is currently designed and implemented is appropriate to very few.

Concerns about the way in which CBT is applied in general in Australia were also raised by Gonczi some ten years before Smith et al. (in Gonczi 1994), and later in Gonczi (1998), Hager (1998a) and Robinson and Thomson (1998). Schofield and McDonald (2004) have also highlighted what is perhaps the most significant criticism in their questioning of whether or not the introduction of CBT as a central element of

the VET reform has achieved its objectives and whether, in fact, it was ever capable of doing so.

While the critics have been vocal in their assertions regarding CBT and VET reform per se, there is little dialogue in the literature regarding two aspects important to the research question: The extent to which individual organisations are applying competency-based training outside of the VET framework, and learning as a natural extension of any training, be it CBT or otherwise. Missing in particular is literature about learning that occurs in the workplace as individuals and teams contextualise newly learned skills and knowledge (or newly shaped *already possessed* skills and knowledge) in the environments in which they need to apply them, environments that are most often range from complex to chaos.

CBT outside of the VET system is discussed (but not in research terms) in the literature by practitioners such as Tovey (1997), Smith (1998) and Rylatt (2003), however such discussions describe it in a generic sense and not as it is applied within large or small organisations for purposes beyond simple training outcomes. In this literature, as in that more related to VET research, it is consistently stated that the competency-based approach to training and assessment as it is applied in Australia is for the purposes of gaining qualifications under the national VET system. And reports to the government by the National Council for Vocational Education and Research (NCVER) on the system give greater prominence to the number and type of qualifications gained (as well as the number of students applying for or taking part in such training) than any other data.

McDonald and Hayton (1998) also reported that in the five years prior to their research there were 98 published evaluations on the VET system and only four on workplace learning (although Boud 1998 does go into this in some depth). Further, Hager (1998) found that nearly all research into quality in VET has been conducted in publicly funded training sector, not outside of it. This lack of analysis in the literature on the degree to which CBT is applied outside of the VET system indicates that in the opinion of those who research this form of training it is either not conducted outside of this system or that it may be conducted but in a form different to that which is recognisable by those concerned with the VET agenda. Or, alternatively, it is of no interest to the researchers.

On the other hand, learning in the workplace, and in particular the way knowledge is gained and managed, is a significant theme in the complexity literature with both complexity theorists (Stacey 2001, 2003, pers comm. 2004, Stacey, Griffin & Shaw 2002, Snowden 2002, pers comm. 2004, and de Geus 1999, 2001) and knowledge management theorists (Lave 1988, 1996, Lave & Wenger 1991, Wender 1998, Wenger & Snyder 2001, and Wenger, McDermott & Snyder 2002) arguing the importance of each other in their theories. In the light of these theories and of the criticisms of the VET approach to CBT noted above, a debate is emerging over the efficacy of the current approach to CBT and the impact that contemporary views about the workplace, and in particular the complexity theories, have on its design and implementation as a means of learning the skills and knowledge that support competent workplace performance. While such debate is still in its infancy, it does indicate that there are some within the Australian VET industry who have identified the need to consider the complexity theories and what it means to vocational and professional training.

Chappell (2002), for example, highlights the need to understand the relationship between the complex and often chaotic contexts in which current and past VET students work and the training they undertake to achieve objectives that are important to them and their organisation. Chappell also points to where research has not been carried out into the impact that the complexity theories have on training and education, not on the processes but on the way they can be conducted to support the learning of skills and knowledge essential to environments that could be characterised using the definitions of complexity and chaos. Highlighted in Chappell's research, and in that of complexity theorists such as Stacey (2001), Stacey et al. (2002), and Snowden (2002), is the lack of knowledge of how a systematic approach to training (such as CBT) that aims to develop pre-defined skills and knowledge can be designed and conducted to meet the needs of individuals and teams whose workplaces could be characterised as environments and contexts that are lacking in stability, control and predictability.

While Chappell's views are yet to be more widely taken up in the VET literature, their general thrust is strongly supported in the contentions put forward by the complexity thinkers noted above. In their view aiming to achieve predictable outcomes as a result

of any activity (e.g., not just training but also the learning that takes place on the job) is not sustainable in a context or environment that is constantly changing and is itself unpredictable. Therefore the question of the implication of the complexity theories to a competency-based approach to training, a form of training that is based on pre-defined objectives and predicted outcomes (but which, according to Griffin and Gillis [1997] and Ling [2000], are in the current approach static and rooted in the past), becomes even more important if trainers and educators are to have confidence in their ability to support students and their organisations whose needs may be found there.

To explore further the question of the impact that the complexity theories have on the way in which competency-based training is reportedly practiced in Australia, it is important to firstly broaden our understanding of these theories and their relevance to the Australian workplace and training and work-related learning that is conducted to meet the needs of individuals and teams that work there. An understanding must also be gained of how a competency-based approach to training is described in the literature and where studies have been carried out into the environment in which it is applied. Through this it is potentially possible to highlight where the research gaps may be and from this build a platform upon which to undertake further enquiry.

2.3 WORK-LIFE AT THE 'EDGE OF CHAOS'

Workplaces today are increasingly being characterised as fast-paced and driven by ever-changing business objectives that cause the emergence of unfamiliar and non-fixed patterns and interrelationships. This is a simple explanation of the term complexity, or what Wood (2000:1) calls a 'collection of scientific disciplines concerned with finding patterns among collections of behaviours or phenomena'. The edge of chaos is a term also used by complexity thinkers to describe organisational life that spans two natural phenomena: the complexity that characterises work life in an environment that business commentators such as de Geus (1999, 2001), Haeckel (1999), Fulmer (2000), Wood (2000) and Hock (2005) declare is fast paced and ever changing, and chaos, the chaotic periods when patterns cannot be readily identified nor interrelationships understood.

Academics and commentators investigating the use of the term chaos and its application to the world of business (e.g., Fulmer 2000, Pascale, Millemann and Gioja 2002, Shaw 2002, Stacey et al. 2002, and Kurtz and Snowden 2003) state that it is not intended to describe a time when the world as we know it is collapsing and everything is turning to disorder. It is simply the phenomenon that occurs when events appear to be out of sequence, priorities are being rearranged or are rearranging themselves, and time and knowledge of the wider consequences of intended actions are insufficient to make well thought-out deductions and considered decisions.

Kauffman (1995) suggests that life itself exists at the edge of chaos – hypothesising that, to use a metaphor from the physics, life exists at that point between solid and gas, and between ice and vapour. That when systems are too closely intertwined in a frozen or ordered environment they would not be sufficiently capable of developing or growing, but when they are too ‘gaseous’ they would not be ‘orderly enough’ (Kauffman 1995:26).

Kauffman’s hypothesis, for which he claims there is considerable supporting data, is that the most successful systems are those that exist between these two regions – in other words at the ‘edge’ of chaos. Here, where there is a compromise between order and surprise, systems are best able to coordinate all of the complex activities that make them what they are and at the same time evolve into whatever they will be.

Kauffman, acknowledging that his studies were primarily of organisms and biological complexity, suggests that the laws that govern the ways in which molecules and artefacts evolve and co-evolve on ‘rugged, deforming, fitness landscapes’ could also be applied to individuals and organisations (1995:246). He is supported in this by de Geus (1999, 2001), Haeckel (1999), and Senge (1995a, also in Senge, Kleiner, Roberts, & Smith 1996, Senge, Kleiner, Roberts, Ross, Roth & Smith 1999, and Senge, Scharmer, Jaworski and Flowers 2005) who contend that businesses, like humans, are living systems ‘bound by invisible fabrics of interrelated actions, which often take years to fully play out their effects on each other’ (Senge 1995a:5).

With the broadening of the suggestions of a relationship between the theories of complexity and the workplace, the study of this phenomenon is no longer limited to the world of physics or the natural world. It is today being extensively studied and

discussed in its relationship to the world of work and how we might better understand the environment in which employees and management perform their daily tasks.

For example, de Geus (1999), Haeckel (1999), Lewin and Regine (1999), Fulmer (2000), Pascale et al. (2000) and Underwood (2002) discuss complexity and its relationship to competitive businesses and private organisations, but not the public sector (although Lewin and Regine do go close in their reflections on the management of complexity in a small public hospital). To them commercial competition is a significant contributor to increased complexity and chaos in the workplace and must be managed if economic success is to be achieved. Holland (1995), on the other hand, along with Senge (1995), Pinchot and Pinchot (1996) and Olson and Eoyan (2001) concentrate more on organisational systems and how these contribute to complex environments and business outcomes. From an organisational point of view, be it private or public sector, Wood (2000), Weick and Sutcliffe (2001) and Shaw (2002) situate complexity in the way that it defines high performing organisations capable of addressing and working within complex or chaotic environments from those that find it difficult to do so.

Handy (1995) and Johnson (2001) also discuss complexity and paradox but as they relate more to an individual's view of the world and what is needed to navigate through landscapes characterised as complex and chaotic. Insofar as straightforward theory goes, Stacey et al. (2000), Stacey (2001, 2003), Snowden (2002) and Kurtz and Snowden (2003) investigate the nature of complexity and its impact on learning through knowing. They do not situate complexity within any particular context, instead relying on broad statements about the phenomenon to imply a universal truth. Finally, Drucker (1999), Streatfield (2001) and Shaw (2002) base their concepts of complexity on what it means to managers and their management style without differentiating between those employed in the private or the public sector.

To add to this diversity, Haeckel and Snowden, while both employed at the time of this study by the same organisation (IBM – Haeckel in the USA and Snowden in England), differ in their interpretations of the way in which the complexity theories are capable of influencing organisational systems and outcomes. Snowden is of the opinion that the notion of complexity underpins an inability to accurately predict outcomes regardless of how well systems and processes are shaped and adapted to

achieve predetermined results. That such shaping and adaptation is possible is the basis for Haeckel's view of these theories.

Although some of the research described by these theorists is of organisations that are also found in Australia (e.g., Hewlett-Packard, Microsoft, Pizza Hut, Visa, Alcoholics Anonymous and Barclay's Bank – see for example Boshyk 2000, Weick and Sutcliffe 2001 and Svensson et al. 2002), in the main their studies describe organisations located in Europe and the USA. For example, Lewin and Regine (1999) provide case studies of the ways in which complexity has been addressed in the organisations that they studied, but in the main these were small to medium sized enterprises found only in the USA.

Some Australian research has been reported but it could be argued that it does not go far enough. Scott (2000) and Chappell (2002), for example, in their contention that the relevance of these theories to the Australian workplace should be explored offer a belief that the theories are relevant but neither went beyond this to demonstrate the basis upon which their suppositions were made or where examples may be found. Other studies have been carried out in Australia of the impact of complexity on the way in which private and public organisations have been run, (see for example Smith 2004, Collier & Hooker 1999, Smith 2004, and Martin & Sturmberg 2005), but these have been from a general point of view and with little or no observations about the generalisability of the respective author's findings. Such commentary was, however, found in the writings of Mant (1997) who reflected on the complexity of the Snowy Mountains Hydro-Electric Scheme and the issues that this raised among the leadership of this project. But, again, he did not draw on any of the theories to explain what such complexity meant or how it impacted on, or was impacted on by, the way in which individual or collective training had been carried out.

Smith (2004) has also explored the relevance of these theories to sports organisations and in particular to the way in which unintentional change, as opposed to planned and deliberate change, in the workplace can be explained. Collier and Hooker (1999) of the University of Newcastle have also explored the capacity for natural and engineered systems to be both casually formed and grounded, and at the same time capable of spontaneous re- and self-organisation, while Martin and Sturmberg (2005)

describe how these theories have been successfully applied in defining the workplace of frontline health care providers.

This study found that the literature referring to complexity in the workplace in Australia did so without an exploration of what this means or the impact that such theories may have on the way in which business systems and requirements are described. And while authors such as Chappell and Scott suggest that the complexity theories have aspects that must be considered when doing so, the failure to explain what these are, and their relevance, leaves a gap in our understanding of how generalisable these theories are, and in particular how generalisable they are to an Australian context.

Nevertheless, that organisations are increasingly being characterised as complex and chaotic is recognition that workplaces are generally not stable and constant environments where every decision is correct and every objective is achieved. Hock (2005:13) calls it ‘chaordic’, the ‘behaviour of any self-organizing and self-governing organism, organization, or system that harmoniously blends characteristics of chaos and order’. It is a phenomenon that has been closely researched and described in theoretical terms for over two decades now (see Waldrop 1993 for an in-depth history of complexity studies conducted at the Santa Fe Institute) with differing views on exactly what it means to the study of management and organisational behaviour.

In Chapter One the researcher’s personal interest in this phenomenon was described. The questions raised as a result of this interest paralleled those of Brian Arthur, widely recognised as the father of studies into organisational and business complexity. In Waldrop (1993) is a lengthy study of how Arthur’s concept of ‘increasing returns’ overturned economic science by proving that the laws of attraction directed spontaneous self-organisation, and that tiny, insignificant changes in a single event can multiply to become significant shifts in organisational culture and direction – in other words a demonstration of the theoretical concept known as the ‘Butterfly Effect’¹. According to Waldrop, Arthur’s focus was on what this means to the study of economics, however others (e.g., Haeckel 1999, de Geus 1999, 2001, and

¹ The Butterfly Effect is used to describe how large scale and unpredictable outcomes can occur as a result of a few simplistic rules. According to Cohen and Stewart it is called ‘sensitive dependence on initial conditions’, or the ‘butterfly effect. (“If a butterfly flaps its wings in Tokyo, then a month later it may cause a hurricane in Brazil”.)’ (Cohen & Stewart 1995:191).

Underwood 2002a, 2002b) have applied similar theories to a broader range of management and business scenarios.

On a broader scale there is emerging a contention (in for example Drucker 1994:1, 1999:4, Pinchot and Pinchot 1996:19, Fulmer 2000:18, Gratton 2000:3, Pascale et al. 2000:13, and de Geus 2001:9) that the changes to modern work methods and organisational structures have followed the recognition of the complex relationships that occur in today's modern and dynamic business environments. Lewin and Regine (1999), in an extensive study of organisations ranging from advertising agencies to restaurants, found that the traditional mechanistic approach to business is no longer applicable to an era of high speed communications, information sharing and globalization, and that they can no longer be controlled like a machine. Seel (2000) sees this as a movement away from planned change to 'facilitating emergence', and that such changes are only possible if the organisation is viewed as a self-organising entity that is worked *with* and not *on*.

Campbell, Flynn and Hay (2002), in testing this contention, describe a study in which the social dynamics of a group of participants were, with firstly the breaking down of expectations or order followed by the application of a few simple rules, manipulated between the stages of complexity from order to chaos to complex and finally back to order. The outcome of their research was a theoretical framework for the way in which group dynamics and development can be modelled.

While their study arose out of a perceived lack of research into the application of the complexity theories on groups, it was nevertheless conducted in a laboratory in which the events underpinning the experienced complexity were artificially developed and employed. In doing this they omitted one crucial element of self-organising systems – that the rules by which these systems evolve or contract are also emergent from the environment and the interactions that take place there. The conclusions reached by Campbell et al. may point to an explanation of how groups experience chaos and complexity, but by artificially inducing such complexity they may have been motivating change and not merely observing it. While this active involvement by the researchers could see a questioning of their results, they nevertheless point to a need to further understand the impact that complexity and chaos has on the way in which teams and small groups interact and the skills and knowledge they need in order to do

this competently and in line with the goals and objectives of the organization in which they may be working at the time.

Examples of the emergence and naturally occurring complexity described by Campbell et al. have been given by Stacey (2001, 2003), Snowden (2002) and Svensson et al. (2002). Studies reported by these authors reveal an exploration of the notion of complexity in the workplace from the perspective of how this impacts on the gaining and application of knowledge, while others such as de Geus (1999), Haeckel (1999) and Underwood (2002) study complexity for its relevance to organisational systems and outcomes. From the literature, however, it is not clear whether the authors also observe the concept of complexity as complex. If this concept is complex then it would appear that there is no single dimension to complexity: it is, itself, quite complex and multi-dimensional therefore any attempts to influence one part of it can have unintended consequences in another – just as their theorists contend.

This is not treated as a negative aspect of work life, even in literature that deals predominantly with project planning and risk management (e.g., Stevenson 2007). In fact, Svensson et al. (2002), in a study into the learning environments in knowledge-intensive industries showed that creativity and work success emerges from such experiences. However, their study also found that the differences in individual perception of complexity lay in three distinct areas:

- the cultural differences between organisations (and, as their research was centred on countries found in the European Union, between countries);
- the level of institutional pressure (e.g., whether the organisation was in a ‘make and sell’ or ‘sense and respond’ mode as described by Haeckel 1999); and
- employee expectations.

Lewin and Regine (1999), on the other hand, also found that such diversity enhanced the outcomes achieved throughout organisations, a point similarly made by Lave and Wenger in their descriptions of the way in which diversity within communities of practice enhance rather than detract from the outcomes that such groups can potentially achieve.

While the impact of complexity on individual and collective competence is well described in the literature (see, for example, Gerber 2000:Sandberg 2000a, Chappell 2003 and Young 2003), nowhere in the literature reviewed for this study was a third dimensional view taken of the way in which such complexity forms, is enhanced or degraded depending on individual confidence at any given time, or that complexity may in fact not be real but simply perception of the individual depending on the level of control she/he has over a certain situation. From this it is hypothesised that the notion of what is or is not a complex environment may be just as much a matter of perception and experience as it is a phenomenon influenced by external and workplace systems and events.

Because these studies provide an alternative vision of the environment in which individuals and teams apply their skills, a question arises of what this means to the way in which training that enables them to be competent in the workplace is designed and conducted. This is particularly true of competency-based training that places such an emphasis on predictable skills and knowledge. Pascale et al., (2000:6), for example, suggest that within the complexity theories there are four principles that are 'inherently and powerfully applicable to the living system called a business'. One of these principles is that living systems cannot be directed along a path – they can only be motivated or encouraged to do so. This idea is reported by Haeckel (1999), Stacey et al. (2002) and Kurtz and Snowden (in Kurtz & Snowden 2003) whose studies found that change in complex systems is controlled 'by the very nature of the dynamic' (Stacey et al. 2002:137), not by some predetermined set of rules or expected outcomes. In their research, the environment in which the application of certain skills and knowledge is required also constantly grow and change even as such skills and knowledge are being applied – sometimes because the skills and knowledge are being applied and sometimes in spite of it. As such it is unnecessary, not to mention impossible, for individuals to take control and to attempt to 'impart stability to a whole network of networks' – an implication that must include those designing and conducting the training of others whose skills and knowledge are expected to do just that.

Control, in this respect, is not something capable of being possessed by an individual but a characteristic of the particularly system-wide dynamics therefore the impetus for

change comes from within the system, not as a result of someone directing it from without. This has significant implications for the way in which CBT in Australia is designed and implemented and will be discussed in more depth shortly.

Stacey (2001), Streatfield (2001) and Stacey et al. (2002) also reject the notion of control and that both the extent and the outcome of any form of knowledge creation and learning can be predicted, aspects that feature very strongly in the processes that underpin competency-based training. Instead they contend that it occurs as a result of growth that is continuous and self-emergent and based around the constant interplay between the environment and the skills and knowledge being applied within it. Stacey describes this as an underlying principle of causality and a 'Transformative Teleology (wherein):

'. . . complex responsive processes of relating are the transformative cause of themselves as a process of perpetually constructing the future as continuity and potential transformation at the same time. Furthermore, simultaneous continuity and transformation are participative.' (Stacey 2001:117)

In other words, knowledge is both its own cause and effect and to try to define it as a system of rules (or standards) that people must follow to be effective in the workplace is, according to Stacey, missing the point. Such knowledge is instead in the 'themes continuously reproduced that pattern the experience of being together' (2001:144). Explicit, procedural or narrative knowledge is simply a resource to achieving this.

Senge (1995a), Stacey (2001) (mindful of the caveat he gives above), Snowden (2002), and Senge et al. (2005) suggest a very similar set of principles to Pascale et al. (2000) when discussing the growth of knowledge and its application in the workplace. They add the point, however, that attempts to artificially induce change within an organisation (as occurred in the research reported on by Campbell et al. 2002) can have far-reaching consequences, little of which (if any) are predictable or capable of being confined to pre-determined patterns and directions. Senge (1995) adds that not only are the outcomes unpredictable, it may be years before their effects are even seen and then, as in the 'Butterfly Effect', such effects might be well outside of the visual reach or even the knowledge or realm of understanding of the observer.

While the notion of predictability will be investigated in greater depth in section 2.5, even at the theoretical level discussed here the implications of the complexity theories

on competency-based training are becoming apparent. It is clear in the literature, for example, that training individuals with the purpose of causing change at levels beyond simple learning outcomes, a concept that is strongly supported by definitions given to competency-based training by practitioners such as Tovey (1997), Smith (1998) and Rylatt (2003) and policy-makers such as the Australian National Training Authority (ANTA 2003e – now the Department of Employment, Science and Technology - DEST), is not something that can be supported from the complexity sciences. Stacey (2001, 2004 pers. comm. 16 January, and 2003) and Snowden (2002) are two whose contributions to this debate appear to be most critical.

Both Stacey and Snowden have been instrumental in framing our understanding of the complexity theories and their applicability to the environment in which work is undertaken. Even though their research was carried out independently their contentions are very similar. These will be discussed in greater detail shortly. What has emerged, however, is a picture that suggests that since the implications of complexity to workplace learning first began to emerge as a field of enquiry it has taken on different perspectives centred primarily on the area of interest of the enquirer. Stacey's research, for example, has led his enquiry into the applicability of these theories insofar as the philosophical act of knowing is concerned (Stacey 2004 pers. comm. 16 January) although he does also show concern for the manner in which the principles of complexity affect organisational systems and business dynamics (see, in particular, Stacey 2003). Snowden, on the other hand, retains a curiosity about both the act of knowing and the concept of knowledge in and of itself (Snowden 2002). Both, however, situate their interests in the workplace and how complexity theories can contribute to our understanding of the nature of work and the learning that individuals and teams gain through the interactions in which they participate daily.

Others have studied this phenomenon but not to the same degree as Stacey and Snowden. Boulton and Allen (2001, 2002), for example, view complexity as a system, albeit one without a predetermined future or outcome while others (such as Savage 1996, de Geus 1999, Haeckel 1999, Senge [see Schultz 1999], Pascale et al. 2000 and Underwood 2002a, 2002b) have attempted to explain complexity as a management construct and therefore an issue that managers must deal with daily to achieve organisational objectives. These studies, and the contribution of the theorists to our

understanding of the impact of the complexity theories on CBT, will be discussed below in the context of the way in which the workplace is described and the training and learning needs found there.

This has been a broad overview of the literature regarding the complexity theories and the significant advances that have been made in our understanding of them and their implications to the world of work. What then of their implications to training and in particular competency-based training? To understand this we need to look more closely at the literature concerning the complexity theories and any implications that can be drawn on their relevance to the way in which knowledge is gained and used to support learning in the workplace.

2.4 THE IMPLICATIONS OF THE COMPLEXITY THEORIES

As noted above, Chappell (2002) has pointed to where research has not been carried out into the impact that the complexity theories have on training and education, not on the processes they follow but on the way they can be conducted in environments that could be characterised as complex and chaotic. The ACCI and BCA (2002) report attempts to address this, but it does so by providing extensive details of the so-called employability skills and knowledge that employers state are at the centre of this country's current skills shortage – in other words from a point of view that describes what can/must be taught and not one which addresses the skills and knowledge that must be applied.

The ACCI and BCA report is an attempt to describe the skills and knowledge needed in the contemporary workplace from a generic and teachable point of view, not one that reflects what must be learned and applied on the job whether gained through training or not. Such skills, in this report, could be seen as an extension to the Mayer Key Competencies and not the vocational or professional skills required of competent workers as capable of being applied across a wide range of contexts and workplaces. Having said that, while there is considerable support in this report for these contentions, it also acknowledges one important point which arises often in the complexity theories, and that is the issue of predictability.

Whether intentionally or not the ACCI and BCA report acknowledged that employers do not know the exact nature of the skills that they and their workforce need, nor do they know when/how they would be applied or how individual or team competence against them can be assessed. They simply agree that there is a skills shortage thereby adding to the complex environment in which any solution to this problem must be applied.

While to some this might seem quite ironic, that while employers deride the fact that there is a skills shortage in Australia they cannot state exactly which skills are required, but to the complexity theorists this is quite natural as will be seen below. What is not found in this report, or in any other literature reviewed for this study, is the solution, and in particular how a systematic approach to training (such as CBT) that aims to develop pre-defined skills and knowledge can be most effective in not just a generic sense but also in complex environments. This leaves a gap in our understanding of the way in which learning, for example, occurs outside of that which is traditionally achieved through systematic training conducted in the equilibrium of stable and uncomplicated environments, and most importantly what can be taught and what needs to be learned through experience.

On the job learning is addressed in a more global sense by Stacey (2001), Stacey et al. (2002) and Svensson et al. (2002) whose studies infer that such changes may be needed. They argue that a formative approach to learning such as CBT (as we currently define it) is simply repeating what is already known and therefore lacking in novelty and self-emergence critical to the needs of fast-paced and ever-changing environments. Instead, they suggest, growth and organisational outcomes can be better achieved if a transformative approach is considered in which learning occurs naturally in the workplace and is being created as it is applied – with both the form of knowledge and its content constantly evolving out of a paradoxical process of repetition and novelty (Stacey 2001:60; Stacey et al. 2002:38).

Taken together, emerging from the literature is the argument that, because they are more and more being used to describe the context or environment within which individual and team skills and knowledge are applied, the theories behind complexity and chaos cannot be overlooked. This is particularly true when searching for answers to the question of how people can best learn and apply the skills and knowledge that

they need to be effective at any point along a continuum between equilibrium (stable or controlled environments) and chaos (uncontrolled environments). Stacey suggests that the answer appears to lie in the work of complexity thinkers such as Kauffman² whose research has found that organisations, and the individuals within them, can be self-organising to the extent where they can learn and grow ‘in the absence of a blueprint’ for doing so (Stacey et al. 2002:178). (For a detailed description of the genesis and history of Kauffman’s work see Waldrop 1993 and Kauffman 1995.)

In this we begin to find clues as to how individuals and groups can learn and grow even though they may not have been trained to do so, or their training was insufficient to meet their needs. Gibbons (1990:166) uses the term *natural learning* to describe such situations – learning that occurs when individuals spontaneously interact with their environment. Stacey (in Stacey et al. 2002:38, Stacey 2001:5 and Stacey 2004 pers. comm. 16 January), as was noted above, describes it as a *Transformative Teleology* – the creation, through interactions within the environment in which it is required, of knowledge and meaning that paradoxically remains consistent and yet has the potential to change at the same time.

While not explicitly using Stacey’s terminology, Scott (2000) referred to this phenomenon in a discussion on the importance of vocational educators and trainers possessing a wide range of skills and knowledge to address and overcome the ‘complexity, unpredictability and variability’ that characterises their work. While Scott was primarily referring to complexity and unpredictability as it emerges in new and ever-changing training or teaching situations, he firmly plants such situations in the context of changes within ‘organisational policy and procedures and demands that will arise from the rapidly changing industrial, economic, technological and political context of the 1990s’ (2000:44-45) – in other words the workplace (albeit that within which trainers work). It is therefore intuitively a small step to transpose such comments to organisations in general.

² Kauffman, in describing why flatter, decentralised organisations may, in his terms, ‘function well’, provides his own definition of organisational complexity. According to him, in such organisations are ‘ordered regimes where poor compromises for the entire organization are found, a chaotic regime where no solution is ever agreed on, and a phase transition between order and chaos where excellent solutions are found rapidly.’ (Kauffman 1995:247.)

Chappell (in 2002) emphasizes the dangers of overlooking the impact of complexity theories on education and training. In his RCVET Working Paper (2002-01) Chappell suggested that if the views of complexity theorists are to be accepted, VET research may need to take into account far more obscure aspects of the modern workplace than it has in the past (Chappell 2002). In his view the recognition that globalisation, increased dependence on information technology, the move away from material production to ‘information processing and cultural production’, and the ‘replacement of mass production principles with flexible specialisation and niche marketing’ (2002:3-4), means that the traditional way of working is no longer sufficient to meet modern demands for a more highly skilled, flexible and technologically/scientifically sophisticated workforce. Exactly what will meet these demands, however, and the impact that the complexity theories have on defining and describing this is clearly an area for further research.

If the definition of competency-based training (see Chapter One) currently accepted by policy makers and practitioners is to be retained whatever will meet these demands must be focussed on the workplace as the environment and context towards which all training is directed. This is the message that is very clear in the literature of the complexity theorists. According to them, however, is that the descriptions of the workplace must not rely on outdated concepts and linear management or business techniques. As was noted above, in both theory and in practice the workplace and organisational imperatives around which the traditional approach to training was developed has changed in too many ways to allow this, or to place any validity on the training approaches that continue to do so. By maintaining this focus it is possible to find exactly why workplaces are more and more being referred to as complex and chaotic, and how CBT can address the needs found there.

The importance of this was also expressed by Robbins, Bergman, Stagg and Coulter who pointed out (2003:278) that management thinking has turned away from the approaches espoused by Fayol, Weber, Taylor and the others and is now accepting that organisations today are expected to achieve far more than systematised and organisation-specific goals and objectives. This, however, is not a recent revelation. Much earlier, while advocating a quasi-systematic constructivist approach to explain organisational phenomena, Milton, Entekin and Stening (1984) suggested that

management even then was no longer of individual roles and activities but of a system of inter-related functions and tasks that have an impact on each other. Senge (1995:7), a decade later, agreed adding that it may take years to fully show where and how such an impact occurred. While Milton et al. may have been ahead of their time with this contention, other postmodernists (e.g., Drucker 1999, Senge et al. 2005, and de Geus 2001) enhanced this with the argument that within these systems decision are made intuitively, collaboratively and interactively demonstrating that management today is not just concerned with change but also the creation of change if their organisation is to stay competitive and innovative.

Boreham and Samurçay (1999) and Fulmer (2000) explain it this way: Technological and organisational changes, including integrated planning and flatter hierarchies, are seeing management placed in a position where many have eschewed the role of controller of their work teams taking up instead the function of supporter or ‘troubleshooter and facilitator’ (Fulmer 2000:188). Such an approach allows for and encourages a shared understanding of both the work and the needs of the organisation that Sandberg (2000a) and Chappell (2003) describe as collective competence, the competence of the whole – not as a multiplication of individual competence but as an expanded enhancement of each.

Collective competence is defined by Young (2003:8) as the ‘interaction between several people engaged in the same activity, each contributing a specific and differentiated individual competence, based on a shared understanding of the collective work and goals’. This does not deny a place for individual competence: It in fact enhances it. As Gerber (2000:75) states: ‘Workers develop their own vision of the job to be done by developing a capacity to organise their knowing in a way that produces value (and by being able to) see the organisation as a whole to obtain the big picture from ‘outside in’.

In sharing their understanding of what needs to be done – and how – workers (and here it is assumed the definition includes managers and employers as well as employees) are capable of individually and collectively driving and reacting to continual change in both their workplace and the way the work is done. Organisational observers such as Haeckel (1999:114) and Vaill (2000:xxiv) contend that the need to adopt a more inclusive approach to the way in which work is carried

out has come about because productivity has moved from a position of 'make-and-sell' to one of 'sense-and-respond'. Here, organisations have replaced the traditional approach of creating a product and then finding clients to buy it with greater emphasis on sensing/identifying market needs (and, where appropriate, global market needs) and speedily responding to them – an objective that can only be achieved when command and control, or top-down, management is reduced or removed.

When considering the actual makeup of the workforce itself, Fulmer (2000:162) and Robbins et al (2003:77) acknowledge the emerging importance of the increasing workforce diversity to managers and their ability to achieve organisational objectives in an uncertain business environment. Such diversity, according to Olson & Eoyang (2001:35-36) brings a 'rich tapestry of experience, insights, backgrounds, and cultures' to shape the organisation's productive patterns. Ignored, it has the potential to disrupt the traditional organisational processes, but when embraced it can generate self-organising change and continuous transformation of individuals, processes, groups and organisations.

A post-Karpin research project conducted by the Mt Eliza Business School (Hubbard Samuel, Heap & Cocks 2002:212) supports this, finding that the most successful organisations in Australia promote a team-based approach where the emphasis is not on individual or cultural differences but on the creation of a team that fits the organisation's culture where attitude is more important than background. This need to accommodate different cultures and lifestyles within the workplace, however, is not necessarily a new requisite for managers, simply one that reportedly must be given greater emphasis if organisations are to achieve their objectives in the most effective and efficient way.

Further, as Robbins et al. (2003:50-52) points out, this is not just an Australian phenomenon but one that affects our international trading partners as well. For example, increased immigration in Italy, de-bureaucratisation of management in Asia, greater female participation in the Japanese workforce and an ageing labour market in Germany places increased pressure on workplace reform and management competence to manage and direct it. Such issues have a major impact on the way companies react to market pressures in these countries and the way business is run

there. As Svensson et al. (2002) found, some embrace diversity and learn to adapt and grow while others actively or unconsciously resist it and eventually stagnate or die.

One organization that did successfully adapt was Semco. Ricardo Semler, in his controversial book *Maverick!* (Semler 1993, 2003), describes how he all but handed over control of this company to his staff with the instructions to find out for themselves the most profitable way in which to run it. While roundly criticized in the press for doing so, between 1994 and 2001 Semco increased its annual revenue from USD\$35 million to USD \$160 million, went from 90 employees to 3,000, and opened manufacturing plants in three overseas countries (Semler 2003).

Semler describes an organization that fits the models provided by the complexity theorists. The employees to which Semler handed over his business had never run a company, but then again neither had Semler, so not only had they to learn business and marketing skills while at the same time continue to run a profitable business, so too did he have to learn how to take instructions from his subordinates.

Even as a multi-national organization Semco appears from the literature to continue to be run, and run successfully, along these lines, and adding to the complexity of the environment in which it operates, is this multi-nationality – something that all organizations at some time or other must contend with. This multi-nationalist view of industry, along with a widening of the marketplace (with, for example, the implementation of the Free Trade Agreement with the USA in 2005), is also adding another dimension to the complexity of objectives that organisations are today seeking to achieve. One, in particular, is related to the way in which organisation's are beginning to measure their success.

The concept of triple bottom line reporting has been adopted, according to a recent Pricewaterhouse Coopers report (SriMedia 2002), by over two-thirds of the multinational companies in Europe and nearly half in the USA. Such an approach sees organisations commit to continuous accounting for progress not only on economic terms but also those of social and environmental importance – an approach that is recently being taken up in Australia (see, for example, the Department of Environment and Heritage 2003).

This widening of an organisation's range of success indicators moves it beyond simple quantitative measurement of progress to one of measuring continuous improvement in a qualitative sense. For example, coupled with the transition to a 'sense-and-respond' business paradigm mentioned earlier, Fulmer (2000:37-38) and Collins and Porras (2000:9) tell us that a 'life science model' (as Pascale et al. 2000:3 describes it) is emerging in the workplace as a reaction to the complex working environment found within certain organisations. In such a model individual and group skills and knowledge grow and multiply faster in comparison to other organisations and individuals with whom they compete for promotion and recognition (internal) or market dominance (external). In other words, the complexity theories may, in themselves be just theories but from an organisational point of view they are reality.

While the contentions made in literature described above appear to suggest a motive for encouraging and supporting individual and collective learning that emerges naturally within the workplace there is no discussion on the relationship such learning has with training. As noted in Chapter One, Boshyk (2000:6-7), for example, records an incident where an analysis of an organisation's MBA program showed that only 50 percent of the knowledge gained during the program was appropriate to current organisational problems at its conclusion, four years later only 25 percent was applicable and after six years this figure had been reduced to 12.5 percent. A similar study reported in Pfeffer & Sutton (2000:3) found that 73 percent of MBA graduates surveyed said that they used the skills learned during their studies only 'marginally or not at all'.

Also, in a review of recent Australian research, Moy (2001:51-52) found that only 20% of training is actually transferred to the workplace, while a survey by the Australian Chamber of Commerce and Industry (ACCI 2004) contends that the number one concern of business is not a shortage of skills or people willing to work but a shortage of people with the right skills – skills that are relevant to the modern workplace.

This degradation of skills and knowledge (or its ongoing replacement by other, more relevant skills and knowledge) is not uncommon emphasising the fact that initial learning is only transient: Ongoing and continuous individual and collective learning and understanding is the key to maintaining individual growth and organisational

prosperity. In this, support appears to be given to Stacey's contention (2001, 2004 pers. comm. 16 January) that transformative learning is more appropriate to complex workplaces and the assurance of an organisation's longevity and success.

A more satisfactory way of describing how this may occur is through the words of the complexity theorists, and in particular Olson & Eoyang (2001:118), Stacey et al. (2002:111) and Snowden (2002:6). In their view the interactions or relationships that grow between individuals and groups (usually referred to in biological terms as organisms) as they grow in stature or skills and knowledge see new forms (i.e., levels of knowledge and capability) co-evolve either through individual and/or organisational growth or through the subsumation of competition.

This constructivist neo-Darwinian concept of the survival of the fittest doesn't treat the new form (organism) – individual or organisation – as the desired end-state but as a platform for further and constant adaptations and growth as the changes impact on the organism's environment and the biology is repeated. In other words, as Pfeffer & Sutton contend (2000:6), people learn far better by doing than by 'reading, listening, or even thinking' or by being 'trained'.

Because innovative approaches to making this happen can be found just as much at the lower levels of the organisation as at the top, according to Butlin & Carnegie (2001:127) learning undertaken within the organisation must also be collective and carried out at all levels if it is to achieve the outcomes the organisation desires. It also implies that the learners need to take an active role in identifying and achieving new learning without waiting for their needs to be identified by some external agency.

Consequently, as Svensson et al (2002) have found, for an organisation to achieve the status of 'sense-and-respond', training to achieve – and learning to apply – competence in the workplace needs to move beyond skills and knowledge as they have been traditionally defined (i.e., in terms of efficiency and reliability as Olson & Eoyang [2001:2] suggest) and reflect the realities of that workplace. Only then will it be accepted by learners as important to their mental model and, as a consequence, be applied in the achievement of individual and organisational goals and objectives. This does, however, raise the question of whether or not it is possible, given the earlier

discussions on complexity, to design competency-based training strategies to achieve it.

From the literature reviewed in this study it is clear that that the image of the workplace being a relatively stable and controlled environment for which predictable and replicable skills and knowledge can be taught is not tenable. The workplace is, according to contemporary studies, fast-paced and ever-changing, and outcomes are no longer predictable or determined by a 'make and sell' business ethic but one which centres on 'sense and respond' – in other words staying ahead of the customer's needs, not behind them. As far as long term organisational survival goes this is a concept equally as important to the public sector as it is to the private. Consider, for example, the transition from the Department of Supply as the government's principle contracting arm for, inter alia, defence procurement. On becoming a prescribed agency (one responsible for generating income separate to a government-supplied budget) it eventually evolved into the Australian Defence Industry (ADI), firstly a government-preferred supplier but today just another private company tendering for government business along with other defence suppliers. It is interesting to note that the Defence Materiels Organisation, originally a branch of the Department of Defence, is as of 1 July 2005 a prescribed agency and as such is now even more concerned with its clients needs than ever before.

While contemporary literature regarding the nature of work and business processes do not explicitly describe complexity as a factor that plays a role in the achievement of strategic or operational goals and objectives, Schildberger (2000), Semler (2001, 2003), Marsh, Mcallum and Purcell (2002), Underwood (2002a, 2002b), Heinrich and Betts (2003), Forsberg, Mooz and Cotterman (2005), and Nickson and Siddons (2005) in particular recognise in successful organisations those issues and business scenarios that demonstrate environments that are emergent, self-organising and unpredictable. Aside from the traditional and linear management activities of marketing, finance control, and business planning, these issues can be summarized as the following:

- the degree to which senior management, through policies and guidelines or simply by direct involvement, micro-manage daily tasks;
- the degree of predictability in daily tasks;

- the nature of short and long term goals and objectives, including the objectives of daily tasks – fixed or flexible, set around the needs of shareholder or clients;
- the degree to which client needs and demands change or remain relatively stable (including the degree to which clients know and understand what their needs are);
- the daily patterns of work – production line or unpredictable;
- the way in which decisions are made and risk taking supported; and
- the role and make up of teams, their degree of independence and the way they interact.

Nickson and Siddons (2005) in a study on project disasters highlighted the failure to understand and appropriately address these as the reason why so many projects either fail to achieve their objectives or result in significant losses in profit, reputation or human suffering. Their findings are that it is not the degree to which these factors impact on the possibility of successful project and business outcomes, for chance and serendipity will always determine that, but a failure to adequately and effectively deal with them before they become a major problem.

How does this impact on the way in which competency-based training is developed and applied in Australia? On two levels: Firstly, implicit in management training programs used throughout the national VET system such as the national training package for Business Services (IBSA 2004) or the previous Frontline Management program, is the notion that the application of a predictable standard of performance based on the models handed down since Fayol and Taylor is sufficient for workplace competence. This is not supported by the literature reviewed for this study. On the other hand, the literature does not imply that such models are wrong – merely that to be competent in the environments described by the complexity theorists another, less predictable, range of skills and knowledge is required. The ACCI and BCA report (2002) has attempted to define what these are, primarily from an employability point of view (and, more importantly, from the perspective of skills and knowledge that may be taught at school), but even the primary client group of such an effort, the potential employers of those possessing such competence, are themselves not sure of

what they want thereby raising more questions out of the report than those which are answered.

Here the question still seems to be one of predictability – predicting what skills and knowledge individuals and teams need to be trained in to competently address the issues that arise out of a more proactive approach to business and client needs. Given that the way in which a competency-based approach to training in Australia relies very heavily on a definition of competence that infers previously determined skills and knowledge can be applied in unknown contexts and environments, it appears to be important that the notion of predictability be also investigated to determine what, if any, impact this has on the way in which CBT is applied.

2.5 A QUESTION OF PREDICTABILITY

On the surface of it, the above appears to contradict contemporary thinking wherein the skills and knowledge needed ‘to perform effectively in the workplace’ (ANTA 2003e) can be predicted and defined as levels or standards of workplace behaviour to which others can perform. In Australia these are described in standards of competence (competency standards) and since 1991 when their development was adopted as an integral component of the national training reform, a variety of research methods have been used to define and articulate them

Such methods included DACUM (Developing a Curriculum), Critical Incident, ‘modified’ functional analysis techniques (see, for example, Ash, Gonczi & Hager 1993), or occupational analysis (Smith 1998:122) based around what job holders are currently doing in certain vocations or professions. They are modelled on the skills and knowledge applied by, ostensibly, competent performers in similar vocational or professional fields. Such models are then used as the basis for formal competency-based training and subsequent assessment programs. (See, for example, the definitions of competency, competency standard and competency-based training provided by the Australian National Training Authority – ANTA 2003e.)

As the competency standards developed as part of the national VET system are attempts to capture the skills and knowledge that others have demonstrated as being

appropriate to similar situations and contexts, the implication is that future needs insofar as skills and knowledge goes can be predicted based on what others have done in the past. Also implied is that people can be trained to a level where they are sufficiently competent to replicate and therefore apply such a level of performance (i.e., replicate that performance upon which the standards are modelled) in the workplace.

While a number of references are made in the literature of the purposes to which competency standards are put (see for example Fletcher 1991, 1995, Simosko 1991, 1992, 1994 and Clark 1993) there is no empirical evidence in the literature to support implications such as these, either overseas or in Australia. In fact, one review of the concept of competence as applied by clerical and administrative workers concluded that the approach taken to defining the skills and knowledge that underpinned their training was not in line with the emerging needs of a modern and technologically sophisticated workplace (Gerber & Velde 1996, 1997). This supports the contention made by Velde (1997:21) that what was needed when defining workplace competence was a more 'enlightened' view of the subject that is 'multi-faceted and holistic in nature', and adopted over an individual's working lifespan because of the 'rapid changes occurring in our environment. . . continuing shift to an information society . . . internationalism . . . micro-economic reform and the changing workplace'.

Svensson et al. (2002), on the other hand, found in their research that to effectively achieve their desired objectives many of the companies studied had to integrate pre-defined competency standards throughout a range of HR processes (e.g., training and development, human resource management etc.). To this they added ongoing support through management coaching and mentoring which in turn assisted in the further identification of what individuals and teams needed to learn to continually grow in parallel with the needs of their workplace. While doing this, however, it became clear that there was still a need for 'innovative learning that could not be restricted to predetermined competencies' (Svensson 2002:11). In their research the character of the work situations studied:

'...to a large extent invites creative and developmental learning. However, the learning tended to have an accidental "critical incident" (sic) character. Learning to adjust to and handle the immediate situation was dominant, especially in situations coloured by time pressure and hectic work pace...The

often tight time limits for delivery of results of projects and parts of work is to a certain extent experienced as a challenge and is stimulating learning, but to a far too large extent they prevent reflection over and integration of what is learned into the competence of the employee and the organisation.’ (Svensson et al. 2002:13)

‘What seemed most stimulating to learning of the creative and innovative kind was the developmental character of the work, especially in relation to customers and co-operation with others in solving new problems.’ (Svensson et al. 2002:17)

One of the basic tenets of competency-based training is that it is designed around standards of performance that, it is expected, individuals will be able to replicate on their return to the workplace therefore making them ‘competent’ workplace performers. The contentions put forward by Gerber and Velde, and Svensson et al., however, appear to question the appropriateness of relying solely on these as determinants of workplace competence. This is beside the point noted earlier by Gilbert (1978), Smith (1998), Gonczi (2000), Stacey (2001) and Snowden (2003) that the behaviourist approach to training, typical of the way CBT is applied in Australia, does not always focus on the correct behaviour in the first place.

While little guidance exists in the contemporary literature on how to analyse and write these standards (except, for example, NTB 1992, 1995, Rutherford 1995a, 1995b, 1997, EHPS 589: Unit notes 1998, Gonczi & Hager 2000, and ANTA 2003f) it is generally accepted that their contents are based on ‘best practice’ as performed by experts or leading practitioners in the field concerned. Aside from the predictability issues and the actual behaviour being modelled, this raises the question of whether or not past behaviour *is* an ideal model upon which to predict future competence.

This is a question that is still being debated. Those studying the science of complexity and complex adaptive systems (e.g., Stacey 2001 and Stacey et al. 2002), for example, contend that it is not possible to predict future behaviour based on past behaviour. To them this is something that simply can’t be replicated – even by the person who demonstrated such behaviour in the first place. The evolving contexts and ever-changing environments simply won’t allow it. Business analysts (such as de Geus 1999, Haeckel 2000, Underwood 2002b and Nickson & Siddons 2005) also contend that such predictability is not possible. Their argument is that the ever-changing and unpredictable needs of clients and the society within which organisations exist means

that the most critical aspect of competence, the environment and context within which it is performed, also changes over time – and sometimes at alarmingly fast rates. This means that even if the performance itself could be replicated (which, according to the literature, it cannot) the environment within which it is performed, and that which makes the competence real, also cannot.

All of this is aside from the fact that any decision to model past behaviour has got to firstly answer the question as to whose behaviour is to be modelled. Weick and Sutcliffe, researchers from the University of Michigan Business School, contend that the general assumption that successful past behaviour equates to replicable future competence is setting the scene for ‘complacency, inattention and predictable routines’ on the part of those who model it. As a result such complacency can lead to an increased likelihood that events outside of the previous experience can go undetected and ‘accumulate into bigger problems’ (Weick & Sutcliffe 2001:56)

On the other hand there are those who say that it is possible to predict what individuals and teams will do (see, for example, Senge 1995 and Senge et al. 2005), but only so long as the context and the environment within which such performance is to be replicated is accurately predicted. This point is responded to by Stacey et al. (2002) who contend that contexts and environments also change therefore the suggestion that they too can be replicated is also quite problematic.

The work of Kurtz and Snowden (2003), however, straddles both sides of the argument. Their contention is that, on the one hand, predictability is not assured simply because it is not possible to predict the environment or context within which any performance is expected to be carried out but, on the other hand, predictions can be made. In this case the prediction is that while the context and environment may well be unknown (but can be learned), *something* will occur that will necessitate individuals and teams having to learn how to analyse whatever it is that is occurring and, in doing so, learn how to address issues that arise out of it. They contend that people won’t simply sit on their hands and do nothing because they have been confronted with a situation with which they are unfamiliar, they will do something but in doing it they will not only be validating the actions they’re taking but will also be creating change to and within the context or environment in which they are doing it. This, in turn, will be encouraging further learning and skill/knowledge growth.

Turney, Whitley and Anderson (1996) looking closely at the implications of the Baldwin Effect (i.e., the notion that lifetime learning can, in some individuals, accelerate evolution) suggest that in doing this ‘something’, genetically knowledge and capability grows simply because the environment changes as people try to figure out for themselves what they should do to address emerging situations with which they are unfamiliar (a point supported strongly by Kauffman 1995 and by both Darwin and Lamarck, from which Darwin drew many of his ideas. See Pascale et al. 2000:33 for a broader discussion on this). de Geus (1999:30) gives an example of this where managers, seeking to reduce uncertainty and be better prepared for the future, avoid questions such as ‘what will happen to us?’ and instead concentrate on ‘a more useful question: what will we *do* (sic) if such-and-such happens?’ This is a simple process known in project management fields as risk management (see Nickson & Siddens 2005 for an explanation and examples of this).

Kauffman (1995) describes this as a co-evolutionary process that sees species evolve and grow through, *inter alia*, the interrelationships that occur naturally within their immediate environment. Others such as Lave & Wenger (1991), Wenger (1998), Stacey (2001) and Shaw (2002) have found similar patterns in human and organisational learning where emergent and co-evolving knowledge occurs naturally in the workplace. This is also supported by the contention by Sandberg (2000a; 2000b) and Targama and Sandberg (cited in Carlson and Larsson 2004) that collective competence grows through interactions with others and shared understanding of the work and the environment. The application of skills and knowledge sees new knowledge co-evolving and, in turn, changing the nature and pattern of what was previously known and what, in the future, must be known to be effective in such a workplace.

How this relates to the application of a competency-based approach to the training of individuals and teams to be most effective in such situations is the notion, expressed by Gonczi and Hager (2000), that competence involves the application, and not just the possession, of skills and knowledge in the workplace *and* within an environment in which others are also applying their skills and knowledge. This therefore raises the question of whether or not competence is more correctly attributed to the application of skills and knowledge and not simply the possession of the skills and knowledge

themselves. That even when individuals don't know what they should be doing, or how, the fact that they are doing something to learn what they need to know to apply whatever skills and knowledge they have or are gaining is more important to the notion of competence than just the possession of the skills or knowledge. In this respect, are the skills and knowledge that individuals are taught, especially those that are modelled on what others have done in the past, irrelevant to the concept of competence? This is an interesting question because if the answer is 'Yes' then it implies that the skills and knowledge that must be taught are not necessarily those associated with doing a particular task (because there is a high probability that the skills and knowledge needed to do so are modelled after the actions of others) but those more closely aligned with learning what the task is that must be carried out given certain conditions and environments.

From the literature regarding complexity and chaos we find a clue that competence, that is the skills and knowledge to 'competently' do one's work, may not be an outcome (as defined by ANTA) but a process – a process of taking knowledge (e.g., knowledge of how to do something, including learning how to identify what needs to be done *and* learning how to do it) and adapting it to current and emerging situations and needs. Or, as Svensson et al. (2002:11) describes it: 'innovative learning that could not be restricted to predetermined competencies'.

The skills may not be current (and, in fact, won't be if we accept the complexity theorist's notion that it is not possible to predict, and therefore train people in, the skills and knowledge needed for future events or situations) and may not even be wholly related to the situations in which the individuals find themselves – but the act of adapting these skills to address emerging issues is the real competence.

Although Velde (1999:439) contends that competence has traditionally been regarded as behaviourist and in terms of 'individual attributes or a discrete set of tasks to be performed', this cognitive aspect of competence was a concept that the National Training Board attempted to address when defining the skills that constitute competent performance in the workplace. Being able to transfer one's skills to new and emerging situations and contexts, and using new knowledge to overcome problems as they arise, for example, were two critical elements of competent performance described by the NTB in its *Policy and Guidelines* (NTB 1992). (For a

further description of these elements, and examples of where and how they have been applied, see Rutherford 1995a.)

While critics of the NTB's approach to competency-based training such as Gonczi (1994, 1998) and Gonczi and Hager (2000) correctly point out, this definition has never been adopted in full as part of the national VET system, it does provide a guidance for the way in which CBT could be developed and implemented in such a way as to influence not just the skills and knowledge that individuals and teams apply on the job but the growth of knowledge of how to constantly evolve the scope and form of these skills and knowledge in self-emergent ways. This is very similar to the interpretative-relational approach to competence that Sandberg (cited in Velde 1999) suggests is formed by individuals actively engaging with their work and the workplace environment and, in so doing, becoming better able to make sense of their tasks and learn by them.

Having said that, Stacey (2004 pers. comm. 16 January) would argue that this still doesn't go far enough. That situating one's work within an environment that itself informs the nature and scope of the skills and knowledge needed to do that work is only part of the equation: What must be also considered is the context of that work which itself is under perpetual construction. This once more emphasises the issues of unpredictability that must be considered when defining the impact that the complexity theories have on the way in which competency-based training is applied in Australia.

How then is competency-based training applied in Australia and what impact does the complexity theories have on it? Having highlighted the issues concerning the complexity theories that emerge from the literature, we must now investigate the way in which CBT is applied in Australia if the impact of these theories is to be fully exposed. From a review of the complexity literature it appears that one of the most significant areas in which such an impact may emerge is not in the processes that guide the development and application of CBT but the definitions that underpin it. To explore this further a clearer picture of the way in which the application of CBT in Australia is described must also be explored.

2.6 COMPETENCY-BASED TRAINING IN AUSTRALIA

Literature regarding competency-based training in Australia is primarily concerned with its introduction and application in support of a national VET agenda. The suggestion, however, that the VET sector is the only environment in which CBT is practised is not supported by the literature. Smith E, Hill, Smith A, Perry, Roberts and Bush (1996), Tovey (1997), Smith (1998) and Rylatt (2003), for example, describe the application of a competency-based approach to training in general terms and not solely within the domain of the VET sector. Simons, Meyers, Harris and Bloms (2004) also report that in Australia key elements of the VET sector were adopting CBT long before reforms were being carried out to vocational training.

Nevertheless, while most research literature is still concerned with CBT as it is currently applied in the VET context, recent studies have focused on issues as diverse as the theoretical underpinnings of competency-based assessment (see, for example, Gillis, Griffin, Trembath & Ling 1997), the application and use of national training packages (Smith E. et al. 2004, Schofield and McDonald 2004), and emergent learning in complex adaptive systems (Chappell 2002, 2003, Simons et al. 2004). In this a new field of enquiry is emerging into what a competency-based approach to training might potentially achieve if it is viewed in the light of theories that, traditionally, have been found not only in the field of training but also in other fields such as social and biological studies.

At this point it is important to recall that CBT, or training designed to achieve work-related outcomes, is not a new phenomenon, nor was it created solely to support vocational education and training. It is, in fact, borne out of a wide range of theories about how individuals and teams learn the skills and knowledge important to their needs at any given time.

According to Knowles (Knowles et al. 1998:22), for example, the roots of workplace training can be found in two discrete theories: the *behaviourist/connectionist* theory (what people do and their motivation for doing it) and the *cognitive/gestalt* theory (how and what people learn). The competency-based approach to training, as it is applied in Australia, according to many commentators (such as Bowden n.d., Galloway 1976, Bass & Ryterband 1979, Merriam & Caffarella 1991, Bowden &

Masters 1993, Smith 1998, Somerville 2000 and Svensson et al. 2002) is drawn predominantly from the behaviourist field and leans very heavily towards such behaviourist traditions as the classical or stimulus-response theories of Watson and Pavlov and the concept of instrumental or operant conditioning of Thorndike, Watson and Skinner.

As Huitt and Hummel (1997, 2003) tell us, this approach emphasises that training is centred on the adoption of an attitude of learned responses/consequences, that particular stimuli (although Skinner did contend that such stimuli can include the environment) consciously or unconsciously triggers a predetermined response. Because CBT aims to achieve predictable outcomes it could be argued that it too is based on an if/then causal relationship (see, for example, the definitions of competency-based training and competency standards given in Chapter One). While not necessarily at the level of conditioned response demonstrated by Pavlov's dogs, the expectations of a competency-based approach to training does define the way in which tasks and activities are to be carried out if one wishes to be deemed 'competent' at that task and obtain whatever benefits such a determination might bring (e.g., licence, right to work in certain industries, qualifications, certification, employment etc.).

Clearly this is a cause and effect approach to training and as such it has attracted its critics wherever, and for whatever purpose, it has been employed. Gilbert (1978), for example, was one of the earliest exponents of the need to concentrate any competency-based approach to training on the outcomes of behaviour and not the behaviour that causes these outcomes. In Australia, Smith (1998) and Gonczi (2000) contend that failure to do this has resulted in training that tends to focus too narrowly on behaviour and, as complexity theorists Stacey (2001) and Snowden (2003) later suggest, often the wrong behaviour at that. The contention of these theorists is that in the human world training that seeks an if/then predictable outcome is in reality designed around a relatively low level of processing that emphasises the way in which learning is carried out more than the outcomes to be achieved and, moreover, incorporates little or no problem solving or individual mastery on the part of the learner, a point that Senge expresses in his descriptions of a Learning Organisation (1999; 2006).

To theorists such as Stacey and Snowden (and later Streatfield 2001) and business commentators such as Senge, any process that aims to achieve a cause and effect, especially when that effect is predetermined, is doomed to failure because of the unpredictability of not just the final state but also of everything that happens along the way. They therefore reject the notion of such control and that the extent and outcome of any form of knowledge creation and learning can be predicted.

Where the confusion arises is in the definitions given in Chapter One of competency-based training and competency standards (ANTA 2003e). These describe an approach designed to enhance workplace performance through the conduct of training that is centred on the achievement of predetermined outcomes that occur as a result of the application of predefined skills and knowledge that have no other purpose than such an achievements. It could be argued that these definitions promote an 'if/then' relationship between training and response and are therefore at odds with the complexity theories described above. Furthermore, while they are still favoured by those involved in the national VET system, there are suggestions that these definitions, and their application, do not go far enough (see, for example, ACCI & BCA 2002). None of them, for example, acknowledge the role that subsequent on the job learning plays in validating the skills and knowledge taught (or already possessed) nor of the way in which the environment in which they are applied can both enhance and at the same time make redundant an individual's competence, points strongly argued by the complexity theorists as critical to understanding workplace dynamics.

Lest it be felt that the only critics of the way in which competency-based training is applied are those found in the training or complexity fields, there are others whose research in separate but complementary areas have opinions that should be brought into the discussion. Sociologists and social anthropologists Lave and Wenger (in, for example, Lave 1988, Lave & Wenger 1991, Wenger 1998, and Wenger, McDermott & Snyder 2002), for example, add to the debate their contention that the context and environment in which all training situates the skills and knowledge being learned are equally as important to the learning as the skills and knowledge being imparted. Therefore, whether behaviourist or cognitive in its roots, and whether gained through training or the interactions that occur naturally on the job, Lave and Wenger contend that learning is constructed within the boundaries set by the context within which it is

being applied. In other words, the context and environment are of greater importance to the learning content than are the content of the training curriculum or the way in which it is taught. When taken out of context (and today this ‘context’ is increasingly being seen as complex and chaotic) Lave (1998) and Wenger and Snyder (2001), agree with the complexity theorists (in particular Stacey 2001 and Snowden 2002, 2003) that learning is meaningless and ineffective when it comes to achieving real outcomes.

Other studies expand on the impact that the context and environment have on those learning job-related skills and knowledge. Martin (1997a), for example, describes two theories of learning that have arisen over the past few decades which in his opinion are important to the way adults learn: *Constructivism*, emerging out of the studies conducted by Piaget and Vygotsky and defined by Seymour Papert, and the *Transformative Learning Theory* developed by Jack Mezirow. This latter theory is based on Mezirow’s perceptions that ‘it is not so much what happens to people but how they interpret and explain what happens to them that determines their actions, their hopes, their contentment and emotional well-being, *and their performance*’ (Mezirow 1991:xiii). (Emphasis mine.)

In presenting these two theories Martin contends that both seem to place importance on personal meanings, past experiences and the social context within which learning is taking place. He does point out, though, that:

‘Papert, whose background has been in the study of how children learn, gives more attention to “local” (sic) events and the constructing of new knowledge within old frameworks. In contrast, Mezirow whose focus is on the study of how adults learn, is more concerned with the “transformative” (sic) nature of learning and the re-constructing of old knowledge into new frameworks.’
(Martin 1997b:3)

Mezirow’s theory in particular is of interest because it describes a learning phenomenon that is ‘transformative’, a concept that Stacey (2001) has explored in the context of a teleology described in section 2.3 above.

A similar conclusion has been reached by those studying work-based learning from an educative point of view. Gerber (2000:86), for example, in a study of the role of on-the-job learning as a critical means of gaining work-related competence, suggests that

the outcomes of a learning experience 'are not isolated from the process of the experience', that the context is equally as important to understanding and competence as the skills and knowledge being learned. The outcome of doing so, according to Gerber and Velde (Gerber & Velde 1996 cited in Velde 1997:21) is competence that is 'multi-faceted and holistic in nature' and not simply aligned against a single task or activity.

Aside from the emphasis placed on context by the complexity theorists and sociologists, its importance to the competent application of an individual's skills and knowledge also appears in literature concerned with describing it from a business point of view. Boshyk (2000), for example, describes context as critical to the achievement of work related goals and objectives and reveals a clear proposition that, when tied to business outcomes, training can make a major contribution to productivity and their achievement.

Boshyk illustrates this with a description of the ways in which several large multi-national organisations adopted a competency-based approach to their training and through this achieved far greater organisational outcomes than were previously possible. While Boshyk's study was funded by the organisations themselves and, because it was for public consumption, may have within it a certain degree of bias, others have noted similar positive outcomes. Szilagyi and Wallace (1980), Billett and Cooper (1998), Chappell (2003) and Smith et al. (2004), for example, contend that in most organisations such an approach achieves a number of outcomes. Included in these are enhanced global competitiveness, greater flexibility in the workplace and responsiveness to change, and increased productivity, innovation and competitiveness, all of which can be delivered in complex and chaotic environments. While promoting a scenario that places training in a very positive light, there is a difficulty in accepting these contentions – they are offered without any verifiable evidence of where such achievements are made.

While these and other contentions indicate that positive business objectives can be achieved through the application of training interventions, there is no wide spread of evidence in the literature that in Australia such objectives are actually being achieved by the application of a competency-based approach to the way in which staff are

trained. This, in itself, does not negate the argument that the workplace has a significant role to play in the training requirement for competent performance in complex environments because the fact that there is no evidence in the literature might not be caused by it not being found – it may be that it simply has never been properly sought.

There is a lot of anecdotal evidence in the literature but little empirical evidence or hard case studies showing where and how objectives at any level of the organisations being studied are achieved. Hager (1997:16), for example, lists several ‘discrete benefits’ of work-related training identified in a number of case studies carried out on behalf of the National Council for Vocational Education and Research. Again, such benefits provide a great deal of promise for others considering such an approach to training but they are offered on face value only. There are no figures depicting growth or enhanced profitability and no empirical evidence showing where and how increased innovation or greater productivity has been achieved. As a consequence of reporting such as this, Schofield & McDonald 2004 express doubt that such objectives have been achieved or, in fact, that they could ever have been achieved.

This is not to say that such achievements have not been, or could not be, made: it is just that the evidence is not there. Where there is quantifiable evidence is in the research that details outcomes achieved overseas (predominantly in the USA, England and Europe) or examines international research for lessons that may be transferable to Australia (see, for example, Smith 2001 and ACCI & BCA 2002), but again digging deeper into the professed achievements reveals little primary evidence.

One exception to this is a study conducted by Blandy, Dockery, Hawke and Webster (2000) and reported in Smith (2001) who attempted to replicate a return on investment study conducted in the USA. The outcome of this study was a report that while there was a general feeling of satisfaction by study participants in the level of achievements resulting from training, it was also felt that in-house and informal training were superior to formal classroom training as the latter was seen as ‘mostly about obtaining paper qualifications’ (2001:68-69). Could it be, therefore, that outcomes that show externally designed and conducted training in a less than favourable light are encouraging researchers to not look in the first place?

While a significant amount of data has emerged from such studies they appear to be aimed at answering academic questions (e.g., the number of people undertaking certain training within the publicly-funded training sector) rather than those important to an organisation's – or even an industry's – business and strategic planning. There is no apparent interest for example on the part of business to evaluate training as a means of enhancing, or even contributing to, productivity or organisational growth despite such perceived benefits stated elsewhere as being achievable. The rationale, therefore, behind the contentions that training achieves organisational outcomes is unclear when from the literature this appears to have been rarely tested either by those responsible for the 'system' or by the organisations themselves.

What is not clear is whether or not this perceived lack of concern by organisations is because they lack interest in how individual skills and knowledge contribute to collective outcomes or are unsure of the benefits that could be obtained from the discovery of such a causal link. This appears to be behind the contention put forward by Billett and Cooper (1998) and Figgis (2001) who found that few organisations have an interest in determining or evaluating a causal relationship between training and the achievement of organisational outcomes such as those described above. An example of this was given in a study carried out by Figgis in which the organisation analysed is reported as having considered the outcomes of training but were looking for:

‘. . . **proximal** rather than **distal** effects – and they described the impact of training/learning in terms of things they could directly observe. They did not of their own accord look for traceable connections to the enterprise's overall profitability or productivity.’ (Figgis 2001:104.)

While this is not an Australian study the key point that Figgis was making is that if there is an interest by industry in determining a causal link between training and the achievement of higher level objectives this appears to be about as far as it goes. In the main it appears that the majority of such studies described in the literature, and in particular Australian studies concerning the role played in their affairs by the national VET system, have not been carried out by the organisations themselves but by academics and dedicated researchers who do so on their behalf or, more frequently, on behalf of an external body such as the Australian National Training Authority seeking answers to questions only the commissioning agency would ask. The review of VET

research carried out by Smith (in Smith 2001) has within it only one recorded study of an analysis being conducted within an organisation – the remaining studies are either reviews of other research or hypothetical models developed as the basis for further studies.

A clue as to why this phenomenon exists can be gained from Billett and Cooper's contention that while organisations accept that training can 'contribute to' achievements at an immediate workplace level (e.g., improved customer satisfaction, workplace relationships, introduction of new equipment etc.), these are 'unintended or unanticipated' results, not planned outcomes (Billett & Cooper 1998:70-75). In other words, a positive outcome from the application of individual skills and knowledge is seen as accidental and not necessarily part of an overall plan. Moreover, there is a recognition that any achievements made in the workplace are not as a result of individual endeavour but of a collective effort made on the part of teams.

Chappell (2003) and Boreham (2004) agree. They argue that in many cases competence in the workplace is collectivist and should be regarded not in an individualist sense but as an attribute of groups, teams and communities. Moy found similar results in an earlier study. Here it was shown in a review of contemporary research that even though only 20 percent of training is actually transferred to the workplace, innovative management practices and 'training decisions and practices', when treated as 'unified cluster of activities in a highly inter-related set of enterprise activities', provide evidence of the greatest economic benefits gained by organisations taking part in the various studies (Moy 2001:51-52). In other words, in his view the outcomes of training are not wholly realised, or realisable, unless they are combined with other activities, and more importantly the activities of others, in a complex business environment.

Is competency-based training appropriate to such environments? This is not clear because the literature reviewed in this study fails to describe the skills and knowledge required of individuals and teams to competently perform there. They point to where the standards of performance required in certain workplaces have been defined in competency standards which, in Australia, are primarily developed as the endorsable component of national training packages, but fail to demonstrate evidence of where these have successfully achieved the outcomes expected of their development.

Furthermore, much is said about how skills and knowledge, when contextualised to incorporate the real needs of workplaces and organisations, can potentially lead to the achievement of organisational goals and objectives but nowhere are such skills and knowledge, or the ‘context’ within which they must be applied, described.

In searching for the answers it is perhaps important to look a little closer at the context within which CBT is currently applied in Australia.

2.7 THE CONTEXT WITHIN WHICH CBT IS APPLIED IN AUSTRALIA

The underlying principle upon which CBT is built is that as a result of attendance trainees will possess the skills and knowledge described in the curriculum against which the training has been run (ANTA 2003e). In Australia, such competence has, since the late 1990s, been found only in descriptions of skills and knowledge detailed in government endorsed national training packages.

Over a decade ago the National Training Board described competence as ‘(a) concept that focuses on what is expected of an employee in the workplace rather than on the learning process, and embodies the ability to transfer and apply skills and knowledge to new situations and environments’³ (NTB 1992:29). In taking this position the NTB defined the rules to be followed when identifying and recording the standard of skills and knowledge required in the workplace and coding them as competency standards. Of importance at the time was that such descriptions included not only what individuals should be capable of doing at the present time but allowed also for potential competence to achieve these standards.

The intention of the NTB’s definition of competence was to encourage the development of standards of performance that described not only what people were to be trained in but more importantly what they were actually expected to do in their workplace, whether they were trained to do this or not. In fact, at the time the notion that these standards were in any way related to training or learning curricula was not subscribed to in Australia (nor in the UK. See for example Fletcher 1991, 1995). Their

³ ANTA later simplified this with their own definition, that being ‘*competency (also competence) the ability to perform tasks and duties to the standard expected in employment*’ – ANTA 2003e.

only purpose was to describe the skills and knowledge required of on-the-job performance, not the foundations of any vocational qualification. Furthermore, when assessing whether or not individuals possessed this level of competence (regardless of how it was achieved) they were to be assessed not just on their current skills and knowledge but also where, when, why and how these were applied across a range of situations and in such a way as to determine the individual's ability to replicate such performance in the future.

To this end, the NTB guidelines stated that a measurement of competence should be that it includes task skills, task management skills, job/role environment skills, and contingency skills⁴. (For a fuller description and examples of these see Rutherford 1995a:7-8.) ANTA provides a similar description, not in their official glossary of VET terms but in their guidance to developers of national training packages (see ANTA 1998).

This definition was later adopted to support the introduction of competency-based training as a part of the then National Training Reform Agenda (NTRA -- a broad group of policies that provided the basis for the emerging vocational education and training system) and up until 1996 was used as the guideline against which competency standards were evaluated prior to their approval and endorsement by the NTB.

The genesis of the VET agenda in Australia is widely described (see, for example, NTB 1992; Tovey 1997; Smith 1998; Boud, Freeland, Hawke & McDonald 1998; Mitchell, Robertson & Shorten 1999), as is the concern that previous approaches to vocational training were inflexible, lacking relevance to industry and failing to support the achievement of industry productivity and national and international performance targets (Smith 1998; Abraham & Tzannatos 2000; Robinson 2000). As a means of overcoming this, greater engagement was made between employment and education portfolios at Federal government level and, at the same time, an integrated vocational education and training system was created.

⁴ It is noted that some add a fifth element to this list – transferability skills – and often quote both the NTB and ANTA as the source. Whether or not ANTA ever referred to this fifth element in the past (they do not in their current literature) is unclear, but the NTB never did, and the definition given here is that which is currently used by ANTA/DEST.

From this emerged a system of training based on the achievement of a standard of skills and knowledge built around what VET decision-makers, researchers and policy developers (notably the then Australian National Training Authority – ANTA) stated were important to the needs of industries across Australia. This system, now known broadly as the national VET system, incorporates processes for accrediting vocational training providers and for recognising training, assessment and resultant qualifications across all States and Territories of Australia, and across award levels and different workplaces.

While the exact processes are described in the literature released by the relevant State/Territory accreditation agencies, the role played by other government agencies, unions and industry in developing the standards and training packages is articulated in the literature released by ANTA (1995, 1998, 2003b, 2003f.). Here it is seen that the primary role of these bodies is to provide advice to Federal and State education and training Ministers, however they are also contracted by government to identify training needs (in the form of national training packages) to meet them which on the surface appears to be a conflict of interests but it is apparently a process that meets the government's needs and is therefore tolerated.

Recent research has found, however, that because of the tripartite approach to doing this, outcomes are slow to be arrived at, are not always seen as representative of the industry sector concerned, and do not always reflect studies of 'best practice', rather 'common' practice based around what is acceptable to the member bodies (see, for example, Schofield & McDonald 2004). Moreover, despite the often-stated claim that this system is 'industry led', research conducted by Henry (2000), Howes (2001), the Tasmanian Department of Education (2001), the Australian Council of Trade Unions (2002) and the Royal Commission into the Building and Construction Industry (2002) has revealed that true industry representation and involvement in these processes has not always been achieved, especially in regard to small to medium sized enterprises and the traditionally disenfranchised groups such as women, those with disabilities, and indigenous people.

Schofield and McDonald (2004) found that as a consequence in only a few cases do the outcomes of the training appear to be aligned directly to business and strategic objectives of the organisation or industry for which they were developed. As a result

there is a strong argument that the VET system in Australia is designed more to meet the needs of government and training providers than industry- and nation-wide interests as a whole (Strathdee 2003).

This concern, according to Butler (1998) and Gonczi (1998), has arisen as a result of the perception by industry that the agenda for training reform is dominated by government seeking to influence not just the general direction of education and training, but also the actual content of educational curriculum and the way in which it is assessed. Furthermore, Butler (1998) contends that by defining it as a 'market', the VET system is seen as driven by a yet to be proven concept, that of supply and demand and the relative power associated with those supplying VET and those demanding it.

Anderson (1998) found that, as a result there is considerable disagreement in the literature over who the principle clients are of this VET system. There is a further suggestion by Boud et al. (1998) that the real end-user of the current government sponsored VET is not industry and individual organisations at all but a labour market of the future – an outcome of more appeal to the government of the day than it is to any individual business enterprise. Boud et al. (1998) also posit that the initial debate on VET policy was weighted towards a system aimed more at meeting a higher, government-favoured ideal than one that supports – and perhaps even enhances – existing training approaches. Seddon (1998) also contends that individuals look at publicly-provided vocational education and training not in terms of what it will give them now but what it will give them in the future, again a cause well away from the immediate needs of most organisations. It is, however, one that sits well with a government concerned with issues of access and equity in education and employment.

Butler (1998:89), on the other hand, contends that the client of this training reform is 'defined as (big) industry, with the training system being described as both industry "driven" and more recently industry "led"'. This begs the question: because industry has an apparent disinterest in data showing where – or even whether – training actually enhances productivity and growth, do they subscribe to this new system of training and education for economical reasons or, as also suggested by Butler (1998:101), because of their ambivalence to training reform that is perceived to be owned and driven by either 'big business' or government? This may be the answer to

the question posed earlier regarding whether or not, and the reasons why, organisations fail to evaluate the causal link (if any) between training events and business outcomes. They may see it as a waste of time and effort because regardless of the outcomes the system itself will not change.

This is the environment within which CBT at the time of this study is designed and conducted in Australia. While the efficacy or otherwise of the national VET system will not be further discussed in this study, it is timely to recall that the question underpinning this research is regarding the impact that the complexity theories have on the way in which competency-based training is applied in Australia. Given that CBT is primarily applied within the VET system, the question that emerges is whether or not it is even appropriate to individuals working in complex and unpredictable environments other than those shaped by the policies and practices that underpin this system.. One way in which this question may be answered is through research into the use of CBT outside of this system; however from the literature there is no example of where such research has been conducted.

For example, Grubb and Ryan (1999:10), while acknowledging that evaluations of VET programs on the whole are often significantly based on assumptions of their purpose rather than defined objectives, suggest that there are four key aspects of this approach to workplace training worthy of discussion: Pre-employment VET, upgrading existing skills, retraining, and remedial. Their point appears to be that competency-based training, against needs other than those of immediate importance to the person being trained, is outside of the training's purpose. Throughout the literature this appears to be the common consensus and may, in itself, be the reason why CBT appears to be rarely examined beyond the confines of vocational education and training systems.

While the way in which competence is defined has not radically changed since the NTB first defined it in 1992 (even though such a definition has not been applied in full), the politics that have underpinned such an approach and the views regarding who 'owns' the outcomes has generated considerable debate. As such in the literature the relevance of the complexity theories to the way in which competency-based training is applied in Australia is a little less clear. While complexity in this sense describes the environment within which work is performed, there appears in the

literature no recognition or acknowledgement of such environmental factors in the development and application of CBT programs. In fact such programs are reported as being of more concern to the VET policy and decision makers than they are to the needs of individual workers and the tasks that they perform (and in this case 'workers' includes managers and employers just as much as employees). Again, a reason why employers do not conduct return on investment analyses of training undertaken on their behalf.

To more clearly define the gap that this leaves in our understanding of the impact that the complexity theories have on competency-based training in Australia it is timely to draw together the complexity theories and the processes of CBT as they are currently described and applied. The purpose of doing this is to develop a theoretical heuristic model for guiding further investigation into the research question and for illustrating the impact that these theories have on the design and application of a competency-based approach to training.

2.8 DRAWING TOGETHER THE THEORIES AND THE PRACTICE

Recent studies of the purpose of competency-based training, and whether or not such a purpose has been achieved (e.g., Schofield & McDonald 2004), reveal a gap in our knowledge of the environment and context within which such achievements should be made and whether or not CBT is an appropriate means by which skills and knowledge can be gained to achieve goals and objectives found there.

While there has been a great deal of literature released in Australia regarding the way in which competency-based training has been applied and in particular in support of the national VET agenda, there appears to be little research conducted into the relevance of the complexity theories to its application aside from the issues raised by Chappell and noted above. To investigate whether or not these theories have any relevance we must therefore return to contemporary studies carried out elsewhere into complexity and the workplace and to the appropriateness, if any, of training within environments that are characterised as such.

From the literature reviewed for this study it is clear that the contemporary approach to training has been widely criticised by those researching its relationship to the way in which knowledge is gained and managed in the workplace. Snowden (2002:1), for example, when describing the reasons why earlier generations of knowledge management have failed to deliver on their promised benefits, points out that the development and application of training in the workplace is, in many quarters, still centred on a linear, systematic approach or on tacit-explicit knowledge conversion processes such as Nonaka and Takeuchi's SECI (Socialisation, Externalisation, Combination and Internalisation) model.

In his 2002 paper *The Complex Acts of Knowing*, Snowden contends that such models fail to recognise the ways in which knowledge is formed through, for example, the complex interrelationships that occur naturally in the workplace (2002:5), a point that Stacey et al. (2000), Sandberg (2000a, 2000b) and Stacey (2001) support. While differing in their opinion as to the degree of certainty we can hold about what can be learned, Stacey (2001:4) and Snowden (2002:3, 2003:5) agree on one point: that knowledge in particular is not something that can be gained or shared in a linear or ordered fashion. Because of the concentration on linearity and the behaviourist and cognitivist view of training design they, like Gilbert (1978:74), are critical of any systematic approach to the gaining and use of knowledge in, for example, the linear model proposed by Haeckel 1999 (Snowden 2004 pers. comm. 20 February) and others who seek a simple explanation to workplace complexity and what management and trainers can do about it. Through this, the theorists contend, there is a tendency to focus too narrowly on behaviour or on knowledge or understanding only to the detriment of context and situation. Their conclusion is that because of the inherent complexity of modern work life, without an organisational context work-related learning is meaningless and without purpose.

This is not the only point on which they hold concerns. Stacey (2001:26-27), as we have seen, also contends that concentrating on the achievement of predetermined objectives suggests a linearity that, in a systematic approach to learning, supports rationalist and formative teleologies that hold that human action is modelled on predetermined goals and processes. This is a Kantian if/then causal relationship which, in Stacey's view, is untenable in a complex environment.

While not specifically referring to competency-based training, the concerns of Gilbert (1978), Snowden (2002; 2003) and Stacey (2002) may well be appropriate to Australia given that CBT is a systematic approach to training and by concentrating more on the system than on the outcomes misses the point in conducting the training in the first place. Schofield and McDonald (2004) certainly agree. Their argument is that the way in which CBT is conducted as part of the national VET system results in patterns of behaviour that are shaped less by what is being trained and more by the processes themselves and the motivation to achieve individual learning outcomes as opposed to collective or organisational goals and objectives. Such a systematic approach, according to Stacey and Schofield and McDonald, sees concentration of effort centred more on meeting the needs of the training process than on meeting the needs of the organisation for which the training is carried out.

In themselves such arguments might not attract a great deal of attention if it were not for the contentions made in the literature that the context within which the outcomes of such training must be applied, that is the workplace, is itself changing or rather the way we now view it has changed. Such views are that it is far more complex and chaotic than that for which competency-based training was originally designed and implemented. A new picture of the context and environment in which the outcomes of any training – not just competency-based training – are applied must therefore be formed if our understanding is to grow of how training may best prepare individuals and teams for it.

This is but one element of concern. Another issue that arises from the complexity theories concerns the notions of predictability and replicability: predictability in that future requirements for any context or environment can be known in advance, and replicability in that these requirements can be modelled on what others have done in the past.

One of the central tenets of competency-based training is that it is concerned with the achievement of skills and knowledge that are needed in the workplace to achieve goals and objectives found there. Moreover, these skills and knowledge can be modelled on what others have done, in the past in similar – but not the same – contexts and environments. Not only can these be predicted beforehand and for application in the short term but also, by implication, over a longer term.

All definitions of competency standards and competency-based training and assessment in the literature, in one way or another, state this. Such contentions, however, are not supported in the complexity theories. Studies into the science of complexity and chaos support this, and in particular the work carried out by Holland (1995), Pearn et al. (1995), Pinchot and Pinchot (1996), Haeckel (1999), Fulmer (2000), Gratton (2000), de Geus (2001), Olson and Eoyang (2001) and Snowden (2003) who consider not just the complexity theories but their implication to the use and growth of knowledge in the workplace and in the achievement of organisational goals and objectives. Their argument is that while predicting the skills and knowledge an individual or team may need might be possible in the short term (e.g., upon a trainee's immediate return to work), in the longer term it is simply untenable. In other words, while it might be true that we can predict behaviour of a training participant upon her/his return to the workplace (and in line, for example, with the way Tovey 1997 and Smith 1998 define training), what they do beyond this is unpredictable.

This challenges one of the most important principles underpinning CBT as it is currently applied – that it is possible to model 'best practice' and use this as the basis for not only training but also, as a result of this training, increased or enhanced workplace performance. It also implies another level of predictability, this time predictability in not only what skills and knowledge are required but when, where (i.e., the context and environment) and, if these are not yet known, when they must be learned.

This is the message that emerges from reading the literature concerning competency-based training and assessment alongside the literature concerning the complexity theories. When read together they suggest that for CBT to be appropriate to environments that are complex and chaotic, training designers must look beyond the current approach to CBT where certain skills and knowledge, modelled on what others have done in the past, are predicted as appropriate to certain workplaces and industries. It points to a need to also understand the context and environment within which these skills and knowledge are to be applied for it is only in such a context that such skills and knowledge become real. Given that, according to the complexity theorists, such contexts and environments are unknown until the time in which they are experienced, so too are the actual skills and knowledge required of competent

performance there therefore they cannot be based on what others have done in the past. They must be unique to the individual or teams concerned.

How, then, can the skills and knowledge required of competent performance in as-yet unknown contexts and environments be determined before the training gets underway? They could be guessed, but we are not investigating a 'guess'-based training system even though this appears to be way in which the current approach to CBT is applied. The only alternative is to look more closely at exactly what skills and knowledge individuals and groups apply in contexts and environments that only become real at the time they are experienced.

From the literature it appears that the real competence in environments beyond those where training is traditionally carried out is viewed not just as the application of previously learned skills and knowledge but the ability to adapt those that are currently known (often, but not always, gained through training) and to learn those that are not yet known but are needed for ongoing competent performance. This is a simplification of Stacey's *Transformative Teleology* and an implication that appears to underpin the ideas put forward by Gerber & Velde (1996, 1997), Velde (1997) and Svensson et al. (2004) in which competence is described not solely as the skills and knowledge that are taught but those that need to be learned to apply them in complex and every-changing environments. While this doesn't negate the skills and knowledge that competency-based training aims to provide in the short term, it could be an important aspect of competence as it relates to complex and chaotic environments and against which CBT for such environments should be designed. This raises the question, though, of when should such learning take place – during the training or after it?

Fulmer (2000) puts forward a compelling case for accepting that learning and growth occurs when individuals and teams, and cumulatively the organisation in which they are employed, are motivated to work together to generate and apply knowledge to adapt to an environment and, over the longer period, survive. According to Holland (1995), Pearn et al. (1995), Pinchot and Pinchot (1996), Haeckel (1999), Fulmer (2000), Gratton (2000), de Geus (2001), Olson and Eoyang (2001) and Snowden (2003), in the workplace such learning events occur naturally from the interrelationships and working arrangements found there. Turney, Whitley and

Anderson (1996) and Turney (n.d.), for example, in also investigating the applicability of the Baldwin Effect and its explanation to learning and instinct, suggest that genetically individuals may know *instinctively* how to apply certain skills and knowledge in the workplace but cannot learn the outcomes of such applications except over a longer period.

Because, according to Turney (n.d.:3), it emerges intuitively, such application takes far more energy and thought processes to be more adaptable to current and immediate organisational goals and objectives but these are the exact objectives that organisations expect individuals and teams, through their day-to-day performance, to achieve. If it is accepted that, as was noted earlier, competency-based training as it is currently applied only prepares individuals for immediate and predictable goals and objectives, could CBT have a role in preparing them for situations beyond this? For example, situations in which they are expected to undertake tasks, often at very short notice, that achieve immediate goals and objectives and at the same time have longer term consequences – consequences that may or may not see them having to rearrange what they've already done or adopt newer and better ways of doing things to improve past achievements.

Earlier it was seen that while Stacey (2001) and Stacey et al. (2002) question such predictability, Haeckel (1999) and Snowden (2002) suggest that there are ways around this. One, for example, is to accept that while it might not be possible to predict the exact nature of the skills and knowledge that individuals and teams must apply in environments that are complex and unstable, it is entirely plausible that they will do something, and in doing so apply skills and knowledge that might not, at this stage, be entirely clear or wholly predictable. According to them, as far as the notion of competence goes, where and how they learned this is immaterial, and while the exact nature of the knowledge that underpins such actions might not be known, it is knowable in that others possess the required knowledge or the individual, through discussions and interactions with others, can learn it – an emergent action that underpins the growth of collective competence. Furthermore, as Stacey (2001) contends, the simple act of knowing can, in itself, be a learning experience.

Therefore if, in striving to meet the needs of complex workplace environments, we change what we believe competent performance to be from one of given and

predictable skills and knowledge to that of unpredictable skills and knowledge made known at some later time through the application of a third level of skills and knowledge, then the question of predictability becomes moot. While we might not be able to predict exactly what people will do under new and emerging situations, the argument that Stacey and Turney et al., for example, might use against the concept of a competency-based approach, is that we can predict that they will do something – and perhaps this ‘something’ should be the focus of competency-based training processes. If only we could figure out what this ‘something’ is!

This is a point on which the literature is silent, just as it is silent on what occurs once formal (off- or on-the-job) training has ceased for the learner and she/he returns to the workplace. Here is where individuals enter that period between when information is gathered from emerging data (i.e., that which was taught during the training and that being gained through contextualising it to the workplace) and turned firstly into knowledge and then wisdom (as the knowledge management commentators such as Kurtz and Snowden, Lave and Wenger tell us) or simply as learning becomes intuitive as Turney et al. suggest. While the processes followed to create the training event might meet the needs of the training, little thought has been given to the ‘what then?’

Existing models do not take into account learning, for example, as a critical continuation of training during which skills and knowledge (gained via, amongst other means, training and education) are contextualised and expanded upon, or the processes whereby such learning, once put into practice, sees the achievement of goals and objectives at all levels of an organisation. This has resulted in a gap in our knowledge of how training, and in particular competency-based training, can enhance the achievement of organisational goals and objectives, and as a result the ability of trainers to have a far greater impact on an organisation’s outcomes are severely limited following these processes.

Sullivan (1995: 3), for example, lists nine characteristics that describe CBT but only up to the point at which the training is carried out. Similarly, the Australian Quality Training Framework (AQTF), a set of criteria with which all Registered Training Organisations (RTO) must comply as a prerequisite for continued accreditation, makes no mention at all of the need to ensure that trainees (the ‘clients’) are capable of achieving work-related goals and objectives as a result of the training the RTO

provides. It is almost as if what happens post-training is not the domain of the trainer but of the training evaluators such as Phillips and Kirpatrick whose models are often used to demonstrate the benefits gained out of the application and continuous growth of skills and knowledge in the workplace – as measured against organisational rather than training objectives.

As was seen earlier in this chapter, there is a lack of rigour in the depth to which current training models such as CBT address the relationship between training and organisational success at the various levels. This means that, despite the definitions given by ANTA/DEST, the role that learning plays in competent performance, and in particular competent performance that is centred on continuous learning and growth, is not fully understood nor is its impact on how such performance is defined and trained to. But there is a body of literature that does address learning that is emergent and relevant to future needs. It is not found in the works of educators or trainers but in that of biologists and anthropologists, and it is to here that we must turn to expand our understanding of emergent behaviour and its relationship to CBT and the complexity sciences to reveal the impact these theories have on the way in which training is designed and conducted.

Over the past two centuries there have been many theories put forward regarding how organisms and societies learn and grow in complex environments and in the absence of guidance on how to do so. The most important of these have been Lamarck, Darwin and Baldwin, the most noted of whom, and the most quoted, is Darwin whose notion of the *survival of the fittest* is often used to explain the superiority of modern humankind over primeval beings.

In the century and a half since Darwin's theory was first postulated (in Darwin 1859) we should, if he was correct, see only two classes of people – the employed who came to be so because they could learn, and the unemployed who are so because of their ignorance or inability to learn. This is not the case therefore it could be argued that Darwin's concept of growth occasioned only by those who were capable of doing so is not relevant to learning. However, does this automatically mean that Lamarck's theory is? Not entirely. Baldwin adopted Lamarck's notion that lifetime learning can, in some individuals, accelerate evolution and growth. However he argued that such learning is not hereditary – rather it is the *ability* to learn that is passed from one

generation to the other. Thus learning, and what is learned, becomes instinctive (Turney, n.d.; Turney et al. 1996). The pace of such learning is determined by its value (its cost/benefit) and, where learned traits are useful they are passed to others in what becomes an evolving population (Turney n.d.; Arita and Suzuki n.d), again a notion that sits well with collective competence.

Clearly this theory is closer to Darwin than it is to Lamarck but it does hint at an emergent side to learning that occurs within an environmental context and in the absence of formal or informal training. Further, it suggests that the environment in which such learning takes place both effects, and is effected by, the learning (a point that Latour uses to explore the extent to which technology influences human behaviour in his Actor Network Theory. For more on this see Wood 2001:324-329). This concurs with other theories that underpin studies into how people learn and, in particular, how they best manage and disseminate knowledge that both demonstrates their learning and, in turn, allows others to learn. For example, it accords with contemporary theories seen in the literature about complex workplace environments and the emergent and constructivist behaviours that are formed as a result of the interrelationships that both form, and are formed by, the modern workplace. Baldwin's contention also partially addresses the question that underpinned the researcher's initial curiosity of how some organisations, resplendent with training programs and aligned to the national VET system, can appear to fail to achieve business and strategic objectives while others, with no formal training agenda or programs, succeed.

The main focus of these theories is on the contention that the context within which the learning/knowledge sharing is being carried out is vital to understanding, situating and embedding such a process. It also directs our focus towards the environment, in this case that in which the workplace is found, and the theory that this has a greater impact on individual competence over the longer term than does formal or informal training. This is a point that Sandberg (2000a; 2000b) contends can be influenced simply because others also exist and work in the environment.

What these theories are saying is exactly what the complexity theorists tell us, that learning will occur anyway whether training is carried out or not, except that they give clues to how this actually occurs. Therefore, if CBT is to be more useful in developing

competent workers (staff and management) theoretically the emphasis has got to be centred less on the input to the training and more on the outcome (the competence) as it effects, and is effected by, the environment (the context) within which such competence is to be applied. As the outcome is future oriented and the training is clearly situated in the present (but, as is currently the case, based on what occurred in the past), it also intimates the competence may not be either: instead it could be the process that links the two together – that is, the present to the future. Exactly how this may occur, and in particular the implications that this approach may have on the way in which CBT is applied in Australia, is again missing in the literature.

Also suggested is that, to be effective, CBT has got to enshroud not just the training event but also the learning that will occur naturally whether it is designed into the training or not. This, however, is not a new concept. It has been known and expressed as far back as the 1890s when John Dewey (1859-1952) wrote his landmark *My Pedagogic Creed*, and has been repeated by nearly every learning and knowledge theorist since. From a training perspective, however, accepting the need to incorporate the theories investigated in this chapter into the concept and application of CBT has the potential to deliver training that addresses the needs of individuals and teams whose workplaces can be defined as complex and chaotic and in doing so achieve verifiable business outcomes.

To study this further it may be useful to consider views on where such training fits in the continuum between stable and controlled environments at one end and chaotic and uncontrolled at the other. One view is that put forward by Moor (1997), in a limited-release discussion paper entitled *Special Forces Selection – A Theoretical Perspective*.

2.9 THEORETICAL MODEL FOR FURTHER RESEARCH

In Moor's paper is a description of a model showing the relationship between training and where/how individuals and groups apply their skills and knowledge in real workplaces that can be characterised as complex and chaotic. In offering these ideas he presents further clues as to the importance of acknowledging the impact that the

complexity theories have on the way in which work-related training is designed and carried out.

This model is of interest to this study because it illustrates not just the continuum between controlled and stable workplaces (the space in which Moor contends training is carried out) and those characterised as complex and chaotic, but also the changing nature of competence along this continuum. While not directly describing the skills and knowledge individuals and teams apply at the different points along this continuum, this model does suggest differences between those that are required in stable and controlled environments and those required in environments that are complex and chaotic. The outcome of this is a clearer understanding of the issues that should be considered when developing competency-based training programs for participants whose workplaces might be characterised as complex or chaotic.

The purpose of Moor's paper was to offer constructive comments on better ways to select soldiers capable of undertaking Special Forces training for the Australian Army and is therefore restricted in its distribution. The argument he offers, however, is very similar to that of the complexity theorists. Of particular interest is that he includes in this paper an unattributed hypothetical model that offers a potentially more realistic illustration of where and how skills and knowledge are applied in situations that are straight-forward, controlled and unambiguous at one end of a continuum and situations that fluctuate between chaotic and complex at the other. This is illustrated in the model at Figure 1.

Moor's model is set in four quadrants. In describing this his contention is that training (in his example military training) traditionally occurs in quadrant I where there is a desire for certainty and control, while the primary conventional tasks of the 'trained' individual or team are carried out in quadrant II where known processes are applied in unknown contexts. Tasks with a higher degree of complexity, or simple tasks applied in a more complex landscape, are carried out in quadrant III where there is tolerance for ambiguity and both context and processes are unknown. (He makes no mention of what occurs in quadrant IV although it is assumed that what happens here is the same as in quadrant II except that the processes are unknown while the context is known.)

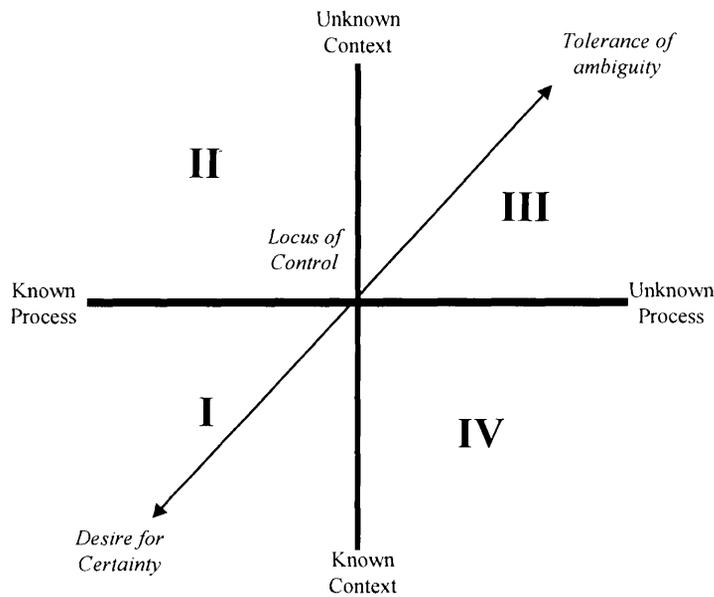


Figure 1. Moor's Tolerance of Ambiguity model (Moor 1997:6)

Other researchers offer similar conclusions (see for example Gerber 2000) but none go so far as to suggest, as does Moor, that learning does not occur at only one point in the continuum but at many, and often at the same time. This, of course, depends on the need and the complexity of the task or tasks and the environment in which they are being undertaken.

Where Moor's model does suffer is that it fails to acknowledge that certainty and ambiguity are not only imposed on individuals and systems by external influences but can also come from within the individual or system concerned – and may even be caused by the individual or the system, or both. This is a point made by the complexity theorists who contend that such a phenomenon can be both the cause and the effect of complex environments therefore Moor's model is not as straightforward as it first appears.

Moreover, Moor's contention that training is conducted in an environment where there is a 'desire for certainty' implies that there is stability and control over the processes and the contexts that are being taught *and* the environment within which such training is carried out. This, again, is a notion that the complexity theorists reject.

Nevertheless, with this model Moor adds to our understanding of training in a complex environment with the suggestion that competent performance is all about the actual application of the skills and knowledge learned during training in an environment – complex or chaotic - outside of that in which the training took place. It occurs, according to Moor, in a landscape influenced by the complexity of the tasks being undertaken or the environment within which they're carried out. While training is conducted in stable and controlled environments, the application of the skills and knowledge is centred on learning that takes place in environments that are anywhere between complex and chaotic.

This implies that moving between training undertaken in stable environments but employed in those which could be characterised as complex and chaotic sees different forms of learning occur along the continuum between the two. Such a view is appealing because it appears to support the suggestion that learning is a continuum from behaviourism at one end (at Moor's 'Desire for Certainty') to constructivism at the other (Moor's 'Tolerance of Ambiguity'). In between is cognitivism where the learner has control over the processes and direction of the knowledge being gained and is an active participant in the processes, even though she/he may not be entirely sure where these processes are leading. It also supports the notion put forward by Sandberg (2000a) and Gerber (2000) of the way in which growth in individual and collective understanding is experienced and which, in turn, enhances collective competence.

Moor's model also supports the view cautiously put forward by Wilson and Myers (1999) that behaviourism, cognitivism and situativity can be combined under a single banner of situated cognition. To them situated cognition, 'because of its holistic tendencies and preferences for rich, active environments', encourages an holistic framework that integrates what we know about learning although, as they say (1999:18), further development and discussion are still needed to draw together the theories that, at the moment, are seen as competitors. When viewed alongside Moor's model and the behaviourist, cognitivist and constructivist learning styles are placed along the continuum from stability and control to chaos, it could be suggested that these theories are not competitors at all but are, in fact, complementary – that is, they are a recognition that the style of learning required for any given situation is

dependent upon the complexity and chaos (or lack of it) within the environment or context at the time.

Where Moor's model has a weakness is that even though it supports Wilson and Meyer's views, it substantially overlooks contemporary theories about situated learning and cognition that occurs through, for example, participation in communities of practice (see, for example, Lave 1988, 1996 and Lave & Wenger 1991, Wenger 1998, Wilson & Myers 1999, Wenger & Snyder 2001, and Wenger et al. 2002). In these theories learning is less focused on the individual *in* environment and more on individual *and* environment (Wilson & Myers 1999), and learning emerges as a function and outcome of the activity, context and culture in which it occurs (Lave & Wenger 1991). This is an important element in understanding how individual and group capability is enhanced through self-organising knowledge exchange (Wenger & Snyder 2001) that others see as a cognitive apprenticeship that enables learners to 'acquire, develop and use cognitive tools in authentic domain activity' (Brown, Collins & Duguid 1989:39). Here we enter the realm of knowledge management where, according to Snowden, knowledge emerges at a time and in a place when it is needed when, for example, like minded people cluster (or are clustered) or swarm together (Snowden 2002).

As intriguing as this line of enquiry is, it will not be followed further here as it potentially could delve deeper into the concept of learning than is the aim of this research. For the purpose of this study, however, acknowledgement and acceptance of Wilson and Myer's contention that learning occurs in different ways in complex and chaotic environments, and the theories of Lave and the others that learning and environment are intertwined, will suffice.

Having said that, Moor's ideas have merit because, as Snowden (2002) and Kurtz and Snowden (2003) have since pointed out, tasks undertaken within the workplace fluctuate between contexts and environments that are conventional and complex (quadrants II and IV in Moor's model) – even at times being performed within the chaotic (quadrant III). Further, while some work contains elements that are straightforward and uncomplicated, other aspects of the same job might be complex or un-ordered (Kurtz & Snowden 2003). These are issues that Moor addresses in his model.

For example, conducting a performance appraisal with someone who is known to be argumentative could see the emergence of behaviour patterns on the part of all involved that are both controlled and at the same time uncontrolled. Therefore, if the influences that shape and pattern how work is carried out can be found at any point along the continuum between equilibrium and chaos (Moor's 'high need for structure' and 'quest for novelty') and co-evolutionary constructivist knowledge growth occurs as a result of this, then there is much to support Moor's contention that what is learned by individuals and groups also occurs at any time and at any point in this continuum. When placed alongside the complexity theories it appears that what is learned, and how, is modelled and shaped by the environment within which it is occurring. This gives Moor's model credibility as a platform upon which to investigate where training occurs along the continuum between stability and chaos, and where/how learning occurs. It will also allow for a further exploration of the notion that competence is a phenomenon that emerges both from the environmental factors that shape it and the continued application of the knowledge that defines it.

Returning briefly to his model, it was noted above that Moor (1997:3) describes 'conventional' training as occurring in environments in which both the processes and the contexts within which they are situated are known. This supports the earlier contention that competency-based training, as it is currently applied, is conducted in stable and controlled environments, in other words, those that may be characterised as at equilibrium. Moor also states that 'conventional' tasks (which, in military terms, mean those carried out in environments that are not unconventional, e.g., guerrilla warfare or terrorism) are carried out in domains in which the process is known but the context is not, or vice versa. The more complex tasks, or tasks carried out in complex environments, are according to him conducted in the domain in which both the context and the process is unknown.

This model, and the way in which the complexity theories support it, provides a useful starting point for further investigation into the relationship between these theories and the way in which competency-based training may be applied. To take this further, however, there are aspects to the model that need to be refined to more fully capture the theories supporting training and learning in complex environments and what they mean to future application and research.

2.10 EXPANDING ON MOOR'S MODEL

While Moor's ideas have merit, he was only hypothesising about the link between training and workplace activity in complex and chaotic environments, not stating a researched and demonstrable fact. Where, in this researcher's opinion, Moor's model has a weakness is in the use of the terms unknown context and unknown process to define the opposite of known process and known context, and his attempt to illustrate the context and environment at different points of the continuum between equilibrium and chaos by the nature of work carried out there (i.e., conventional versus complex tasks).

By using such terms Moor appears to attempt to describe a phenomenon where trained individuals undertake conventional tasks in environments where the processes/context are known but the contexts/processes are unknown, and tasks that are complex or carried out in complex environments take place in a domain where both the context and the processes are unknown. This suggests that individuals and teams, in this domain, know neither what to do nor where/when to do it. It also suggests that they are doing nothing about learning that which they do not know, a point that Turney et al. reject.

In using this model as a framework upon which to base further research into the impact that the complexity theories have on competency-based training, Moor's 'unknown' was changed to 'knowable' (i.e., knowable context and knowable process). The reason for making this change is because it draws on Snowden's contention that while certain skills and knowledge are unknown, or the context within which known skills or knowledge are to be applied are unclear or unpatterned, they can be learned either through interactions with others, with the environment in which they are applied, or by experimentation. Adopting Snowden's 'knowable' over Moor's 'unknown' also has the potential to suggest an evolutionary process through which learning is self-organising and emergent in environments that are themselves growing and adapting as a consequence of the application of what is being learned. This is illustrated in the model at Figure 2.

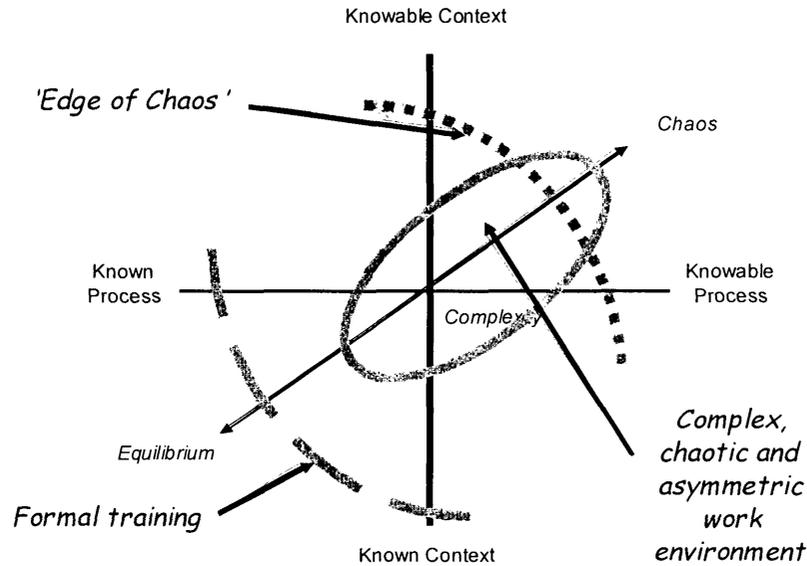


Figure 2. Training in complex and chaotic environments (adapted from Moor 1997)

Moreover changing the domain from unknown to knowable infers a learning action on the part of the individual (construction) rather than a passive acceptance of the unknown and fits with the radical constructivist approach of von Glasersfeld (in *An Exposition of Constructivism: Why Some Like it Radical* n.d.). It also allows us to situate the contention by Stacey and Snowden that knowledge in the workplace is not gained solely in stable and controlled environments but also, and perhaps more so, in those that can be characterised as complex and chaotic.

This model is also an attempt to demonstrate where, if we accept the complexity theories, competency-based training can potentially be more closely aligned to the known skills and knowledge in an environment that is stable, controlled, and at a point of equilibrium, *and* the unknown but knowable skills and knowledge that are needed closer to the point of complexity and chaos. While considering the accepted theories that underpin how people learn naturally, it may be possible using this model to plot how, along the continuum from equilibrium to chaos, learning occurs in the workplace and from this use a competency-based approach to pattern learning and knowledge towards outcomes that are important to the individual and her/his workplace – regardless of the complexity of that workplace at any given time.

In doing this, it also may theoretically be possible to develop a competency-based training and assessment program that provides the appropriate skills and knowledge (and assess their application) even when trainers and trainees don't know the purpose of such competence or the goals and objectives their application is designed to achieve. For example, teaching several methods for solving problems and the contexts in which they are most appropriately applied rather than teaching only one problem solving method and implying that it is useful in all contexts. This is not an attempt to predict the actual skills and knowledge that will be needed to achieve goals and objectives that emerge at different points of the continuum for, as we have seen, such predictability is just not possible. It is simply that theoretically it may be possible to provide a competency-based training solution to achieve a level of competence important to the way individuals and teams discover and apply whatever skills and knowledge are needed at some future time. The only predictability here is that *some* skills and knowledge will be needed, not what they are, therefore the individual and/or her/his team will need the competence and confidence to learn them, something that theoretically can be taught at the time that this lesson is needed. In this way the competency-based training approach will be one of 'Just in Time' rather than 'Just in Case' which appears to currently be the situation.

2.11 LIMITATIONS OF THE MODEL

Even with the change from unknown to knowable a weakness remains in this model. It is only two dimensional. It shows the length and breadth of complexity but doesn't show the depth, particularly the depth insofar as the individual, team and business objectives to be achieved when applying skills and knowledge at varying points along the continuum from a stable workplace to chaos. Further work needs to be done to explore the impact that the complexity theories have in the self-organisation of work-related goals and objectives and the means by which individual and team endeavour can be shaped towards their achievement.

For the purpose of this study the outcome of the application of individual skills and knowledge, as they impact on higher level organisational goals and objectives, will not be focused on even though, in competency terms, they are essential to the assessment of competence in the workplace. Instead tested in the research will be the

assumption that the goals and objectives individuals and teams are tasked with achieving are shaped and prioritised by the same complex and chaotic burdens as the workplace in which efforts are being made to achieve them. For example, a patient who becomes more aggressive and less cooperative as efforts are made to apply calming medication, or a client who becomes more belligerent the longer she/he has to wait for assistance in solving a problem. The skills and knowledge to achieve one objective theoretically must change to satisfactorily achieve the same objective as it is influenced by changing environmental factors.

While this illustrates the contention by the complexity theorists that the skills and knowledge needed to address a situation cannot be accurately predicted – even a situation that may have been experienced by the person concerned or others in the past – the question that remains is whether or not competency-based training could have prepared individuals for such environments. The literature implies that the way in which CBT is applied in Australia (i.e., within the current VET system) does just that, but there is also a significant view that it does not. But is this the fault of CBT or the way it is defined and applied in a context that was not itself so closely defined at the time CBT was adopted as part of the VET system? Nowhere in the literature is there a contention that the concept of CBT is wrong – only that its application has failed to fully adopt the definitions of competence therefore the outcomes of such training have failed to achieve the objectives of applying such an approach in the first place.

The links in this model between the environment and the training are well established in the literature; however they are grounded in theory rather than empirical evidence. The connection between these ideas and the questions of interest to this study will provide a guide in the exploration of the data emerging from the qualitative study described in the following chapters.

2.12 CONCLUSION

The question at the centre of this study is what impact the complexity theories have on the way in which competency-based training is applied in Australia. From the

literature reviewed for this study there have emerged three main issues that, on face value, suggest that the impact is significant.

First of all there are the critics such as Gonczi, Hager, Schofield and McDonald who contend that competency-based training has failed to meet the real needs of the workplace in which individuals work. While rightly pointing out that the skills and knowledge upon which such training is based do not encapsulate all of the key attributes and competence required for effective workplace performance, they do not however clarify exactly why this is so or what can be done to correct it. This leaves a significant gap in the literature as to whether or not competency-based training is capable of addressing the concerns raised by the critics and, if so, whether or not the concept, definitions, or processes of such an approach need to be changed to do so.

The second issue is raised by sociologists and social anthropologists such as Lave (1988), Lave and Wenger (1991), Wenger (1998), and Wenger, McDermott & Snyder (2002). They contend that for learning (whether as an outcome of training or not) to be meaningful to individuals it has got to take into account the environment in which it is placed. Learning that takes place outside of its context is meaningless and quite probably a waste of time.

Such contentions, however, are not supported by clarifications as to the nature of these environments and the impact they have on learning carried out over the longer term, for example the learning needed to further contextualise skills and knowledge once their application has created changes within and to the environment in which they were first applied. It is a simple matter to assume that future and constantly changing environments are encapsulated in their contentions but their studies centre more on how dialogue and interrelationships create and shape such environments rather than on the way in which such environments themselves create others in emergent and self-generating ways.

To find broader descriptions of such environments we must turn to the literature concerning the complexity theories and their impact on workplace environments and the learning that occurs there. This raises the third issue found in the literature.

Of importance are the theoretical positions taken by Stacey (2001) and Snowden (2002; 2003) whose contention is that what must be learned is not predictable simply

because of the ever-evolving environments formed and shaped by what has already been learned. To them, predictions of what must be known and applied (i.e., the knowledge and skills) to achieve medium and longer term objectives are untenable simply because the exact shape and nature of such objectives cannot be predicted – they will be shaped by the skills and knowledge applied at the time. This, however, has a significant impact on the way in which CBT is designed and applied in Australia because it suggests that the very basis upon which it is built is flawed.

CBT in Australia is centred on a number of conditions: firstly that the outcome is an individual with skills and knowledge that are at a predetermined level, secondly that these skills and knowledge (generally based on what others have done in similar industries and conditions) are replicable in the workplace, and thirdly that they can be transferred across contexts and environments. This suggests an if/then causal relationship that is not supported in the theories put forward by the sociologists and complexity theorists noted above. The lack of evidence in the literature of where it has actually achieved any of the systemic or organisational benefits for which it was adopted in the first place is but one example of how such a suggestion might come about.

Whether or not this view of the way in which CBT is currently applied, and the criticisms that have been raised, is because the full definition of competence developed by the National Training Board has never been fully subscribed to or implemented is not clear in the literature. The definitions currently used to describe competence and competency-based training/assessment have dropped the NTB's support for standards that are futurist and sufficiently flexible to be applied in any workplace be it stable and controlled or complex and chaotic and it would therefore be a simple solution to accept that this is the case. No alternative approach, however, has ever been attempted therefore it is not possible to state for certain that the NTB's definition would have been sufficient to address these concerns or that they could have enfolded within them the concepts suggested by the sociologists and complexity theorists.

Finally, emerging from the literature is a model that draws together the threads of these theories in a way that provides a guide for further research into the validity or otherwise of these ideas. In particular it provides a guidepost to identifying and

situating the competence required of individuals at varying points of a continuum between stable and controlled work environments and those that are uncontrolled and characterised as chaotic. In providing this guide also highlighted is the impact that the complexity theories have on the way in which competency-based training is applied in Australia and what this means for future research and enhancement of this approach to training.

CHAPTER THREE

RESEARCH METHOD

3.1 INTRODUCTION

In Chapter Two it was concluded that while much has been written about the application of competency-based training in Australia as an essential element of the national VET system, the workplace in which students of such training are expected to apply their newly learned skills and knowledge is not so well described. Nor does it appear that the workplace or the environment in which participants of such programs are expected to demonstrate their competence has in the past been analysed for the impact that it may have on the actual skills and knowledge required of individuals and teams to competently perform there when competency-based training programs are designed. In fact from the literature it appears that little acknowledgement has been given at all to the workplace environments in which participants of such training are expected to apply their skills and knowledge, and in more especially those environments that are characterised as complex, unpredictable, and chaotic. As a result little is known about the impact that the complexity theories have on the way in which competency-based training is, or can be, applied in Australia.

The aim of this study is to explore this gap in our knowledge. Of interest to this study are the following questions:

- Are the complexity theories relevant to Australian workplaces?
- In environments that could be characterised as complex and chaotic, what skills and knowledge do individuals apply?

- Where and how are these skills and knowledge learned?
- Could such skills and knowledge be gained through the processes of competency-based training?

The outcome sought of this study is an understanding of the issues raised by an application of the complexity theories to competency-based training, and whether or not CBT as it is applied in Australia, is capable in its present form of meeting the skills and knowledge needs of individuals whose workplace can be characterised as complex, unstable and chaotic. If not, what changes, if any, must be made to the way competency-based training is currently applied to make it so?

In this chapter the methods used to explore these questions from the individual's or past student's point of view will be reviewed. The methods used to collect and analyse the data will be discussed along with their strengths and weaknesses, and the measures used to check the quality of research and analysis to assure a high standard is maintained throughout. The range and profile of the research participants will also be clarified and any limitations of the research method and the data gathered.

3.2 RESEARCH METHODS

This was a qualitative study employing a multi-method approach to data gathering through documentation review, interviews, observation and focus groups. In turn, constant comparative, inductive and thematic analysis techniques were used to analyse and make sense of the data. The intention in doing this was to overcome the weaknesses and disadvantages of each individual technique through the application of a range of complementary methods for gathering data to either support the findings revealed in one or more techniques, explain these findings, or offer alternative means or hypotheses for understanding them.

This approach follows the reasoning by Arrow, McGrath and Berdahl (2000) whose studies of small groups and complexity found that to gather the richest and most reliable data in such contexts is through naturalistic research using comparative studies, experimental simulations, and theoretical studies using computational models.

In this they commend the use of natural groups from which to create multiple sets for comparison rather than single case field studies, the testing of hypotheses using group observation within (as close as possible) its natural setting over time, and the exploration of multiple different interpretations of a given theoretical point under a variety of conditions. While Arrow et al. describe this last approach from the point of view of computer simulations, this study relied on constant comparative analysis to test theories during the interviews, observation and focus groups.

While the advantages and disadvantages of the individual research techniques will be addressed later in this chapter, the advantages of applying such an approach are that it not only assists in the validation of the individual techniques, it also allows for an increased robustness of understanding of the outcome of the research and how they were revealed. This also allows for a higher degree of confidence to be gained in the interpretations of what is observed or gathered through data analysis through a form of triangulation that not only validates the research method but also allows for a better integration of the data gathered through the various techniques. At the same time it supports the development of hypotheses that may be tested by these same techniques or a combination of them (Agnew & Pyke 1994, Wood, Daly, Miller & Roper 1998).

The disadvantages of this approach can also be a reflection of the advantages. For example following a multi-method research approach can generate too much data, more than is required for either the research or the audience concerned. This has the potential to submerge the important data with peripheral details that expand rather than focus the aim of the research. The use of different techniques that follow procedures and measures that are not standardized also can potentially impact on reliability and replicability of the study. The importance of this is that qualitative research relies on cognitions relevant to the area under study that, once revealed, may be reflected differently should they be subjected to different research studies and different researchers (Jackson & Niblo u.d.).

Conducting a multi-method research can be expensive in time and financial cost and must therefore be carefully planned and its scope clearly defined before commencing the study. Because each technique, while complementary, requires a different approach (and sometimes a different range of respondents) the time and cost to set up and conduct this form of research can sometimes see researchers aim for a level and

quality of return based more on cost and time efficiency than on rigorous data gathering and analysis. The desired degree of depth and richness of data sought, or its breadth and variety, must be given considerable thought when preparing for such a study.

The ability to use the research findings to triangulate and validate each technique can also highlight negative aspects of these techniques or their outcomes which, on their own, may not be limiting to the research aim but when measured against the outcomes of another technique might be found less than optimal. As a result additional time and effort may also need to be spent in understanding and explaining the differences in the outcomes.

To overcome these disadvantages, this study involved a range of participants from different organisations and employed a number of data gathering and analysis techniques. While the number of respondents was relatively small the data were gathered and analysed in different ways to ensure triangulation and cross-checking, and to promote a higher degree of confidence in the research findings. The data gathering and analysis techniques employed in this study are discussed below.

Aside from the documentation review, this study followed an interpretative approach. It was based on the view expressed by Berger and Luckman (1967) and Agnew and Pyke (1994) that people construct their own realities socially and symbolically, and that knowledge is gained through social constructions such as language, shared meanings and documentation. Individual knowledge, therefore, is constructed through interactions in and with the environment that produces their experience. Through reflection, individuals create their own knowledge based on the meanings and interpretations they gain through their lived experience, and it was this knowledge that was sought during the data gathering.

Arrow et al. (2000), in their research into small groups as complex systems, tell us that research studies similar to this have, because of the nature of the method used, not sought such reflections and interpretations and therefore overlooked a source of very rich data. Instead the preferred means of conducting such research has been a quantitative approach using representative samples, questionnaires, experimentation (e.g., pilot studies), data gathered from previous research, and surveys. While

qualitative processes have been used (e.g., critical incident interviews, observation, 'modified' functional analysis), these have in the main focused on a need to endorse the outcomes of data analysis rather than contributing to the data in the first place (Schofield & McDonald 2004). Because it was seen as important that the data gathered in this study represent individual reality rather than a collective endorsement of data gathered by other means, while at the same time revealing meaningful generalisations, a qualitative rather than quantitative case study approach to the research was adopted.

In adopting this approach, however, borne in mind has been the previous research into complexity and its impact on small groups and their behaviour (e.g., Arrow et al.2000) that has revealed that any study that treats its subject piecemeal and in isolation rather than holistically will always be limited in the generalisability of its outcomes because it is of a phenomenon situated within its own perspective. Therefore, in conducting this study an acknowledgement was sought of the need to describe and understand the experiences reflected in the data while at the same time reflecting on the generalisability of the outcomes of any analysis of that data. In taking this approach the participants' voices framed within a natural setting became a reflection of the phenomenon, not the phenomenon itself. This, in turn, allowed for an analysis of data that were grounded in participant's actual experience and individual perspectives on the importance and relevance of this experience.

Also, because of the limitations of time and range of research participants imposed on this study the data gathering techniques selected were those which it was felt would result in the richest data being gathered in the time available. To gain the greatest understanding of the context within which these data would be framed, however, the interviews, focus groups and observations were supported with a number of other research activities. These included the following:

- A study of company records to determine the way in which the training undertaken by two groups of participants had been designed and conducted and the experience they had gained subsequent to this training. All participants in these groups had attended the same training program (although one group had its training program contextualised for their workplace) therefore aside from gaining an understanding of the training

they had undertaken, the data gained from these records was used to develop an understanding of the experience these participants had gained since and to complement other data gained through observation of workplace performance and the interviews carried out of these participants.

- Natural observations during workshops and tutorial sessions conducted by the researcher and external trainers and assessors. The purpose of the observations and the way in which they were conducted is discussed at section 3.8 below.

To codify and analyse the data emerging from this research a thematic analysis (Kellehear 1993:33-39) approach was selected. This is an approach that, according to Berg (1989), allows the researcher to develop themes within which data can be framed for comparison and analysis. Berg contends that these themes can be developed either inductively (i.e., as they emerge from the data), deductively (i.e., drawn from a theoretical perspective against which the data are used to test hypotheses), or a combination of them both (Berg 1989:111-112). Berg suggests that if the perceptions of respondents are to be presented in the most forthright manner then greater reliance should be put on an inductive approach. In his opinion, however, this should not be undertaken at the exclusion of deductive analyses therefore an approach to data analysis through a combination of the two was selected for this study.

Aside from following Berg's reasoning for using a mix of both inductive and deductive analysis, this approach was used because it allows for a certain degree of intuitive post-structuralism in which a search can also be carried out for 'omissions and oppositional symbols which may reveal one or several hidden agendas' (Kellehear 1993:33). This was an important aspect of this study's data gathering and analysis because it was clear from the outset that the on-the-job behaviour of some research participants was bound by rules and customs that do not apply to others (e.g., public versus private sector participants) but which could not be ignored because of the potential impact they could have on the lived experiences of those taking part in this study. In such situations using both inductive and deductive analysis enables sub-

texts or alternative meanings to be drawn and analysed for their impact on the data, even though their first appearance is quite often within the data itself.

In this respect, the approach taken to gathering and analysing the data for this research was similar to that given in Kellehear (1993), in particular the use of margin notes to record thoughts and feelings about sub-meanings based on responses from research participants and the researcher's own knowledge about the environment within which they work. This assisted in enriching the thematic approach to the data analysis and, while the difficulties in conducting such an analysis are discussed in section 3.18.3 below, the aim of its selection was to gather a wide range of information from diverse sources that could be combined to provide a rich, detailed description of issues relevant to a study of the impact the complexity theories have on competency-based training as it is applied in Australia.

While the essence of this study is of a phenomenon that theoretically is shaped by a constructivist view of knowledge (in the workplace) created from the context and environment within which it is applied, the actual means for conducting this research was created around an interpretivist view of the world. Here the research attempts to follow Hammersley who pursues a 'synthesis between social realism and constructivism', that is, a balance between understanding the 'complex world of lived experience from the point of those who live it' (Schwandt 1998:221-224) and, at the same time, acknowledging that these meanings are only real at the time and place in which they were formed.

Boyatzis (1998), in presenting a case for the adoption of thematic analysis in qualitative case studies, suggests that it allows a researcher to use qualitative methods to 'more easily communicate observations, findings and interpretations of meaning to others who are using other methods . . . allows more comprehensive understanding of the phenomenon (and) provide crucial insights to scholars in their review of 'what is known' to guide their research strategy and design' (1998:6). He does, however, point out the obstacles that such an approach faces. These obstacles will be discussed in section 3.18.3.

The outcome of this study and an analysis of the method followed will be discussed in Chapter Four.

3.3 ROLE OF THE RESEARCHER

Throughout this study as the role of the researcher was that of interviewer and non-participant observer (Agnew & Pyke 1994:176), staying on the sidelines and both observing what was going on while at the same time, and at the appropriate time, conducting more in-depth questioning to explain and understand what was happening (Krueger 1988:30).

There were four groups of respondents involved in this study:

- Group 1 – staff from an aged care facility;
- Group 2 – staff employed in a federal government department;
- Group 3 – a mix of public and private sector employees; and
- Group 4 – senior level managers from another federal government department.

Throughout this study these will be referred to both by their group number and (except for Group 3) the organisation within which they are employed.

Except for the focus group from Group 4 (the Defence Materiel Organisation – DMO), the researcher was known to some participants through social gatherings (Group 1 – Goodwin Village where his wife is employed) or formal training programs he has run (Group 2 – the Department of Employment and Workplace Relations – DEWR and some respondents from Group 3). During discussions on their participation in this research all participants acknowledged this and the importance of allowing the researcher to adopt the position of impartial and neutral observer during the interviews, the observation and the focus groups. To overcome the possibility that these relationships may influence the data being gathered by respondents inadvertently giving responses that they think the researcher needs as opposed to those that are expected to emerge naturally from the study, a fourth group was approached and their participation sought. This group had no previous dealings with the researcher and was therefore able to provide data that had a high degree of validity and reliability while at the same time triangulating data gathered from other sources.

To also avoid this becoming a longitudinal research project (and thereby potentially implying that it was an evaluative examination of the quality and effectiveness of the training that participants had undertaken in the past) in planning this study there were a number of objectives that had to be achieved. The importance of this was expressed by Barnes et al. (2003:275) who suggest that the researcher's role is to understand how 'different meanings and values creates different realities across which it may be difficult to plan and implement action that will achieve objectives, which may themselves have different meaning for the multiple players involved'. While the actual form these objectives took only became clear as the interviews and observations were being conducted, at the commencement of the study they included the following:

- Identify individuals and groups capable of providing data important to the study.
- Develop, through a review of documentation, an understanding of the level of skills and knowledge participants had previously gained through attendance at a competency-based training program.
- Develop questions that provide a framework for the responses elicited from research participants.
- Confirm the appropriateness of initial codes/themes developed for use in the data analysis.
- Identify the most appropriate people to invite to focus groups.
- Develop a framework upon which further research questions can be created based on outcomes of the literature review and initial observations of group interactions at work.

In many respects the selection of these objectives was intuitive because the very nature of complexity, as the literature clearly showed characterises and informs the environment in which this investigation was conducted, does not allow for absolute certainty when predicting what is sought or even the eventual outcomes achieving such objectives will bring. Even confidence in the appropriateness of objectives such

as these is not always assured until further information is gained that supports the initial contention that they are critical to the research outcomes. Therefore, the achievement of these objectives was due as much to the study of secondary resources such as company records and competency-based assessments carried out as part of the training programs, to the feedback received from respondents in the form of their responses to the interviews, and their behaviour during the observation as it was to the analysis of the primary data. This, in itself, demonstrated the very message that the complexity theorists present when they intone that knowledge both creates, and is created by, the environment within which it is used.

3.4 INTERVIEWS

In qualitative data gathering two of the main techniques used are interviews and observation (Madriz 2000:835). Throughout this study interviews were used as the primary method for collecting data about respondents' workplace and the skills and knowledge that they apply in workplaces that are characterised as complex, uncontrolled and chaotic. Such a perspective was sought from a range of respondents and to clarify and confirm the data that was expected to emerge, four focus groups made up of specialists and senior managers from the vocational areas under investigation were also conducted and the data gained from them analysed for similarities or contradictions.

There are many advantages to be gained by using interviews (e.g., ease of administration, usefulness in narrative evaluation, capability to discriminate, and thereby reduce, the quantity of qualitative information being received etc.) and, as Krueger (1988:23) and Patton (1990:196) tell us, in doing this there is an assumption that the perspectives of others are meaningful, knowable and able to be made explicit. This approach, however, also suffers from a number of disadvantages. For example there can be difficulty in comparing results if the approach taken is too unstructured or the samples may be unrepresentative of the phenomenon, there could be problems of (conscious or unconscious) bias on the part of the researcher or the participants, and there may be variations in knowledge and/or (intended or unintended) truthfulness

on the part of respondents (Agnew & Pyke 1994:196, Gomez, Moore, Mortera-Gutierrez & Torres 1999:9, Fontana & Frey 2000:650).

To overcome these disadvantages unstructured interviews were conducted. This involved the development of a list of open-ended questions to be put to all respondents but actually done so in a relaxed, informal and flexible way. This incorporated both an adaptive or creative interviewing approach (which, at times, was almost conversational) and a postmodernist questioning approach that included multiple voices (recorded, sorted and transcribed separately) and interpretive interactionism (Fontana & Frey 2000) – the identification and pursuit of ‘epiphanies’ during which the ‘topic of inquiry becomes dramatized by the focus on existential moments in people’s lives, producing richer and more meaningful data’ (Fontana & Frey 1994:368).

Following this approach enabled the researcher to expand on the questions during the interviews to draw more information from respondents if their answers appeared to cover only superficial aspects of their experiences. It also enabled the researcher to direct the line of enquiry into other areas that emerged from their answers and which had the potential to contribute to new themes or greater understanding of the overall phenomenon.

In doing this the raw data were gathered while at the same time the validity of the themes and the direction the questions were taking the research were constantly reviewed and, where appropriate, added to with new themes or questions. For example, the initial set of questions was tested on a number of respondents who had volunteered for this task. As a result this list was found to contain questions that did not contribute to the study and missed some that did. Further, the responses given by this group identified a number of themes that had also been overlooked when the questions and themes were first created. This allowed for a richer and more meaningful list of questions and themes to be settled on before continuing the interviews.

In a sense the questioning, rather than being an interview designed to uncover specific information, turned out to be more of an informal discussion around a broad overall

research theme within which were found sub-themes to guide the gathering of the data.

3.5 SELECTION OF QUESTIONS AND TIMING OF INTERVIEWS

The wording of the questions and the order in which they were asked was deliberately set out prior to the interviews to ensure that there was a smooth flow of questioning that followed a logical path through the themes from reflections on their training and assessment experiences to actual on-the-job application of their skills and knowledge. The choice of open-ended questions was so that respondents were allowed plenty of room for variety in their responses; however these questions were asked of all respondents, in the same order and recorded using the same codes and themes.

Following this approach meant that respondents were asked to share their individual perceptions about the whole experience of undertaking the training, being assessed against the training objectives, and later creating and applying on-the-job the skills and knowledge that they required in complex environments. The researcher's training and experience at conducting interviews related to military and criminal investigations showed that following such a logical pathway helped respondents recall and relate information that was richer and deeper than would have been possible had the questions been randomly selected and out of sequence.

To assist in the interviews a matrix was developed based on the list of issues and business scenarios revealed on page 52 that, according to the literature, demonstrates environments that are emergent, self-organising and unpredictable. This matrix was used so that respondents could recognise and indicate the environment that most closely resembled that which formed the background to their responses to several of the questions.

This matrix was developed along the lines of a Likert Scale in which these issues were transcribed into four columns representing stable and controlled environment at one end and a chaotic and uncontrolled environment at the other. The columns were headed as follows:

- Stable/controlled environment.
- Changeable/irregular environment.
- Complex environment.
- Chaos.

All but the second title were taken from the complexity literature. The second heading was created so that an option could be presented to respondents that described issues or an environment that were not stable or controlled but which were also not as complex as the complexity theorists describe. Because in the literature it is clear that workplaces can not be wholly one or the other, it was important that respondents be presented with an option that described workplaces and their environments that fell to a greater or lesser degree between the two. The heading of this column is therefore one that is not found in the literature but which the researcher felt accurately described environments that were not stable and controlled but at the same time were not as complex as characterised by the complexity theorists.

Options were further given to respondents to enable them to decide between the degree of stability or complexity found in their workplaces on days that were relatively quiet or those that were hectic or busy. This avoided them having to view all issues or situations as either black or white, or that they all had to fit under one heading when some may be leaning towards (but not fully falling under) headings to the left or right of those they were considering.

These options simply stated 'to a lesser degree' or 'to a greater degree', and except for the first category were read from left ('lesser') to right ('greater'). Because a more ('greater degree') stable environment is one that is the most removed from chaos, the options under the first heading are reversed. This was not meant to test respondent's reading or reasoning ability, simply to allow for a natural progression of understanding from most stable/least chaotic on the left to least stable/most chaotic on the right. To have the options at the heading of this column the same as that found in the others would have been confusing so this change was made and pointed out to respondents when the matrix was presented to them.

Below each heading are a number of descriptors. These descriptors were based on the issues and business scenarios described on page 52 and described activities or situations that graduated in complexity from stable at one end to chaos at the other. In each column were boxes in which respondents could indicate whether the descriptors matched their perceptions to a greater or to a lesser degree so that they may more closely relate their experience with the descriptors in the matrix. This allowed them to indicate issues that were relevant to the response they were giving but found in two adjoining columns.

An example of this matrix is at Appendix A.

To make it easier for respondents to more clearly define the skills and knowledge that they applied in such situations, the term 'day' rather than 'environment' was used even though environment is the term used by the complexity theorists. The reason for doing this was because when the first set of questions were developed some respondents viewed certain environments as hectic and complex while others viewed the same environment as stable and controlled. By using the term 'day', each respondent was thereby able to visualise an actual time in their working life and describe situations which, in their opinion and experience, were more or less controlled and stable than others.

Prior to conducting the interviews colleagues of the researcher agreed to act as respondents to practice asking the questions and using the matrix to get a feel for how long the interviews would take and the usability of the matrix. From this it was estimated that each interview would take around 40-50 minutes, however being unstructured, no specific time constraints were placed on them. The reason for not imposing time limitations was so that respondents could fully respond to questions in their own time, at their own pace, and in their own language. If more time was needed than was available (e.g., because respondents had to return to work if the interview was being conducted during their lunch break) then a second interview would be arranged. In this way each question could be fully explored with respondents and, where necessary, followed up with more in-depth questions put to them or explanations sought from them without being restricted to a specific timeframe.

The benefit of taking this approach was proven on two occasions, both times because respondents had forgotten to bring certain information with them and therefore had to postpone answering some of the questions until such time as they were in possession of it. In both cases the delay was over 24 hours but on neither occasion did it cause a loss in the quality or richness of responses.

Aside from testing the initial set of interview questions and the matrix (which, with fine tuning, was found to be useable as it was), the time it took for the early interviews was also noted (see Table 1) to give later respondents an idea of the time they may, as a minimum, need to set aside to participate in this study. If it was found that the interviews were taking too much time (because, for example, further explanations were needed to fully convey the meaning of a particular question), then the questions were reviewed to ensure that this did not occur with later respondents. For example, it was found on two occasions that certain questions required more time to explain their meaning than it took to answer them, so for subsequent respondents the wording was changed to make them less in need of explanation. Of importance, however, was that the respondents didn't feel that they were being rushed either by time limitations imposed by this study, by confusing questions or questions requiring knowledge they did not possess (e.g., questions about the background to organisational policies) or them not being properly briefed on the time the interview may take.

Table 1. Interview timings

Interview number	Initial interview with original questions (with colleagues)	Second interview with revised questions (with participants)
1	1 hour	40 minutes
2	1 hour 40 minutes	50 minutes
3	30 minutes	45 minutes

(Times are approximate only)

After trialling the questions, the next set of questions were trialled, with their permission, on three respondents to validate the codes/themes and ensure that the questions were, in fact, leading towards responses that were of concern to the research questions but were not taking so much time that respondents felt pressured to cut the interview short. In the event it was found that some questions and themes were not

relevant to the study and where thereafter discarded. These questions can be found at Appendix B. Additional questions were then formed and inserted, and the order of the questions rearranged so that they aligned with the themes emerging as the foundation for later thematic analysis. (See also section 3.19 for details on how the themes were developed.)

Interviews were then conducted with another two respondents to check the balance of the questions, the themes, and their ability to enhance the study. This then became the final list of questions (at Appendix C) which, when settled on, all respondents (including the initial group of volunteers) were taken through at least once in an unstructured interview. Where required some respondents participated in a follow-up structured interview (i.e., an interview centred around only one or two questions designed to elicit additional or clarifying information) or focus groups to cross-reference data or expand on earlier responses.

Most interviews were conducted face-to-face, however where respondents lived interstate or time did not permit face-to-face interviews, these were conducted over the telephone. Telephone interviews were not taped but detailed notes and records of interview were kept. Also kept were notes of emerging theories and links to other data, similar to the way in which they were kept during face-to-face interviews, for use in comparing the data as it was gathered and for later testing it against other theories that emerged from interviews, observation and case studies.

To make sure that each theory and theme had been adequately assessed for their importance and analysed against all other data, these notes were the last to be reviewed. Examples of these interview notes can be found at Appendix D. A summary of the interviews is detailed at Table 2 and the demographics of participants are detailed at Table 3.

Table 2. Summary of interviews

Group	One	Two	Three	Four	Total
Total Number of participants	7	15	10	13	45
Interview:					
Face to face	7	8	1		16
Telephone			9		9
Focus group	5*	7		13	25*

* Goodwin focus group participants was drawn from those who also took part in the interviews

Table 3. Demographics of participants in study

Group	One	Two	Three	Four
Number of participants	7	15	10	13
Organisation/industry sector	Goodwin Village Ainslie/Aged care	Department of Employment and Workplace Relations (DEWR)/Federal public service	Mixed private and public sector	Defence Materiel Organisation (DMO)/Federal public service
Training attended by respondents*	<ul style="list-style-type: none"> • Bachelor of Nursing (Registered Nurse) • Certificate of Nursing (Enrolled Nurse) • Aged Care Certificate III 	Diploma of Project Management	<ul style="list-style-type: none"> • Diploma of Project Management • Advanced Diploma of Project Management 	Information was not sought on this as it was not required for the study.
Role in research	Interviewee Focus group	Interviewee Observation Focus group	Interviewee	Two Focus groups
Number attending focus groups	5	7		13

* This indicates the training course attended by participants and upon which their responses to this study were based. Other training attended by respondents is detailed at Table 11.

As the actual location of the interviews was not important to the data being gathered, these were carried out at a time and place chosen by the respondent. Of importance was that the locations were relatively quiet so that the questions and answers could be heard and easily understood, private to lessen any discomfort that the respondent might feel on being interviewed in a public place, and comfortable so that the respondent was more likely to be relaxed physically and mentally.

Given that respondents were interviewed at a time of their choosing there was no fixed format for ensuring an equitable balance of these requirements across all respondents. Prior to the interview it was agreed with participants that, in the event that they felt uncomfortable or wished to pause or defer for any reason an interview that had already commenced, then such a request would be granted and arrangements made for a further appointment to meet at a time and place more acceptable to their needs. In the event there was no requirement for this.

3.6 CONDUCT OF INTERVIEWS

The respondents participating in this study were made up of four groups, three of which took part in the interviews and the fourth used to form two focus groups. One group (Group 1) was drawn from the aged care sector (a focus group was also formed from this group because of the need to clarify data subsequent to the interviews), and the remainder were practising project managers in the public and the private sectors. While the processes for selecting respondents will be looked at in more detail in section 3.10 below, a timetable for their interviews was established as shown in Table 4.

Table 4. Timetable for interviews

Date*	Activity
Weeks 1-3 of the research	Test interviews (drawn from Group 1)
Weeks 4 and 8	Test interviews (drawn from Groups 1 and 2)
Weeks 9-11	Interview with final set of questions (Group 1)
Weeks 12-17	Interview with final set of questions (Groups 2 and 3 although some telephone interviews were conducted during weeks 17-26 due to the unavailability of some respondents)
Weeks 17- 26	Focus groups (Group 4 and the focus group drawn from Groups 1 and 2) and data analysis

*Duration is for planning purposes only and is based on a commencement date of March 2003. Some activities were conducted concurrently.

The initial set of interview questions was piloted using volunteers from Group 1 and changes tested on Groups 1 and 2. Respondents in Group 3 were drawn from a list of potential participants who were widely dispersed and were therefore less capable of contact for more than one interview or follow up. It was assumed, however, that concerns with the questions raised by Groups 1 and 2 would also be raised by Group 3 had they taken part in the testing of the initial set however opportunities for further changes to the questions remained open even during the interviews conducted of Group 3.

The aim of the interviews was to probe for perspectives regarding experiences gained in implementing and seeking/gaining new skills and knowledge in environments that can be characterised as complex and chaotic.

The only prerequisite of respondents was that they must have attended a formal training program based around the principles of competency-based training sometime in the previous 2-3 years. The study was not of the training program or the way it was conducted but of the additional (if any) skills and knowledge individuals had to learn and apply in different contexts and environment. The plan therefore was to conduct unstructured interviews using the list of questions and the matrix described above. As Fontana and Frey (in Fontana & Frey 2000:653) found, however, because there was to be identified informants, and clearly discernible respondents and settings, such an approach had the potential to retain a fair degree of structure. Structure would also be found in the interviewer retaining a neutral role – never interjecting with his own opinion – and in the position of interested listener, and even though the aim was to ensure that the questioning is casual and friendly it would also be directive and impersonal. Responses would be rewarded but not evaluated. Structure was also applied in the discipline of note-taking during interviews to highlight specific themes emerging from the interview, issues for following up later either with the respondent or one of the focus groups, or theories for testing against the data. In this way a form of comparative analysis was being conducted during each interview, if only to gain another dimension on data that had already been gathered elsewhere.

As it transpired, the interviews conducted as part of this study confirmed Fontana and Frey's findings in that even though the plan was to keep the questioning conversational and open to deeper probing on issues that might have been unclear or lacking detail or clarity during respondents' answers, there was still a requirement to keep the discussions on track and within the limitations imposed by the research question and the time available to explore it. One respondent, for example, took so much professional interest in the study that on several occasions his answers tended towards a theoretical resolution to the research problem rather than a simple explanation of his experience. This meant that, as rich and fulfilling as his responses tended to be, they had to be returned to the interview question to finish the session at the point at which we'd previously agreed.

Another respondent at times drifted off into reminiscing about the lack of leadership she had received in the past and the impact this had on her ability to more effectively apply the skills and knowledge she had learned during the training she had undertaken. While this enabled a clearer picture to be gained of the environment in which she worked it did, at times, see her stray too far away from the original question therefore a certain amount of direction had to be imposed to return her thoughts to the issue being discussed.

Even though the basic thrust and structure of each question was retained, and in most cases was asked directly from the pre-prepared list, by keeping the questioning conversational the tone, pitch and tempo of each interview was able to be adjusted to suit each respondent and the environment in which the interviews were taking place. For example, one interview conducted in what, at first, was a relatively private area of a café soon had to contend with noise and other interference as lunchtime patrons began to take up the empty seats. This meant that the tone of the interview had to be more conversational to not draw attention to the researcher and the respondent nor make it appear that our meeting was anything out of the ordinary. To do otherwise would have, in the researcher's opinion, put the respondent at risk of being embarrassed by such attention and cause the respondent to either suspend the interview or result in data that may have been tainted through, for example, hesitation or embarrassment.

The conversational nature of the interviews also allowed any ambiguity in a question, or the reasons behind asking it, to be clarified as and when required. While this only occurred on only a few occasions, there were some instances when the purpose of the question was misunderstood (especially where respondents were trying to be helpful and coloured their responses with lengthy, but not always relevant, monologues) and had to be rephrased or enhanced through additional explanations. When this occurred it added to the length of these interviews however it did provide greater understanding of the respondents' workplace and other issues that played a part in the way they applied their skills and knowledge on the job. One respondent, for example, stated that not long after attending the training she sought a posting to another government department therefore the rigour with which she applied herself in the final days was not as conscientious as she would have otherwise done. This affected the type and

quality of skills and knowledge she sought to apply and, in her sharing this, led to a greater understanding of the individual and her workplace and opened up potential new avenues of research.

Because of the variations in depth and relevance of responses, the researcher had to play the role of arbiter when it came to deciding which responses required more clarification, which were irrelevant, and which were of interest to the study. This was initially carried out intuitively during the interviews and notes were made in the margins where further data or follow up was required with either this or other participants (in, for example, focus groups), for checking against the themes where previously unraised code-able moments occurred, or where data required further reflection on the meaning and potential value of responses.

A description of how this occurred during data analysis is at section 3.18.

3.7 MULTIPLE-VOICING

Throughout the research the concept of multiple voicing was applied. This is a post-modernist approach (Fontana & Frey 1994:368) where more than one person speaks on the same phenomenon (through observation of what they are doing, and through interviews and focus groups) thereby giving a wide range of perspectives, either individual views ('minor opinions') or those of the group as a whole (Gergen & Gergen 2000:1028-1029). These perceptions were recorded and repeated separately in the text either as quotes or as individual views on the phenomenon under study.

Using multiple voicing, however, is not without its limitations and criticisms. For example, while this technique allows for a significant amount of data to be gathered for analysis within the phenomenon, it is impossible to draw any firm conclusions or generalisations about issues outside the area of immediate research (physical and process) or of other 'voices'. Also, conclusions can not be prematurely made about the applicability of data that arises from outside of the parameters of the study or its relevance to areas within the scope of the research, even when there is a high likelihood that such data could be similar or the same as that already obtained.

Also, when qualitative data are gathered from many sources it can sometimes be difficult to determine at first which opinion is, and which is not, important to the research question or which is from the individual's perspective or that of her/his organisation. For example, is the individual expressing a personal opinion or one that her/his organisation wishes expressed? Moreover, is the opinion a true reflection of the phenomenon or simply a perception on the part of the respondent?

To overcome these disadvantages, throughout the data gathering the researcher acted as an arbiter in prioritising which data were chosen for analysis, and why. Where the data were not clearly of significance to the research, such selection was based on either feedback gathered during focus groups, follow up interviews or intuition based on the researcher's experience. The adoption of such an inductive approach to selecting data appropriate to this study is because when acting in the non-participant observer role it was impossible to test any hypotheses that emerged from the data collection or analysis and, as such, it was not possible to do more than suggest a causal relationship between events that required further investigation. Where induction has led to untested hypotheses this is noted in the data analysis and discussion section of the following chapter.

3.8 OBSERVATION

Denzin and Lincoln (2000:19) suggest that one way of enhancing research is by observation, a method of gathering data that helps the researcher see something for what it is rather than what others say it is or for the phenomenon that supports or drives it. This is especially true, as Kellehear (1993:5-6) contends, if such observation is unobtrusive and discreet.

Aside from its use in the triangulation of data gathered during interviews and focus groups, observation was used in this study to better understand the environment within which participants applied their learning and their reactions (in the form of the skills and knowledge they applied) to it. This is important because one of the claimed benefits of a qualitative study is that it significantly assists the researcher to identify and describe patterns and meanings that the subjects of the research may themselves neither see nor understand. As a result a concern at the outset of the study was that

participants might be capable of describing what they do or have done, but not fully understand, or be capable of articulating, the impact that their environment has on their performance.

Because this study centred on an investigation of the implications of a phenomenon as it occurs within a specific environment, this form of data gathering was seen as ideal. Moreover, there was a potential that observation could produce descriptions of not only what respondents say they do but also their behaviour in the context in which it is performed, the context or environment itself, and the way in which their performance changes this context, if at all.

On the negative side, observation can be highly subjective (Merriam 1998:95). Using it as a research technique can lead to charges of researcher bias (intentional or unintentional) and lower level of validity in findings should the participant group be too small, unrepresentative, or uncooperative.

Such a lack of cooperation, whether intentional or unintentional, can arise simply because of, for example, the presence of the researcher (Kellehear 1993:6-8). This was a phenomenon highlighted in the analysis of the unexpected outcomes of the experiments conducted at the Hawthorne Works of the Western Electrical Company by the Harvard Business School between 1927 and 1932 (Straub 1979:9-10, Robbins et al. 2003:45-46). Here it was found that simply participating in the research caused subjects to unintentionally display behaviours that contaminated the results.

To overcome these the researcher chose to conduct observations of one group in two separate and different settings: one setting was a natural workplace in which participants carried out their daily tasks, and the other was of the same participants as they interacted during workshops facilitated by the researcher and conducted to address issues arising out of their workplace but not related to this study. This enabled observations to be made of their interactions and the way they applied their skills and knowledge in their natural environment. It also enabled the researcher to observe the impact that traditional hierarchical levels and organisational policies, procedures and politics plays on shaping their environment and the way that they perform their functions on a day-to-day basis. In both cases the individuals knew they were being observed but the work they were doing (either in the workplace or while forming and

self-managing the workshops) was being monitored and directed by a third party (their manager, supervisor, co-workers or client) thereby taking the focus off the researcher and allowing him to more easily blend into the background.

Given that the researcher was known to the participants in the observation (some of whom had also taken part in the interviews), it was important to ensure that the environment in which they were being observed was as natural as possible and that the researcher could, as far as was practicable, merge with the background to be as unobtrusive as possible. To achieve this, the researcher followed Kellehear's approach in conducting simple observations of the subjects in their natural environment (1993:136-137).

Because, as Kellehear contends (1993:6-8) there are disadvantages in this approach (e.g., negative work practices may be consciously or unconsciously hidden by participants, interpretations being made by an external observer fail to grasp important in-group meanings, or 'intervening variables' being overlooked when observing and interpreting behaviour), the purpose of observing workplace practices was to identify actual rather than stated behaviour in the most easily accessible and inexpensive way. It was also carried out to provide another perspective of the data emerging from the interviews and focus groups and to add to the richness of the analysis of the data through having observed the phenomenon first hand.

The observation carried out in the workplace was of performance carried out of tasks that were being overseen by the participants' manager (who was not part of the observed group) and therefore more in line with their natural workplace behaviour. The workshops, on the other hand, were presented with a question or issue and allowed to discuss it amongst themselves before forming a response. Clarification and support was given to them to form their response but the observation was of how they interacted, and how such interactions impacted on or re-created the environment in which these interactions were conducted, when seeking an answer to the questions put to them. Because they were outside their normal workplace it was more difficult to observe the impact that this normally has on their workplace behaviour but, as the activity conducted within the group was a real work problem solving exercise, it could be argued that their participation created an environment that was related to their daily activities even though it may have been artificially induced.

Permission was granted by the manager of this workgroup and the participants themselves to carry out workplace observation over a period of six months. This observation was not conducted continuously over this period for three reasons:

- time did not allow for an observation to be carried out over such a lengthy period;
- this was not a longitudinal study therefore it was felt that ‘snapshots’ of the phenomena taken at irregular intervals would reveal data as rich and appropriate as would a full-time and lengthy observation; and
- as this was a qualitative study it was felt that more data would not necessarily result in better data and thereby generate a significantly greater result than that which could be gained through infrequent studies carried out randomly across the six month period.

The aim of these observations was to look for clues leading to inferences of performance that may not be revealed during discussions and questioning. For example, heuristic problem solving skills (i.e., solving ill-defined problems by, for example, trial and error, means-ends analysis, or working backwards from hypothetical solution) not taught during their training, might be something that participants do without realising that they are doing it, but observation of the way in which they solve problems and make decisions can identify instances where they are doing this and the context/environment that is shaped by doing it.

The following checklist was developed and used during observations (based on Merriam 1998:97-98):

- **The setting:**
 - What is the physical environment like?
 - What is the context within which performance is being carried out?
 - What kinds of behaviour does the setting promote or prevent?

- **The participants:**
 - Who is in the scene? How many are there? What are their roles?
 - What brought these people together?
 - Who is allowed here?
- **Activities and interactions:**
 - What is going on?
 - Is there a definable sequence of activities? Is it in accordance with the skills and knowledge they were taught?
 - How do the people interact with the activity and with one another?
 - What skills or knowledge are they applying that would not have been covered by their training?
 - How are people and activities connected or interrelated?
- **Frequency and duration:**
 - When do they apply the skills and knowledge they were taught?
 - How long do they do it for? Why do they stop doing it?
 - Do they apply them in some situations and not in others?
 - What, if observable, is the outcome?
 - How typical of such situations is the one being observed?
- **Other factors:**
 - Are the activities informal or unplanned?
 - Is there a symbolic or connotative meaning of the language being used?

- Are there nonverbal communication cues such as dress, physical space, power symbols?
- What is not happening – especially if it should be happening?

The conduct of the observations is described below.

3.8.1 Observation of groups in a workplace setting

While the on-the-job observation was limited due to time and opportunity constraints (e.g., because the nature of the skills and knowledge they were taught meant that they were not being applied continuously), descriptive field notes were kept both on the phenomena observed and explanations arising from the observation. These notes were critical to the analysis of the data and the data gathering techniques for researcher bias or external variables that may have influenced the outcome of the analysis. Notes were kept of key phrases, themes, quotes and words used by participants and these formed the basis of daily field notes that contained a record of events, people, conversations and the setting or context. Examples of these notes can be found at Appendix D.

3.8.2 Observation of workshops

As reported elsewhere in this chapter, two of the main techniques used by researchers in qualitative research are interviews and observation. According to Madriz (2000) conducting observations has the potential to bring together aspects of both techniques while at the same time retaining a unique approach to the gathering and analysis of the data. To achieve this, the systematic questioning of several individuals was carried out simultaneously in both formal and informal setting to achieve what Fontana and Frey (2000) describe as a blend of formal and informal interviewing. Coupled with observations of their actual performance a rich source of data were gathered that upon analysis generated a clear picture of the phenomenon under study and at the same time a triangulation of other data emerging from interviews and focus groups.

In making preparations for this study it was noted that one group of participants was also taking part in workplace problem solving and direction setting workshops at the same time as they were participating in the interviews. An agreement was made with the manager of this work team for the researcher to observe these workshops and, where appropriate, question the participants on their motives for certain actions or explanations of activities or processes that appeared to have special meaning for the group. It was felt that the data gathered from observing and questioning these participants would reveal a deeper understanding of the way in which skills and knowledge, gained as a result of a competency-based training program and subsequently learned through experience and interactions with others, were applied in complex and chaotic environments. The opportunity to conduct this observation was also pursued because it was felt that data could be gathered from observing the ways in which participants identified and applied the appropriate skills and knowledge required to cover real or perceived gaps between what they've been trained to do and what they need to do on the job. Because of the experience and maturity of the group (a point noted by their manager and expressed to the researcher as the reason why these particular staff members were selected for the workshop) it was felt that they would be more capable of reflecting on and discussing personal as well as collective thoughts and feelings on these issues that framed the way they worked in complex and chaotic environments.

During these meetings group interactions were also observed because, as Agnew and Pyke contend (in Agnew & Pyke 1994:196) this allows the researcher to gain another level of understanding that may not have been possible through other observations and interviews alone. More importantly it helped confirm data gathered through these methods because it was possible to actually observe the information being acted out.

For example, one group was asked about the way in which individuals in their workplace make decisions. Their explanation was that decisions are jointly shared but before giving this they discussed it amongst themselves and came up with a group consensus. As they were discussing this issue it was possible to add another dimension to the data being gathered because not only were they acting out what they were about to say, what was observed was an exploration of the alternate views and perceptions that may not have emerged through, for example, individual questioning.

It was almost as if they had to think about what they do naturally and unconsciously therefore the actual question was superfluous.

3.9 FOCUS GROUP

In following Krueger's advice to keep focus groups relatively small to retain control over the proceedings and the outcomes (1988:27), four focus groups were formed to gain another range of data regarding the impact that complex workplaces have on the skills and knowledge applied there.

The volunteers for these groups came from a federal public service organisation (the Defence Materiel Organisation – DMO – two focus groups, and the Department of Employment and Workplace Relations – DEWR – one focus group) and an aged care facility (Goodwin Village Ainslie). These organisations, and the membership of the focus groups, were selected for the following reasons:

- DMO was selected because it is well publicized as an environment in which a high degree of complexity and chaos frames its operations. It was felt that data gathered from focus groups drawn from experienced managers employed there would provide an alternative view to that gained through the interviews conducted with participants from other organisations. Moreover, because interviews were not being conducted with staff of that organization it was also felt that data gathered from the DMO focus groups would not be contaminated by any contradictory data emerging from, for example, interviews with or observations of other staff employed there. As a result data could potentially be more easily and accurately compared with those gained through interviews, observation and the focus group conducted within DEWR and Goodwin Village. These groups were drawn from volunteer middle and upper level managers who themselves were interested in the data as a means of better understanding the competence required of current and future staff reporting to them.
- A focus group from DEWR was arranged to cross-reference the data gained through individual interviews. A significant amount of discussion

was generated regarding the validity and appropriateness of the responses given by participants of this group thereby further validating both the data emerging from this focus group and that presented previously through the interviews.

- The aged care facility was selected as appropriate for the formation of a focus group because of the different forms of competency-based training that respondents from this organisation had undertaken in the past or, as in some cases, still being undertaken. Goodwin Village was chosen because the researcher knew the manager there and was friends with a number of staff. The aim was to encourage participants of this group to explore the different training and education they'd undertaken and from this draw conclusions for analysis. This group was also used to explain acronyms and terminology, procedures and processes described by respondents during the interviews but requiring clarification by the researcher.

The actual selection of participants from these organisations was managed internally, participants being called for through an internal email sent to, in the case of DEWR and DMO, experienced project managers and directors responsible for high level and complex projects. In the case of the aged care facility volunteers were called for from within the group of respondents who had taken part in the interviews.

In keeping with the ethical considerations of this research, membership of these groups was wholly voluntary and members were free to withdraw at any stage. This did not happen: In fact others expressed an opinion that they too should have been able to form focus groups but time did not allow this.

Krueger (1988:44-46) gives a number of disadvantages and advantages of using focus groups. The disadvantages include difficulties in coordinating participants and selecting a location where all can meet and feel comfortable, there is less control over data collection because the participants actually shape the discussion, and as a result the moderator must be experienced in facilitating discussions and encouraging all participants to contribute. The advantages, for the purpose of this study, are that it is economical, enhances validity through face-to-face interaction with participants, and it allows individuals to confirm, in a non-threatening and familiar environment, their

own perspectives of the issues surrounding both the research question and the processes followed in gathering the data.

In the case of DEWR and DMO, because the focus groups were carried out in conference rooms near to where the participants worked, all appeared to be relaxed and easily enticed into providing data relevant to the study. In the case of the focus group drawn from the aged care facility, this was conducted in the lounge room of one of the respondents (who was well known to the other participants) and as a result they too appeared to be relaxed and more forthcoming than they were during the interviews. The outcome of this was that a deep and rich range of data emerged, particularly the feelings and opinions that they may not have felt comfortable expressing in an interview.

An example of this emerged when one participant, a Chinese national working in Australia, only felt comfortable talking about her early work experience in China when it was clear that others in her focus group supported her doing this. Such insight did not come out during her interview. Another example occurred with participants who appeared to be hesitant while being individually interviewed but were more relaxed and confident when contributing in a group.

Examples such as these not only added to the richness and relevance of the data, they appeared to also validate individual beliefs and experiences and make them more real. It also appeared that in a group individuals were able to recall shared experiences and, in explaining them, gain a deeper insight into what occurred and their reactions to it. This occurred in all of the focus groups and as a result, using this approach to data gathering also allowed for a certain amount of quality control in the data collection and its reliability as an accurate description of what occurred and how individuals and groups reacted to it. For example, opinions expressed in front of others appeared to be more likely to be genuinely felt by individuals and teams as a whole and honest in their depictions of the phenomenon being discussed than those presented as personal and limited to individual and/or one-off situations. While, in the case of DMO, there were alternative – and at times very strong – opinions, these could be discussed with both being given equal airing and consideration for their relevance to this study.

While the skills needed to facilitate a focus group are not dissimilar to those needed when conducting small group workshops or facilitating, for example, brainstorming sessions, Fontana and Frey remind us that there are a number of points of which the researcher must be mindful (2000:652). In particular is the potential problem of one or more people dominating the conversation and, in doing so, dominating the group. While all respondents were keen to contribute their experiences and feelings, some were more vocal than others so, to avoid this becoming an issue, where this occurred the quieter or less confident members of the groups were encouraged to contribute so that responses were received from the groups as a whole and not just the more vocal members.

The dynamics of focus groups must also be managed to keep all participants focused while at the same time allowing them freedom to explore issues that might not have been obvious to the researcher prior to the meeting. For example, participants in the various focus groups were from the same organisation and in each group there was inevitably one person more senior than the others. As much as Krueger (1988) encourages researchers to seek a balance of participants but avoid using those from the same workgroup or supervisors and their staff, the limited time and small range of prospective members available to this study meant that this could not be avoided. Any potential concerns that this may have caused, however, were avoided because early in the group meetings participants were informed that their individual contributions, as well as their collective contribution, were going to be important because they would be based on their personal beliefs and individual knowledge borne out of a the context shaped by their experience. This included individual experience gained through their work and life history as well as their experience working together. Therefore, no single person's contribution was going to be any more important, or any less, than everyone else's. In doing this the atmosphere was more relaxed and generated a rich flow of information that both confirmed other perspectives (and others' perspectives) while accumulating new knowledge and data – although they can sometimes be too relaxed, as occurred with one group when the practice interviews were conducted during and after dinner.

Finally, of importance is that focus groups can act as informants to help clarify a researcher's understanding of data and especially jargon, terminology and the culture

that surrounds it (Fontana & Frey 2000:651). In this study a guide for the conduct of the focus groups was developed (attached at Appendix E) to help maintain control over the direction of the groups and ensure that the objectives of bringing them together were being achieved. The purpose, aim and conduct of each focus group was explained and agreed at the outset with the result that participants became involved in the gathering and synthesis of the data emerging from the group discussions, and at the same time provide a second and third perspective on the issues that also emerged while doing so. It also gave them a sense of ownership of the data and the research, and an opportunity to consider their views with others and through this reflect on the data they and others were contributing to the research project.

3.10 RESEARCH PARTICIPANTS

One of the major problems for any research is selecting, and getting permission from, those whom the researcher seeks to study (Krueger 1988:91). Johnson (1975:50) suggests that the reason why so much emphasis is placed on selection as an issue of some importance is twofold: without such permission the research cannot be carried out, and the researcher's entrance into the research setting defines how the participants view the research, trust the researcher, and from this make their decision to cooperate with the researcher in the production of an objective report.

Selection, however, is more than simply asking people to be involved in a study. It also involves defining the research problem, selecting a setting, deciding on a balance of overt and covert observation, and defining what is to be done and why. Some of these aspects, or others important to the research, may only emerge once the study has commenced (Johnson 1975:60) therefore choosing participants can be especially difficult. The first step, however, is to select an organisation from whom permission can be gained to approach staff to request their participation in the research.

Fontana and Frey (2000:654-656) provide extensive guidance on some of the factors that should be considered when looking to gain such access. These centre not simply on the choice of organisation but also on establishing rapport and empathy with those people within the organisation who it is expected will participate in the research. For the purposes of this study it was possible to identify, through acquaintances, three

organisations whose management teams were not only willing to release staff to participate in the research, they were also familiar with the concept of competency-based training and the potential of those trained using this approach to influence the achievement of organisational goals and objectives in stable and complex environments. (In selecting participants for the fourth group, through previous activities the researcher was able to access a list of individuals from varying private and public sector organisations who had completed a competency-based training program and who, upon being contacted, volunteered to take part in this study.)

Preliminary meetings were held with senior staff of these organisations at which time the purpose of the research and the expected outcomes were discussed. This resulted in formal approval being given to select and approach prospective participants to be part of the study. Official approval to do this was confirmed with the signing of a pre-drafted letter of agreement by the prospective participant's line manager on behalf of the organisation. An example of these agreements can be found at Appendix F.

The benefit of approaching these organisations was not just that the management teams supported a competency-based approach to individual and team development but also the high degree of complexity within which they operate daily. Such complexity is regularly reported in the media (especially that which defines the operations of the DMO and the aged care sector in general) therefore it was felt that as the research question is centred on an investigation of training in such environments, it was important to select participants whose experiences were framed through their work in such environments.

Taking part in this study were 45 participants, seven from an aged care facility in Canberra (Goodwin Village), 28 from two federal public service departments (the Department of Employment and Workplace Relations – DEWR, and the Defence Materiel Organisation – DMO) also in Canberra, and 10 from a mix of private and public sector organisations in Canberra, Melbourne, Sydney, Brisbane and Perth.

All seven participants from the aged care facility (Group 1) took part in the interviews, five of whom also took part in a focus group. Eight participants from one of the federal public service departments (DEWR) (Group 2) took part in the interviews and observation, while a further seven participated in a focus group. All 10

participants from the mixed public and private sector organisations (Group 3) were interviewed while the remaining participants, from the DMO (Group 4), took part in two focus groups. The purpose of selecting such an eclectic group was discussed in section 3.10 in Chapter Three.

The experience of respondents in their current position ranged from over 5 years to as little as 3 months, however on further questioning all were found to have had previous experience in similar positions so the figures given here would have been far broader had they been questioned on overall rather than current experience. Of those responding to the interview questions and taking part in the observation, except for five respondents from the aged care facility all were middle to upper level management, although those from DEWR and the mix of public and private organisations were managing projects (of varying sizes) rather than managing work centres of what could be considered a traditional branch of an organisation. Two were senior directors with up to 10 years' experience with only one with less than one year's experience. The five aged care respondents were carers and not responsible for supervisory or management duties.

In short, all respondents taking part in this study were mature and, while possessing varying degrees of experience in their current positions, had significant life skills in both paid and unpaid (e.g., home) workplaces.

Although their exact details were not sought, the members of the focus groups from DEWR and DMO at the time of this study were practicing and experienced project managers. In both cases participation in these groups was volunteered and their applications were channelled through another manager who confirmed the level of experience these participants held.

The demographics of these groups, and the positions they held at the time of the study (and the length of time they had held them) are detailed at Table 5 (p.132).

As the researcher had conducted training in the past for two of the groups (Groups 2 and 3) it was felt that responses needed to be balanced by the inclusion of respondents with whom the researcher had no previous contact. To achieve this, and at the same time gain a wide range of perspectives, respondents were selected not just from

different organisations from those with whom the researcher had had previous contact, but also from different workplaces. The aim of this was fourfold:

- To avoid unintentional bias on the part of the researcher and/or respondents, while at the same time assisting in the triangulation of the data and analysis to enhance reliability and validity of the processes and outcomes.
- To achieve a wide understanding of respondents' experiences and the environments within which they gained it. It was felt that to interview respondents from the one workplace would not result in data reflecting different aspects of complexity as experienced by others in different workplaces.
- To explore the similarity or contradictions between individual perceptions as they reflect experiences gained in different environments.
- To determine whether or not it was possible to make generalisations about the data and the outcomes of the analysis.

It was accepted, as Kauffman (1995) states, that all living systems are complex therefore the workplace within which respondents worked was not itself an essential criteria for selection, nevertheless to avoid having to include in this study lengthy descriptions of why certain workplaces fit the characteristics offered by the complexity theorists, those selected were done so because they are well known as complex and often chaotic environments in which to work. It was also important that more than one workplace be captured to compare and contrast not only the data but also the context from which the data emerged and the issue of how generalisable the outcomes may be.

To gain a different and broader perspective on the research topic a group that was not from any one organisation was also invited to participate in this study. This group was drawn from students who had recently graduated (i.e., within the last 3-4 years) from a competency-based diploma course (the same one undertaken by the employees of DEWR, one of the federal government departments described above). These invitees were drawn from various public and private organisations and, although they were

widely spread geographically (most were in other cities around Australia), their selection was based solely on their having completed the entire program and, unlike those from the other groups, not the environment within which they work.

The demographics of respondents are detailed at Table 3 on page 112 and Table 5 below.

Table 5. Positions held by respondents at time of study

Organisation/facility	Part. No.	Position	Length of time in position
Goodwin Village Ainslie (Group 1) 7 participants (Focus group members were drawn from these respondents)	GX1	Team leader	18 mths
	GX2	Carer	4 mths
	GX3	Carer	15mths
	GX4	Carer	8 mths
	GX5	Team leader	9 mths
	GX6	Carer	8 mths
	GX7	Carer	3 mths
DEWR (Group 2) 15 participants (Included in these figures are 7 participants who formed a separate focus group. Their demographics were not recorded.)	DX8	Assistant Secretary	8 mths
	DX9	Project Manager	4 mths
	DX10	Manager Policy	13 mths
	DX11	Manager Contracts	10 mths
	DX12	Deputy Director	4 mths
	DX13	Manager policy	16 mths
	DX14	Senior Project Manager	3 mths
	DX15	Project Manager	4 mths
Others (Group 3) 10 participants	DX16-22	Focus group participants	
	OX23	Project Manager	8 yrs
	OX24	Senior Project Manager	5 yrs
	OX25	University Lecturer	7 yrs
	OX26	Senior Project Manager	5 yrs
	OX27	Project Manager	3 yrs
	OX28	Project Manager	5 yrs
	OX29	Director	Not given
	OX30	Company Director	10 yrs
	OX31	National Program Manager	18 mths
OX32	National Program Manager	6 yrs	
DMO (Group 4) 13 participants	33-45	This group formed two focus groups used in this study. Both were made up of experienced project managers and project directors.	Ranged from 2 years to over 20 years.

Having decided on the areas from which to invite participants to take part in this research, a list of names was drawn up from the organisations themselves (either volunteers responding to calls for assistance or suggestions from management in the case of the aged care facility and the federal government departments), from

recommendations from other staff, (i.e., what Fontana & Frey 2000 calls the 'inside informant'), and from the researcher's own experience working with these groups.

This final group included a list of former students of a Diploma of Project Management program who were spoken to personally by the researcher. The names of members of this group were randomly picked from a list of those having completed a competency-based training course in the past 3-4 years. Such an approach to selecting participants follows Krueger (1988:92) suggestion that contacts, existing groups and lists of names (such as telephone books and rent rolls) are methods usually preferred by researchers when identifying potential participants of research groups. He points out (1988:97), however, that lists and contacts can lead to concerns about the quality of participant. For example, existing groups may already have established ways of interacting with each other (e.g., superior-subordinate) or may fear expressing negative feelings or comments in front of co-workers or supervisors. Other concerns include the fact that those on the list may not be actually applying the skills and knowledge gained during a training program, however uncovering this fact was one of the purposes of this study therefore this was not seen as a concern.

As Groups 1 and 2 were formed from existing work teams contingency plans were made to address Krueger's concerns, for example selecting participants from diverse work areas and the use of a range of research methods to triangulate data to overcome the possibility that they had formed their own ways of doing things or there were relationships already created based around workplace hierarchy. Members of Group 3, as far as could be ascertained, were completely unknown to each other therefore it was highly unlikely that they had formed common approaches or superior-subordinate relationships.

Moreover, because only a relatively small number of people were invited to participate in this study, Krueger's concerns, should they arise, had the potential to limit the quality of the data being presented by respondents. Each respondent was therefore interviewed separately and as far as was possible their identity was not disclosed to others. As participants in two of the three groups worked together, however, it was accepted that it was highly unlikely that their participation was not known to others. As the prospective participants in Group 3 were not likely to know each other it was believed that this would probably not affect them, however they, like

all respondents, were assured that whatever could be done was done to ensure that their participation would not be disclosed to others and they were comfortable with and throughout the interviews.

What participants could expect by way of confidentiality and support throughout the research was explained in an information sheet that they were asked to read and sign indicating that they understood the background to the study, the role they were being asked to play, and their agreement to take part in the research. They were further reminded throughout the interviews that they had the right to withdraw at any time and for any reason – especially if they began to feel uncomfortable with the way that the interviews were being conducted or the outcomes that emerge from their participation in them. In the event none withdrew from the study.

An example of the letter sent to all participants is at Appendix G.

3.11 ETHICAL CONSIDERATIONS

Owen and Rogers (1999:158-162) in their extensive treatise on the conduct of evaluation, describe the five Guiding Principles for Evaluators defined by the American Evaluation Association (AEA). These principles (covering systematic inquiry, competence, integrity/honesty, respect for people and responsibilities for general and public welfare) were designed both as a code of practice for members of the AEA and as a yardstick against which research and evaluation could be measured for its acceptability to clients and other stakeholders.

Aside from ‘competence’ it could be argued that the AEA’s Guiding Principles are all about the application of ethical practices in the gathering, evaluation and analysis of data within a research setting and therefore don’t go far enough in defining the ethical considerations of a research project such as this. The reason being that this form of study is of a phenomenon that is created, measured, and valued by the participants only at the time that the phenomenon emerges and within the context from which it emerges. Ethical consideration, therefore, are centred on the way in which the research is conducted but cannot be applied in a general way because of issues that emerge naturally out of the phenomenon.

For example, there was no real research setting involved in this study because the data being gathered came just as much from respondents' history as it did from their current work lives. Furthermore, every participant's history was different therefore adopting an ethical response to one person's need for, for example, privacy in this regard had the potential to inadvertently limit the richness of data to be gathered from another's. To gather such data from one and not another was defeating the purpose of their participation.

Miles and Huberman (1994), on the other hand, also considering ethics and its place in research, list several issues that should be considered, including the following:

- informed consent;
- harm and risk;
- honesty and trust;
- privacy, confidentiality, and anonymity; and
- intervention and advocacy.

Before this study got underway participants were assured that their concerns about these issues would be addressed through a mutual undertaking to protect them and their organisation. Such an undertaking had been presented to the Human Research Ethics Committee of the university prior to the research commencing with the result that approval was granted for the conduct of this study (approval number HE03/088 valid until 17/2/2005). A copy of this approval is at Appendix H. This was made known to all respondents along with written confirmation that they were free to withdraw from the research at any time.

Other ethical considerations were also made known to participants. These included the voluntary nature of their participation, their right to withdraw any time from the research, confidentiality of data and how it would be stored and disposed of, avenues available to them for questions and issues of concern, and an explanation of the processes to be followed throughout the interviews. Their acknowledgement of this was sought in the form of a consent form attached to the information sheet that was given to all participants of the interviews.

3.12 SENSITIVE INFORMATION

Boyatzis (1998) also raises a concern that centres on the nature of thematic analysis, that being a method of uncovering data through an individual's own words, actions and outcomes. In his view this results in data being gathered that is quite often more sensitive than any that may be gathered using questionnaires or surveys. He states that the 'increased sensitivity (that this causes) requires a high degree of thought and caution regarding the subject's informed consent, protection of confidentiality, protection against abuse use of raw or coded data, and protections against abusive application of the results of the study' (1998:61).

To avoid any disclosure, even in the research report, or use of information or observations that may result in sensitive data being obtained, clarification of what was and was not releasable (and in what form and when) was sought from the individuals concerned before any further use was made of it. Sensitive information that had inadvertently become part of the research data (e.g., business issues or comments regarding personalities) was immediately expunged from the records, and tape-recorded information deleted.

3.13 INFORMED CONSENT

As Fontana and Frey point out (2000:662), the fact that the subject of an interview (for example) is a human being, extreme care must be taken to ensure that participants are not harmed in any way as a result of their taking part in the research. This raises the issue of informed consent, or in other words, participants giving their consent to both the research and its outcomes only when fully cognisant of all of the facts surrounding how the study will be conducted and the outcomes (if any) of the research will be used.

Informed consent includes honest and truthful disclosure of all of the facts concerning the research, its publication and the individual's rights, especially their rights to privacy. It also includes the fact that they can, at any stage, withdraw their approval to being subject to the research at any time without penalty, and that all attempts will be

made to protect them from harm whether they decide to withdraw from or continue to participate in the research.

Clear and detailed information about the project was given to all prospective participants and, prior to the study getting underway, both oral and written consent were obtained from individuals on their own behalf and on behalf of the organisation within which the study was conducted. This was in the form of the introductory letter attached at Appendix I and the consent form attached to the participant information sheet at Appendix J.

3.14 QUALITY ASSURANCE

Qualitative research is by its very nature a multi-method approach that studies objects in their own natural setting. It uses an interpretive and naturalistic approach to attempt to make sense of or interpret phenomena in terms of the meaning people bring to them (Denzin & Lincoln 2000a, 2000b). It is not a means of validation, simply an alternative to validation through the employment of interconnected data gathering techniques to triangulate that which emerges from the studies of a phenomenon and thereby make sense of it.

While the purpose of using multi-method data gathering techniques is to enhance the confidence given to its outcomes, another important objective of this form of research is to ‘describe, explain and make understandable the familiar in a contextual, personal and passionate way’ (Janesick 2000:391-395). As this study progressed it was found that in applying this method it was much easier to carry out the data gathering and analysis processes and at the same time ensure that the highest level of clarification and explanations emerged from them.

While multi-method research can be time-consuming and not always guaranteed to overcome the weaknesses of single-method research (e.g., more data doesn’t always guarantee it is any more correct or truthful, there is no guarantee of validity, agreement of results doesn’t always guarantee that the results are correct, etc), in this study it helped address and explain the different but complementary issues that arose (e.g., the structure of the various training programs respondents had undertaken *and*

the skills and knowledge they had to later acquire to be fully competent in their workplace). It also assisted the exploration of the reasons behind relationships between variables and gave a broader range of perspectives. Of importance, though, is that it reduced threats to the validity and reliability of the research through a closer identification of those inferences and conclusions that were valid and those that were not.

Having said that, this study was not an examination of individual competence nor of the quality of the training they had undertaken. It was of their experiences in enhancing the skills and knowledge gained through their training to meet their needs while working in a complex environment and their opinions based on this experience, both from the point of view of those who had lived this experience and those who had expectations of what such experience should give to others. The data gathered from the interviews and the focus groups reflected similar themes and, upon analysis, similar opinions.

Further checks to assure the quality of this research included the application of multi-method data gathering techniques.

Emerging throughout this study (although not itself a major focus of this research) was the inferred role played by constructivist learning and its relationship to training and knowledge management in complex and chaotic environments. Given that the literature describes this as part and parcel of working in today's organisation it was appropriate that its meaning as far as the validity of research findings goes should also be explored.

Lincoln (1995:287) argues that the validity of knowledge arises from 'the relationship between members of some stake-holding community' and that agreements about truth 'may be the subject of community *negotiations* regarding what is accepted as truth.' (emphasis the author's). This suggests that if the stakeholders and participants accept the outcomes of the research as truthful and accurately reflecting what occurs in their workplace then potentially they will have greater confidence in its validity. Lincoln and Denzin, (in Denzin & Lincoln 1998:412) on the other hand, suggest that too often the final product is that of the researcher no matter how much it has been 'modified or influenced by the subject'.

To enhance the validity of the findings and inferences emerging from this research the data were triangulated using interviews, workplace observation and focus groups. This not only involved ‘multiple-voicing’ (Gergen & Gergen 2000: 1028) but also the multi-methods research processes described above. In so doing, information was tested against other sources of the same information (e.g., other respondents, focus groups or from the literature) or of the same source responding in different situations and contexts (e.g., private interview versus feedback during focus groups). The mix of respondents was designed to achieve this.

Where inconsistencies or contradictions emerged, additional data (gained through further interviews or questions put to the focus groups) were sought to explain why they have occurred and what inferences could be drawn from this. Where consistencies were clearly identified and inconsistencies and contradictions explained, the reliability of the findings was enhanced and in turn the credibility and validity of the research processes increased.

To test the reliability and validity of the data, issues that challenged the research findings were explored and implications drawn. To this end explanations of rival data were also sought and the data that did not fit the themes developed to assist in comparing and analysing the data were analysed for negative cases and contradictions. For example, explanations were sought as to why one participant would contradict or present an opposing view to that given by another participant in the same work area, or why two respondents reported similar experiences even though their workplaces are totally different.

Parallel to this were tests of internal (“Did the study achieve what it set out to achieve?”) and external validity (“How relevant are the findings and inferences to other sites?”) (Scriven 1991:160, 198, Agnew & Pyke 1994:131, Merriam 1998:198-212). While the study was based around capturing data relevant to an emergent phenomenon (i.e., one that can only be described once it has emerged), when the validity of the research was tested against whether or not the research question had been achieved the answer was not one of ‘Yes’ or ‘No’, but how much deeper could it have gone. That the phenomenon existed at the time of the research is without doubt, but the extent of its existence and its relevance to other environments and

contexts was outside of the parameters of this study and are therefore offered for future research.

On the question of external validity, without further research the relevance of the research data to other sites is also primarily inferential based on responses given by participants. An attempt was made to determine generalisability and relevance across situations and sites but this was discarded after it was realised that the participants were not the researcher therefore inferences made from their responses could only be taken as relevant to their situation and experiences. For example, one of the original questions asked participants for their opinion as to the generalisability of their responses to other similar work areas. While some felt they could answer this question, any response they gave was based solely on their experience and not on acceptable proof therefore this question was omitted from the final set. Any generalisability of the data is therefore inferred only. Further research is required to confirm these findings.

Finally an essential element of validity is an understanding of the values and biases that the researcher brings to the study. To this end the researcher's background and biases must be explained.

For the past 10-12 years the researcher has been studying the phenomenon of training within complex and chaotic environments to better understand the shortfalls and shortcomings of, *inter alia*, the national VET system. The purpose of this was, as both an internal and external consultant, to help organisations identify the strengths and weaknesses of such an approach and judge for themselves whether or not they could – or should – be involved in it. As a result the researcher has built up a considerable amount of experience here and overseas in the way in which competency-based training influences learning outside of the confines of publicly-, or privately-, sponsored training environments.

This background had the potential for the researcher to pre-judge the data upon which the research findings were based and through this see the emergence of inferences and lessons centred more on his experience and developed beliefs than on the emergent data. To avoid this he relied as much as possible on the participant's own words as the descriptions of the research findings. Examples, where appropriate, were given in the

participant's own words to illustrate meanings drawn from the data, and wherever possible the researcher encouraged them to summarise and draw inferences from their experiences. In this way it was hoped that the participants were the ones describing the phenomenon of competency-based training at the 'edge of chaos' and not the researcher.

The researcher also employed the bracketing method described in Janesick (2000:390) to confirm or validate his own experience with that of the participants. This maximised his capacity to treat all of the data equally, including that which came from his own experience, and look for 'points of tension and conflict and what doesn't fit' (Janesick 2000:391). This saw the following steps applied (adapted from Janesick 2000):

Step 1. Identification, from the researcher's own experience, of the key phrases and statements that related to the study, and interpretation of them as an 'informed reader'. This allowed for a deductive selection of the initial interview questions, and of themes within which to cluster these data for analysis, which later allowed for inductive improvements to be made to both through reflection and analysis of the emerging data.

Step 2. Gathering the participants' interpretation of these findings. This occurred initially through trial and error – the initial set of interview questions being trialled with colleagues to determine their relevance to the research question, timing, and their validity as questions through which meaningful data could be gathered. As the interviews were unstructured it was also possible to test the appropriateness of the researcher's experiences with participants (of interviews and focus groups) on those occasions that the discussions revealed similar or opposite experiences. This allowed for a greater understanding of the validity of such experiences and revealed, where appropriate, alternative positions, interpretations or experiences that were contradicted those of the researcher.

Step 3. Inspection of these meanings for what they revealed about the essential, recurring features of the phenomenon being studied. One of the techniques used to triangulate and analyse the data were a comparative analysis which, through comparison with other data, allowed for a number of views to be developed of each level of data as it emerged through the interviews, observation and focus groups. Because of the varied backgrounds and experiences of participants it was possible to gather data from those whose experiences were similar to those of the researcher and from those whose experiences were vastly different (e.g., while the environments were relatively similar, participants with a nursing background were able to describe experiences similar to those of respondents with a defence background even though their professional fields are vastly different). In doing this it was not only possible to view the same phenomenon in different ways, it was also possible to look beyond the data to identify and investigate hidden or subliminal meanings arising out of, for example, data that were presented in the form of answers to the interview questions which were compared to data that arose out of observations of the respondent/s in their natural workplace. Furthermore, such data as arose out of the answers given by respondents in one workplace could also be compared to that which was gained, for example, through a focus group drawn from a different workplace thereby allowing for not only a different picture of the same phenomenon to be created but also an enhanced understanding of the overall environment in which participants in the profession concerned find employment. This in turn allowed for a broader understanding of the relevance of the complexity theories to the workplaces in which participants are employed but, at the same time, added further investigable elements and code-able moments to the study. The range of options open to the researcher in doing this was greatly increased because of the varied backgrounds and experiences of the participants and with each set of data these options multiplied exponentially. This, in itself, was a testament to the nature of complexity.

Step 4. Offering a tentative statement of definition of the phenomenon in terms of the essential recurring features identified in step 3 above.

Following these steps was made less difficult by the adoption of a thematic approach to the coding (as themes) of data deductively (as detailed at step 1) and later inductively defined as the data emerged. By continually cross-checking these themes with the data, and making adjustments where required (see section 3.19 below), it was possible to cluster the data for later analysis. As patterns emerged these were referred back to interviewees (where appropriate) or to focus groups to confirm their relevance to the study and veracity insofar as the participant's experiences was concerned. With each iteration the phenomenon became clearer allowing, in the end, for a simple drawing together of the themes into a conclusion emerging from the data that were relevant to the study.

This approach was chosen because it offered the greatest potential to reduce researcher bias which others (for example Merriam 1998:44-45, Selby Smith et al. 1998 and Chappell 2002) says is inherent in research of this kind and which may, if unchecked, have a significant influence on the outcomes of this case study.

To maintain the methodological integrity and enhance the quality of this study, two additional aspects of validity were employed. Lee's (1999) explanation of Kvale's (1996) 'validity as craftsmanship' was incorporated into the way in which data were gathered and analysed. This is a process that requires a critical stance from which to scrutinise the design, collection, analysis and discussion of findings. To adhere to this practice of 'craftsmanship', a standard approach to the use of field notes was adopted along with a constant and critical re-evaluation of the data through the iterative process of collecting and interpreting material.

The second element is the concept of 'validity as communication', a type of validity particularly relevant to a study of lived experience because it is based on the premise that 'truth (sic) can be tested through dialogue' (Lee 1999:161). This supports the notion that the quality of communication is a driving factor in the overall quality of research and to fulfil this aspect of validity careful attention was paid to the messages that respondents were giving both orally (through interview and focus groups) and non-orally (through observation) and their translation into data.

Finally, the way in which respondents were selected was also based on the need to enhance the validity of the research and its outcomes. In this Yin's argument (in Yin 1994) regarding the logic of multiple-case design, while directed at the design and use of a case study approach, is relevant to this study.

In Yin's view the logic of multiple-case designs is centred on replication rather than sampling distributions which, in the example of case studies, is similar to the development of several experiments. According to Yin there are two aspects to this logic:

'Each case must be carefully selected such that it either (a) predicts similar results (a *literal replication*) or (b) produces contrasting results but for predictable reasons (a *theoretical replication*)' (Yin 1994:46) (Emphasis author's).

As a consequence the outcome of a multiple-case study can fall into one of two categories: parallel results for all case studies that provide strong support for the initial propositions, or broadly differing results that pinpoint weaknesses or contradictions in the emerging theory.

In this study Yin's contentions were adopted in the selection of the groups of participants to take part in the interviews and focus groups. The rationale for selecting groups from a range of work areas and environments was based on the concern that, had they all been drawn from the same or similar workplace or environment then their common background and work experience had the potential to impose a form of 'group think' on the data. Choosing participants from different experiences was expected to avoid this. As this was a primarily inductive study, both replication and purposive selection techniques were therefore used to select participants, the replication in this case being based on respondents' ability to provide data that were similar to that gathered during earlier interviews, observations or focus groups, but could potentially be sufficiently contradictory or contrasting to enable meaningful conclusions to be drawn.

In applying this approach it was important to maintain a clear distinction throughout the data gathering and data analysis phases between data that supported the theoretical heuristics and that which presented an alternative picture. This was important in that it not only helped maintain a flow of concurrent data but also enhanced the quality of the research outcomes.

3.15 DATA FROM OUTSIDE THE STUDY'S PARAMETERS

Because it has the potential to be more difficult to carry out in practice than it is to describe in theory, observation was only carried out in those areas, and of those people and their activities, covered by these agreements. Because the group under observation interact daily with others outside of this research there was a concern that data may inadvertently be gathered (through observation in particular) from outside of the scope of this study and in doing so contaminate the analysis and the results. Wherever possible such data were ignored or discarded; however this was not always possible for example when a respondent bemoaned a lack of leadership in her workplace and how it limits her ability to fully apply her skills.

Where doubts existed, or where clarification was required of what constituted data from within the study parameters, guidance was sought from either management of the organisation or participants of the focus groups as relevant and appropriate. Where doubt still existed these data were excluded altogether from the study and, by doing this, the integrity of other staff members not associated with this study has a greater possibility of being preserved.

3.16 POSSIBLE NEGATIVE CONSEQUENCES OF STUDY

This research project studied the skills and knowledge participants sought and applied on-the-job in complex environments and as it occurred in the days and months after a training program had been completed. There was a possibility, therefore, that data gathered from participants may demonstrate that the training they had received was ineffective and inappropriate for the organisation, its staff or the context within which it was expected that individuals and teams would apply their newfound skills and knowledge. On the other hand it may even demonstrate that learning could have occurred without the training (the investigation of which was part of the purpose of this study) therefore such training events may not be seen as necessary in the future.

While such data were critical for the research outcome, a concern emerged that, should it become general knowledge throughout the organisation that the study was being carried out, it might have a negative effect on the perceived reliability of any

and all training to enhance the achievement of organisational goals and objectives. The basis of this fear was not derived from the literature but from the researcher's personal experience in the conduct of training evaluation for his own programs and those of others. This experience has seen internal and external training courses cancelled which, for the want of more frequent in-depth evaluations, might have become perfectly suitable for the organisations concerned. Therefore, aside from the study report being limited in its release to only the university and its examiners, every effort was made to ensure that its contents and conclusions did not become public knowledge at any stage of the study or after it.

Another possible negative consequence was, and still is, based on the possibility that some participants may feel as if they have been 'betrayed' if their private conversations with the researcher are intentionally or unintentionally released without their permission. The effects of this could potentially be worse if what was released may appear to be not what they were really trying to say, but were nevertheless released anyway. Knapik (2002:4-5) cites several examples of how this can manifest itself.

In research that centres on narrative type data (unstructured interviews, focus groups etc), participants are encouraged to share information that might be charged with emotion or be contentious when taken outside of the context in which it was presented. Knapik tells us that because data gathered through such an approach is often emergent and complex in nature, the guidelines for ensuring informed consent that protects the individual from harm cannot always fully prepare them for such uncertain outcomes (2002:6-7).

This research was therefore guided by what the individuals said/did and any decision to record or delete this from the investigation was made in partnership with the individual/s concerned. Prior to the commencement of each interview, respondents were provided with information about the purposes of the research, the method of data gathering, and what would happen to the data during the research and after it. Respondents were also made aware, and signified their understanding of this by signing the consent form attached to their information sheet, that what was said or seen during interviews and observation could and will (if appropriate) be recorded, however this would only occur if their permission was given before the observation or

interview was completed. Further, all respondents knew, and where appropriate reminded during the interview, that should anyone wish to have any observation or interview deleted after the event this would occur at no penalty to the person or people concerned.

3.17 TAPE RECORDING

Wherever possible interviews were tape recorded to capture each respondents' perspectives in their own voices and to ensure that no data were lost. Earlier it was revealed that the process used to gather and analyse the data were thematic analysis which, it was shown, allows for hidden meanings and sub-texts to be drawn from responses. By tape recording interviews it was possible to replay them a number of times to draw out these sub-texts once the dominant and most obvious messages had been revealed.

Tape recording interviews does, however, have its disadvantages. For example it can be time consuming when setting up and using, particularly when, for example, tapes end midway through a respondents' answer and the line of thought has to be held while the tape is turned over and the recorder restarted. It can also be time consuming when transcribing the data, especially if the data are to be transcribed verbatim. In this respect some individuals might feel inhibited by the tape recording and concerned that their candour may be later (advertently or inadvertently) accessed by others with less sense of ethics and confidentiality than the researcher. This may see them hesitant about divulging honest opinion or thoughts that may be personally or commercially sensitive.

Having said that, tape recording interviews does have several advantages, all of which were important to this study. For example they assist the novice researcher to retain a certain degree of confidence in the capturing of responses that note taking might not allow. This is especially important when the researcher is also mindful of the need to be prepared for data that confirms or rejects earlier theories and hypotheses or fits within, or falls outside of, existing themes. In such cases the researcher must be ready to explore the data further to gain sufficient understanding of the individual's

perceptions for later analysis. Being busy taking notes does not always allow for this to happen.

Because of the researcher's lack of experience in conducting such interviews it was decided that, on balance, the disadvantage of it being time consuming was not so critical as to outweigh the need to use tape recording wherever possible to supplement note taking as a means of capturing the data. The accuracy of transcribed data was checked, where required, with the original respondent and where necessary terms or procedures that were not clear were clarified with the focus groups.

3.18 DATA ANALYSIS

Because of the limited number of participants involved in this study, the following data analysis techniques were employed:

- constant comparative analysis;
- inductive analysis; and
- thematic analysis.

Adopting these techniques allowed for greater effectiveness to be achieved in the analysis of the limited data gathered from participants and potentially a richer outcome that allowed for a building of a general theory rather than a testing of it through the gathering of larger amounts of data. Other data analysis processes were considered (such as Hermeneutical Analysis, Discourse Analysis) but rejected because the purpose of this study is to record and interpret individual perspectives, not analyse them for deeper or hidden meanings, develop a hypothesis for testing within the data, or analyse the way in which the data are revealed.

To enhance the confidence in the outcomes of the data analysis all data were subject to these processes. Again, because of the limited number of respondents, the purpose in doing this was to mine as deeply as possible into the data to extrapolate as far as was possible the richness of the individual voices and the meanings behind them.

While this increased the amount of time spent on the analysis it did provide for a greater reliability of the data and validity of the processes followed.

3.18.1 Constant comparative analysis

This form of analysis followed the processes developed and applied in the grounded theory method of Glaser and Strauss (cited in Lincoln & Guber 1985) and involved taking one piece of data and comparing it with others gathered from the same or different source. The data used in this comparison came from the observations and interviews as well as individual statements and themes, and comparisons were made within individual activities (i.e., interview or observation) and between them.

In making these comparisons the aim was to look for, and seek explanations of, meanings, contradictions or relationships for later analysis. This process was carried out with all data until each had been subject to comparison with all other data gathered throughout the research, including that which was gathered through other or complementary means (e.g., comparing interview data with that gained through observation or focus groups).

The constant comparative analysis process is suited to a study such as this because it allows for a study of the social processes and human phenomena within the context and environment in which they are experienced. It combines an 'inductive category coding with a simultaneous comparison of all social incidents observed' (Goetz & LeCompte 1981:58) that constantly undergo refinement and feedback throughout the data collection and analysis into the process of category coding. In doing so it also allows for a discovery of new dimensions and relationships right from the point of initial observations and data gathering.

3.18.2 Inductive analysis

To develop the themes or categories required for grouping and analysing the data, the processes of inductive analysis were used. These processes, according to Patton (1990), allow for the themes or patterns to emerge from the data rather than being

developed and imposed prior to the data collection or analysis. This is a creative process that requires careful consideration about what is important and significant to the study and what is not. It involved finding a focus within the data for analysis and the interrogation of the data for patterns that supported the inductive processes and which in turn enabled a platform to be created for later thematic analysis.

From Berg's suggestion (Berg 1989:111-112) that an inductive approach to the development of themes in which to frame data for later comparison and analysis, while more beneficial in presenting respondents' perceptions in the most forthright manner, should not be carried out to the exclusion of a deductive approach, an approach that combined the two was adopted. In the first instance this saw a limited number of themes drawn from the researcher's experience in the application of competency-based training within a number of large public and private organisations and areas of interest that emerged in the past while doing so. This established a framework and a focus point against which emergent themes were assessed and adopted either as new themes or as refinements of those previously identified. Further refinements to these themes were made throughout the thematic analysis.

3.18.3 Thematic analysis

As noted above, to codify and analyse the data emerging from this research an approach known as thematic analysis was selected. The purpose of adopting this approach was to gather data from diverse sources that could be combined to provide a rich, detailed description of the phenomenon of the skills and knowledge respondents' learned and applied in complex and chaotic environments.

A range of themes was selected through inductive analysis and trialled during the early interviews and observations to determine their relevance to the study and to the data that were emerging. Because of their importance themes will be discussed separately below.

While not a case study in its own right, the research described in this thesis is a 'descriptive study' along the lines of that described by Merriam (1998:38). It uses a thematic approach to the gathering and analysis of the data and in doing so allowed

for the creation of a conceptual framework from which themes could be drawn and tested for their appropriateness to other organisations or other sections within the organisation in which respondents worked. The approach used was qualitative to reflect the experiences of participants within the contexts and environments in which they work. To do this, a phenomenological approach to data collection and analysis was used, the aim being to capture these experiences through the participants' eyes and voices and ensure that the essence or structure of their shared experiences (Merriam 1998:15) could be fully captured and understood.

Boyatzis (1998) points out the obstacles that such an approach faces. Chief amongst these are, in his terms, projection, sampling, mood and style (1998:12-16). These are described below.

Projection

This occurs when the researcher reads into the data, or attributes to somebody else, their own characteristics, emotions, attitude and values etc. To overcome this, the researcher aimed to:

- Develop clear and explicit codes or themes for sorting and classifying the data as it emerged from the research.
- Establish consistent and reliable processes for judging which data were important to the thesis, which were not, and from the latter determining why they were not important and the implications this had for the research.
- Confirm the codes and themes with colleagues and participants to get a variety of views and perspectives. Where there were disagreements or dissenting opinions these were viewed in the context of the overall study and, where they were found to be valid, changes were made to the codes or themes concerned. Where their validity was not immediately obvious, or where there were reasons why the views or opinions should not be adopted, these were noted and explained in the research findings as alternative perspectives which, for reasons that were also explained, were not adopted.

- Be open to emergent themes and their interpretation from a wide range of sources, including differing individual perspectives. Frequent reviews of the themes and their appropriateness to the study were carried out throughout the research, especially in the early stages of the interviews. Where data emerged that suggested a theme was partially or fully no longer appropriate to the study then its continued use was examined in line with the overall objectives of the study. Where it was found that a theme was inappropriate then it was either discarded or revised. If necessary, earlier interviews and observations were reviewed to determine whether or not additional questions needed to be put to respondents to fully understand the theme or the data gathered through, for example, the use of a focus group.
- Use bracketing techniques (see section 3.14) to share the researcher's own experiences and encourage participants to reflect on these and interpret them in light of their own perspectives.

While it took some time to get used to it was not long before such checking and revising became second nature and themes were created that led data collection and analysis directly towards conclusions that were critical to the objectives of this research. On the other hand the resultant outcomes of using this approach did challenge some of the assumptions and biases that the researcher had previously held as truth which, in a more positive sense, amplified situations where researcher bias could have emerged but, as a consequence of being challenged, was easily held in check.

Sampling

Sampling is a process of selecting a range of interviewees who, it can hopefully be claimed, are representative of the population being studied. Agnew and Pyke (1994) and Kellehear (1993) tell us there is no perfect way of doing this beyond studying everyone within that population therefore an arbitrary decision must be made as to how many respondents could be deemed as representative of the whole.

To draw conclusions about the generalisability of the findings of this research it was felt important to employ a purposive sampling approach to enlist a range of

respondents from different work and vocational areas but possessing similar characteristics. The point here was not to aim at seeking a maximum variation in respondents but different responses to the research question from interviewees immersed in environments that are typically characterised as complex and chaotic. As this was a qualitative study the outcome sought was one of quality of response, not quantity.

According to Boyatzis, however, problems with sampling occur when the raw data contains embedded characteristics of the group being studied or other factors of which the researcher is unaware. Accepting all data as reflective of the phenomenon under study therefore has the potential to contaminate the validity of the findings and to overcome this the researcher:

- Constantly reviewed and clarified the units of analysis (the organisation or environment in which they apply their skills and knowledge) *and* the units of coding (the individual perspectives) to ensure that it was clear who or what was being reviewed/observed/analysed and the most appropriate way to encode and analyse it.
- Constantly compared the data with that which had already been gathered from all other sources.
- Continually assessed both the units of analysis and units of coding from different perspectives (e.g., through questions to participants, observation of workplace practice and focus groups) to identify areas overlooked in the data-gathering plan or anomalies arising out of the data.
- Established a guide for information gathering, in particular for use with the focus groups.
- Where doubt existed as to whether or not sufficient data were being gathered, the breadth of data gathering and/or time over which data were gathered was increased. While this had the potential to see more data gathered than was necessary and, in turn, make it difficult to sort that which was important from that which was not, it was decided that having an over-supply of data were more satisfactory than having too little.

- Encouraged participants to reflect on the data and discuss, in focus groups, any implications and inferences that were not immediately apparent in the raw data.

In doing this the researcher was better able to judge which data represented the phenomenon from a theoretical perspective and which emerged from known and supportable fact. Moreover, the researcher was also able to recognise, observe and capture what Boyatzis calls a ‘codable moment’ within the raw data (1998:66) – actions, responses or performance that provided opportunities to record and understand the emergent phenomenon within the theoretical framework upon which the research is based (i.e., information about or observation of the application of skills and knowledge at the edge of chaos).

Mood and style

Mood and style can potentially impact on the quality of data gathering and analysis because of fatigue and/or sensory overload on the part of both the researcher and/or the group under study. Frustration with the processes for gathering raw data or confusion as to the units of analysis and coding can as a result decrease the ability to conduct satisfactory thematic analysis and in turn limit the veracity of the analysis outcomes. To avoid this the researcher:

- Ensured that there was sufficient time between, and during, interviews so that respondents and the researcher were not fatigued by the processes.
- Wherever possible conducted the interviews and focus groups in an environment that was restful and conducive to open and relaxed dialogue.
- Ensured that the codes/themes were clear and easily attributable to the data being gathered.
- Paused the process of coding, gathering, sampling or analysing the data when fatigue or boredom appeared to be setting in.
- Ensured that, where it was appropriate to do so, rationale and deep analysis was suspended and raw data were used ‘as is’ to form judgements about its applicability to the research project.

Doing these ensured that the data being gathered retained its richness and relevance to the study but was obtained in the most comfortable, effective and expedient manner.

In overcoming these obstacles the researcher was able to more confidently sense the themes as they emerged from the data and recognise codable moments as and when they arose. The researcher was also be able to use these themes reliably, develop a process to capture the essence of observations, and interpret the information and themes in a way that contributed to the development of knowledge (Boyatzis 1998:10-11) and the achievement of a reliable and honest research outcome.

3.19 THEMES

A thematic analysis is one in which themes are used to classify data and assist in its analysis. In this study, the themes used to categorise and analyse the data were based on those described in Boyatzis (1998) wherein themes were first developed deductively and then refined based on previous research (e.g., literature review, other researchers etc.). The relevance of these themes was then tested during the interview through margin notes highlighting where responses and emerging issues fitted the themes or where new ones were emerging.

This process was followed to firstly develop the themes and then check and confirm them at the same time as the data were being gathered through observation, interviews and the focus groups. This enabled a triangulation of where and how data were gathered, coded and analysed independently of each other. It also enabled the relationships between the data to be crosschecked within a very short space of time after they were observed or emerged.

Following this approach also allowed for possible relationships to be discovered from the time the initial observations commenced. The inferences drawn from these relationships were continuously refined throughout the data collection and analysis cycle and fed-back into the collection and analysis processes to confirm their validity or check the accuracy of the inferences being drawn from them. These data were then condensed into four broad themes (pre-training experiences, perceptions of the validity of the training and assessment to work needs, actual on-the-job application of

skills and knowledge, and perceptions of skills needed in complex and chaotic environments). This enabled data to be grouped and codified for analysis while, at the same time, setting aside data that were not immediately recognised as relevant to the outcomes. Examples of these themes can be found at Appendix K.

In itself the data that were set aside created its own theme which was later explored for its relevance to the study. Because relevance to the subject of this research were found while undertaking this analysis, but not to this research itself, the outcome of analysing the data under this theme was a number of areas in which further research is suggested. These are detailed in Chapter Five.

The data that were set aside were also analysed for sub-texts or themes not critical to the central study but important to a fuller understanding of the issues being raised. For example, research participant satisfaction with the level of supervision at work and its impact on whether or not they apply their full range of skills and knowledge. One respondent stated that she felt her supervisor was not allowing her to contribute fully to the work team achievements therefore was unable to apply everything that she had been taught. Work satisfaction versus commitment to contribute was not one of the themes pursued in this research but it clearly is an environmental aspect that has the potential to impact on whether or not an individual's competence can be fully displayed on the job now and in the future. As this phenomenon only emerged from one respondent it was analysed for its impact on other themes, and conclusions were made regarding both this and future research.

Themes specifically aimed at codifying data important to understanding the impact that the workplace has on the application of competency-based training outcomes also emerged from data gained during observation research conducted within one organisation. Respondents from this organisation had agreed to take part in this research and, while their actual involvement will be discussed in Chapter Four, it provided an opportunity to develop themes with which to guide an analysis of the impact the complexity theories have on the way in which competency-based training is applied in Australia.

This data were also categorised according to theme or, if they were important to the research outcome, given their own separate sub-theme to enable other similar data to

be categorised in future observations or questioning. Where the data were not immediately seen as important to the research outcome they were analysed to define why they were not of importance and the appropriate inferences drawn from this. These inferences then formed their own theme and were set aside for later analysis in the light of data that may later emerge. This involved checking new data and themes as they were gathered against that which had been previously set aside to pick up on issues that had already been raised. Where appropriate, data that could potentially be of interest were included as part of a new theme and that which was not of interest was set aside.

At the end of each interview an inductive cross-case analysis (or cross-site analysis as detailed in Miles & Huberman 1994:151) was conducted to 'build a general explanation that fits each of the individual cases' (Yin 1994:112). Also it was used to examine emerging data and observations once coding and categorisation by themes had been completed. This involved the ongoing collation of responses from all interviews and discussions (including data that had been rejected previously as not obviously related to the research) to identify recurring patterns across all research activities. The themes that emerged from this analysis were inductively identified before the research commenced and those that emerged naturally from the participants' responses to questions put to them during the interviews and focus groups.

These categories were then analysed for internal and external homogeneity: internal homogeneity to determine the extent to which the data belonged together in certain categories or 'clusters' and external homogeneity to determine the extent to which the differences in the categories were clearly defined (Patton 1990). This was carried out primarily by reviewing each response and asking whether or not it fitted the theme and whether or not each theme was sufficiently different to allow for clear and obvious grouping of data. Doing this enabled the bulk of the data to be progressively sorted and categorised into smaller and more easily manageable clusters before analysing and reviewing each for inferences and conclusions.

Finally, the analysis included transcribed descriptions of the participants' experiences and perspectives in their own voices. This allowed them an opportunity to support or reinforce the researcher's observations through first-person narrative and, in doing so,

allow for another perspective of the data to emerge. The aim of this was to ensure that the data were organised to relate the phenomenon of complexity and its impact on competency-based training in the words of those who were actually involved in or affected by it as opposed to that which, throughout the literature review, had been written about it.

After considering the opposing views on the matter (e.g., Sacks 1992:26-27 and Silverman 2000:830), this study did not attempt to capture inferential data such as body language except where it was pertinent to the quality or validity of the information being obtained through observation or interviews. Where the information was pertinent it was captured in field notes and recorded in conjunction with the transcripts for later analysis and inferences.

3.20 LIMITATIONS

It was noted in Chapter One that there are a number of limitations to this study:

- This study is of a phenomenon that hypothetically occurs within many vocational areas, at all levels of organisations, and continuously throughout an organisation's life. The conclusions drawn from this research, however, are only those that can be tied to a single snapshot in time of the phenomenon that occurred in the lives of those who experienced it, and not to events that preceded or followed it.
- The results of this study are not meant as a generalisation of the way in which learning occurs naturally and outside an organisation or of the way in which the complexity theories impact on competency-based training wherever it is practised. The outcomes and conclusions arising out of this study are based solely on what was observed and recorded, and are therefore only theoretically applicable in other environments, contexts and situations. In fact, if the theories of some of the complexity thinkers are to be accepted, it is not possible to predict that such outcomes would occur in the future, even in the same organisations in which they are reported in this research as occurring in the past.

- The researcher's own experience limits the extent to which bias can be totally eradicated from this research. Where his own experience contradicts, was at odds with, or mirrors that emerging from the data this was acknowledged and any inferences that can be made from this noted.

These limitations are appropriate more to the construct of the study as a whole rather than to way in which it was carried out. The limitations of the research method emerged primarily from the limited number of respondents and the degree to which an analysis of the data gathered can be accepted as a reflection of the thoughts and feelings of the wider population. Having said that, however, such limitations are not unknown to qualitative researchers and are accepted as limitations to and disadvantages of the methods adopted throughout this study. Where appropriate these have been noted above and the mitigation strategies used in the data gathering and analysis noted.

3.21 CONCLUSION

In this chapter the research method and participant selection processes were described. The strengths and weaknesses of each approach were discussed along with the means by which quality of the data gathering and analysis was assured and the limitations to the study overcome. In the next chapter the outcomes of the data gathering and analysis will be discussed.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

In Chapter Three the method used to gather and analyse data in this study was described. In this chapter the findings from the data and its analysis are revealed using as a framework the theoretical model developed in Chapter Two and the following questions:

- Are the complexity theories relevant to Australian workplaces?
- In environments that could be characterised as complex and chaotic, what skills and knowledge do individuals apply?
- Where and how were these skills and knowledge gained?
- Could such skills and knowledge be gained through the processes of competency-based training?

While the focus of this study is on the application of competency-based training, it is not on CBT as it is applied as part of the national VET system, although discussion of that system must inevitably occur. Nor is it on the quality or otherwise of any training that the participants in this study have undertaken or are currently undertaking. It centres on their recollection of the skills and knowledge that they have learned and applied subsequent to their training, and their experiences of doing so in the environments described by the complexity theorists.

This chapter will discuss these findings and conclude with a discussion on the limitations and implications of the research findings in the light of the above questions and the method used to gather and analyse the data throughout this study.

At their request the names and other identifying details of participants (beyond their organisation or the part they played in this research) are withheld. Throughout this chapter where a direct reference is made to one or more participants they will be referred to by the number allocated them in Table 5 in the previous chapter (p.132). Discussion on these responses, and conclusions and implications for current and future practice, will be presented in Chapter Five.

4.2 RESEARCH FINDINGS

Revealed in Chapter Two was the contention by complexity theorists and business analysts that work carried out in organisations and individual workplaces occurs within environments that range from those that are controlled and ordered to those that are unstable and unpredictable. Such environments include work processes and systems include those that are predictable (e.g., organisational processes and procedures) and those that are not (e.g., client decision making processes, the ways in which individuals and teams interact and the outcomes of these interactions). And in working together to achieve organisational and individual outcomes individuals and these systems create environments which may, on one day or at one point in time, be stable and straightforward, and at others complex and chaotic.

To explore the impact that this has on the way in which competency-based training is designed and applied in Australia, participants in this study were drawn from a wide range of public and private organisations, all of which could be viewed as possessing environments that accord with these characterisations. In some cases, notably the aged care sector and defence procurement establishments, these organisations are more recognisably complex than others.

The findings and conclusions that emerged from an analysis of the data drawn from their responses, and observations carried out of the way in which they perform their function in real work environments and focus group activities, is discussed in the

following pages. Heading each section of discussion is the questions detailed in Chapter One as the basis for this study and which, when considered together, provide guidance on how an answer to the main research question may be formed.

4.3 QUESTION 1: ARE THE COMPLEXITY THEORIS RELEVANT TO AUSTRALIAN WORKPLACES?

To assist in this study a matrix was created based on the list of issues and business scenarios drawn from the literature (p.52) that describe complex environments as emergent, self-organising and unpredictable. Descriptions of these scenarios were clustered in the matrix under the headings of stable/controlled environment, changeable/irregular environment, complex environment, and chaos. (See the matrix at Appendix A for a complete description of these scenarios.)

Interviewees were asked to describe, using the matrix, their workplace on days that were in their experience relatively stable and controlled (in other words, days in which respondents found were in their opinion quiet) and those that in their opinion were busy. A summary of responses is illustrated at Tables 6 and 7 and discussed below.

All interviewees reported that the business scenarios detailed in this matrix were appropriate to some extent to their workplace; however there was little agreement as to the degree of complexity to which each participant was subject on quiet or busy days respectively. This is illustrated and discussed at Figures 3 and 4.

4.3.1 The environment on a quiet day

The data shown at Table 6 revealed a very mixed response to the question of the environment experienced on a quiet day. 13 respondents (50%) agreed that the descriptors under the heading of controlled and stable represented their workplaces on a quiet day while 10 (38%) stated that it was changeable and irregular, Three (12%) stated that it was complex.

The numbers in the boxes indicate the number of responses that were given when respondents were asked to describe their workplace and work environment on a quiet day. The seven respondents from Group 1 (Goodwin Village) were in less agreement about what, in their opinion, constituted a ‘quiet’ day while those in Group 3 were. Group 3 respondents provided a more unified voice on what they perceived the environment to be on a quiet day but the spread of responses indicates that when there is a disagreement on this it is quite broad. Group 4 did not take part in this aspect of the research.

Table 6. The number of responses to the question of how the environment in the workplace is perceived on a quiet day

Group	Stable/controlled environment		Changeable/irregular environment		Complex environment		Chaos	
	<i>To a greater degree</i> a	<i>To a lesser degree</i> b	<i>To a lesser degree</i> c	<i>To a greater degree</i> d	<i>To a lesser degree</i> e	<i>To a greater degree</i> f	<i>To a lesser degree</i> g	<i>To a greater degree</i> h
1	1	2		3		1		
2	2	4		2		1		
3	1	3	3	2	1			
4	Group 4 did not take part in the interviews							

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

Group 4 – Defence Materiel Organisation

Numbers in boxes indicate total responses

While the mean appears to centre on a point close to where stability and control blends with an environment of change and irregularity, the responses from interviewees of the aged care centre (Group 1) and the federal government department (Group 2) are more widespread than those from the mix of public and private organisations (Group 3). That there were more respondents in this latter group wouldn’t alter the fact that as a whole they perceived their workplace to be less complex, but not completely stable and controlled, than did respondents from the other two groups.

While the analysis here is of data drawn from responses to the question of the environment experienced on quiet days, of interest is whether or not similar results could be found in the data gathered from responses to the question of the environment interviewees experienced on a busy day. What emerged from such an analysis was that the complexity theories are still appropriate to Australia but in ways unlike those referred to by respondents describing an easy day. A summary of these responses can be found in Table 7.

4.3.2 The environment on a busy day

On those days that were busy, respondents from Group 1 perceived their workplaces to be more complex than did either of the other two groups, and Group 3 perceived their workplace to be the least complex of all, although it is still regarded as complex bordering on chaotic (at the edge of chaos). A little under half of all respondents (42%) stated that they were subject to a high degree of chaos (although only two respondents rated it to be at the highest extent) while a further 12 (46%) stated that it was subject to a greater degree of complexity bordering on chaos. The remainder (12%) stated that the workplaces on these days were either to a lesser degree irregular and changeable or, in the case of two respondents, were stable and controlled.

Some of these respondents, while not describing their workplace using the terms complex or chaotic, commented on aspects of their workday that the complexity theorists contend lead to a higher degree of complexity and chaos in the workplace, for example constantly shifting priorities and uncertainty. This suggests that even those respondents who did not consider their workplace to be complex, such complexity does exist simply because their descriptions closely match those given in the complexity literature. For example, typical of the responses given by respondents from the aged care facility are the following:

‘(On busy days my work includes) survival prioritizing ... being able to prioritise tasks to be able to assure the survival of the person or people who need it the most at the time. Everything else (I have to) drop’ (GX01).

‘There are a lot of things that you can’t teach in a classroom ... (for example you) can’t teach people how it’s going to go when someone has been told they’ve got cancer (or) how (you’re) supposed to manage people’s feelings . . .

(every) situation is different, every person is different, every family is different, every disease is different ... you can bring all your (skills and training) with you but you never know how it is going to be.’ (GX07).

Table 7. Summary of responses to the second part of question 13 – the environment on a ‘hectic’ day

Group	Stable/controlled environment		Changeable/irregular environment		Complex environment		Chaos	
	<i>To a greater degree</i> a	<i>To a lesser degree</i> b	<i>To a lesser degree</i> c	<i>To a greater degree</i> d	<i>To a lesser degree</i> e	<i>To a greater degree</i> f	<i>To a lesser degree</i> g	<i>To a greater degree</i> h
1						1	4	2
2			1		2	2	4	
3		2			2	5	1	
4	Group 4 did not take part in the interviews							

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

Group 4 – Defence Materiel Organisation

Numbers in boxes indicate total responses

While such responses were not unexpected from respondents employed in the aged care sector, a similar response was noted in the interview with an Assistant Secretary from DEWR who stated that:

‘The last thing you want is to look like you’re not in control of what is going on (when) your priorities and your business plan fly out the window. I’ve had (another branch) transferred into the office and I’ve had to completely change our focus and put on more resources into (looking after) that and just try to keep the business going at the other end as well’ (DX01).

One of his staff members also stated that:

‘(The objectives I am most concerned with achieving on a busy day are) whoever had the most priority. You take it as it comes. You play it by ear. Struggle the best you can. (The objectives) could be anyone’s including myself’ (DX09).

Such complexity, according to the respondents, is not limited to the public sector. One respondent from the private sector stated that:

‘(Not covered in my training was) customer expectations – especially how to manage them: What to do in crisis situations, how to tell people they’re incompetent, especially when they’re your customer ... working with a company that doesn’t have formal policies and procedures, again especially if they’re your customer’ (OX27).

Another noted that:

‘(Things I had to learn on the job included) political skills ... identifying that there was a problem there and coming up with a strategy to how to actually get that change to occur and sometimes that required a quite definite and legitimate tactic of having upper management taking credit for things that they didn’t have anything to do with but that was a means to the end and it made a difference to the project’ (OX31).

The weight of responses appears to support the complexity theories in which workplaces are described, for example, as subject to fluctuating priorities and decision making based around limited information or knowledge. Also supporting these theories were comments by respondents who reported environments that are created by the need to achieve outcomes that are controlled or impacted upon by others or other systems in both familiar and unfamiliar ways, for example applying already known skills and knowledge in different and unfamiliar situations. Again this is very similar to the contentions put forward by the complexity theories in their descriptions of complex workplaces.

A practical conclusion of this finding, even on this limited evidence, is that the complexity theories are likely to be relevant to the Australian workplace, be it private or public sector. While this answers the research question posed above, it does not explain the extent to which they are applicable or why such environments could be characterized as on one day stable and controlled while, at other times, they may be characterised as complex and chaotic. To explore this the data emerging from the interviews was reviewed and analysed against other data (e.g., other responses, the observation etc.) to develop a picture of the relationship between the demographics of respondents and their responses regarding their experiences in such environments on days that were quiet and thereby less complex and on those that were busy and as a result bordering on, if not found at the heart of, chaos. To explore the outcomes of this analysis we turn to the theoretical model developed at Figure 2 in Chapter Two (p.90).

4.3.3 Balance of responses along a continuum from stability to chaos

Because the concept of complexity and chaos were unfamiliar to most participants they were not provided with a model of such an environment and asked to comment on it. Instead the analysis of the data to ascertain the degree to which individual's perceived their workplace to be complex was based on the actions that they claimed to carry out when confronted with such environments. These claims were compared to the data illustrated in Tables 6 and 7 and the following conclusions were drawn from the outcome. This allowed for an interpretation of what is or is not a complex environment to be carried out by the researcher and not the participants.

As was noted at Table 7, data drawn from Group 1 showed an agreement that an environment on busy days was to a lesser degree characterised as chaos with two respondents claiming that on such days it was to a greater degree characterised as such. These respondents stated that on such days their environment was highly customer-centric and when urgent or critical tasks had to be carried out their most important need is to prioritise their work based on what is best at the time for the resident/s concerned. For example, typical of responses to this question were the following:

‘When I’m faced with a situation or just a chaotic day I think logically about which things need to be done now, which things need to be done later, which things can wait until 3 o’clock (and) which things need to be done by lunchtime. . . . (but) where experience comes in its not so much thinking about what to do but also doing it instinctively’ (GX01).

‘So much of the time (on busy days) is spent trying to sort out what is important and what isn’t, trying to figure out what is happening and whether or not it is causing more problems or can be solved without upsetting anybody else. Sometimes you don’t get to do what you’re supposed to be doing because all of these other things come up’ (GX02).

‘(The skills I apply on busy days include having) to plan (my) time and make decisions about what must be done and what can be put off until (I’ve) got more time). This is really important because (I) can’t always know what (I’ve) got to do until (I) get to work’ (GX04).

From the data it is clear that in complex and chaotic environments the respondents’ first aim is to understand and stabilise the environment so that they may bring it back to a level whereby effective and efficient decision making skills can be applied. This

implies that for example possessing decision making skills is important but not in such environments – unless the first decision includes how to stabilise the environment so that a more systematic approach can be applied. Of more importance is the gaining of control over the decision making process whether such control is given to them by virtue of their position or function or they take control even though their position would not normally hold such a responsibility.

Of this, one respondent from the aged care centre stated:

‘Everything I do I am trained to do it. Trained to apply procedures and trained to follow them. But where experience comes in it is not so much thinking about what to do but also doing it instinctively. For example interruptions. In some situation I don’t like people getting in my way because it aggravates me and . . . (when people try to get involved) I have to tell them ‘I’m alright’. (It is) from good motivations that they want to help but I know that I can manage and I’d rather manage on my own’ (GX01). (The respondent emphasized the words ‘I’m all right’ in an exasperated and almost defensive tone.)

This is a personal reaction to a complex environment in which the respondent later confessed arises out of a feeling that others perceive she is unable to effectively achieve her desired objectives. Such a perception, if not addressed, will according to the theories only increase the complexity of the situation and risk the emergence of chaos. According to this respondent, to stabilise a situation so that the appropriate decisions can be made, her first step is to establish that she is in control and understand what must be done to allow the situation to stabilise so that the appropriate decision can be made. In quoting one example during her interview, this respondent stated:

‘(During one incident when) I finished panicking I thought about the logical sequence of things that I should do . . . so it wasn’t that I went (flying) in there (to solve the problem). It didn’t happen like that. I had to logically think ‘Get some assistance. Get someone to pack her bag. Ring the ambulance.’ It is all these things that you have to just stop and think about. I know (this) from my training and my experience . . . (some) of it is instinctive or intuitive (however the skills and knowledge) themselves are instinctive because I’ve learned (them), so if you say I instinctively applied that learning then that is a different matter (because) instinct might be like a woman’s intuition – it is just a feeling about something . . . about having gone through a process of learning and knowledge and bringing yourself up to a point and then knowing what to do as a result (of) having a feeling about something’ (GX01).

Instinctively knowing what to do appears in the responses given by all respondents from the aged care centre and is therefore an important means by which, according to

the respondents, they stabilise a situation to control it and make effective decisions. But neither this nor 'having a feeling' about what needs to be done is a competency found in any training package reviewed as part of this study, nor is the ability to do this found in the program against which these respondents were trained and assessed despite it clearly being an essential element of competent performance in such a workplace.

While the skills to instinctively stabilise situations and environments appears to be important in the aged care centre, it does not appear to be so in other organisations studied as part of this research. In fact it appears that such stability is controlled more by the organisation and its adopted policies than by the actions of individuals employed there, although this comment was made by a respondent from one of the Statutory Authorities:

'(The skills and knowledge I apply on a busy day include how) not to panic. On days like this when there are competing demands and priorities it really needs a lot of re-prioritisation skills and communications skills to keep people working together even though you are throwing new challenges and objectives at them. Telling people to drop one thing so that they can refocus on something else that suddenly crops up. Rushing from one bushfire to another. You're doing real well if you can keep all of the balls in the air, but if you panic when you drop one then there is a good chance that you're going to drop the lot. It really is a case of not crying over spilt milk – recognising something has cocked up but not letting it affect the momentum of everything else. It isn't easy but this is how I spend most of my time' (OX30)'

Responses from Groups 2 and 3 were also almost identical in that 66% and 60% respectively contended that such days create an environment that is to a greater degree complex or a lesser degree chaos, in other words bordering on the edge of chaos. The two respondents from Group 3 who stated that even on their busiest days their tasks and the environment in which they were conducted were controlled and stable, both had previously stated that their quiet days were to a greater or lesser degree also stable and controlled. As noted above, it was revealed on further questioning that they both held a higher degree of control over their day-to-day workplace than did the other respondents, particularly those from Group 1 whose environments on such days were subject to a multitude of factors almost entirely outside of their control even though they had a high degree of control over their reactions to any given situation.

On being questioned about this, one of the Group 3 respondents claiming that her environment on a busy day was also stable and controlled (OX33) replied that as a one-person operation she was in close control of her business and could make all decision 'on the spot'. Doing this enabled her to maintain control and stability over her workplace, even on the most hectic days. The other respondent (OX27) stated that his organisation does not have a great burden of policies and guidelines that must be followed, and while he suggested that this was not an ideal situation he did say that it allowed him to be more flexible in his dealings with customers and be more responsive to their needs. As a consequence, according to them neither of these respondents experienced the environments that the complexity theorists state are typical of the workplace. They do, however, illustrate the contention by the complexity theorists (notably Kauffman 1995) that the most successful complex systems are those that are run according to only a few rules.

The respondent from Group 2 (DX15) who stated that his quiet days were very controlled and stable also responded that his busiest days were only to a lesser degree changeable and irregular. His suggestion was that this is a result of him having only one client, and that was his immediate superior. Even when pressure was being placed on his workplace by external clients his primary focus still remained on meeting his immediate superior's needs. Therefore, while the wider environment may be complex and chaotic, having only one level of objectives to achieve meant that for this respondent the immediate environment was relatively more stable and controlled.

An analysis of the data gleaned from other responses to this question showed that the respondents from Group 1 rated their busy day as more complex and chaotic than did other respondents and had a broader agreement between respondents than was seen in their responses as to the environment experienced on a quiet day. The responses from Group 2 were also more uniform, although one (referred to above) disagreed. Similarly, in an analysis of the data gathered from Group 3 the majority of respondents (80%) stated that on a busy day their environment could be characterised as complex or chaotic. The exception were the two respondents referred to above who reported their busy days as being characterized as stable and controlled. (See Table 7.)

From an analysis of the data regarding the skills and knowledge that individuals apply on such days it is clear that there is a greater emphasis on the more immediate

objectives and short term strategic planning than on quiet days, and in particular on those objectives that have the greatest potential to change quickly and often without warning. An example of this emerged from the aged care centre in which the term 'survival prioritisation' was used. This described the way in which respondents claimed that their tasks on such days revolved primarily around ensuring that the priorities of most importance were those that centred on interests and longer term survival of their client (i.e., the residents of the centre), similar to the way in which patients are prioritised in a medical triage. Interestingly, while not using the same terms, a similar concept was described by respondents from Groups 2 and 3 who professed to being more concerned with their client's needs on such days than even, in some cases, those of their organisation even though their client may be their immediate manager or supervisor. Survival, in this context, was also noted during the observation when one team was so concerned about being seen as unable to carry out a task they had been given that they tried to avoid the subject arising when talking with their manager. The implications arising out of this will be discussed in the next chapter.

4.3.4 The degree of complexity experienced in the workplace

The model at Figure 3 is based on the adaptation of Moor's model illustrated at Figure 2 in Chapter Two (p.90). It shows a four quadrant framework through which a continuum runs from environments in which known processes and contexts are applied (the equilibrium of stable and controlled environments at the bottom left of the model) to those in which unknown but knowable contexts and processes are required (complex and chaotic environments at the top right). Of importance is this continuum and where, along this, responses could be plotted.

On those days that respondents stated were most stable and controlled (in other words were found in Quadrant I), thirteen respondents (48%) stated that their work was highly reliant on organisational factors for direction. That is, significant reliance is placed on policies and guidelines, work is straightforward and unvarying, objectives and tasks are set well in advance, client demands generally remain the same, and so on. Twelve (44%) stated that their day was relatively unstructured and subject to

changing contexts in which familiar processes are applied (Quadrant II), or of familiar contexts in which there is a need to learn and apply unfamiliar processes (Quadrant IV). The remaining respondents (8%) stated that their easiest days were primarily uncontrolled and subject to unpredictability in terms of what needed to be done, where and how (Quadrant III).

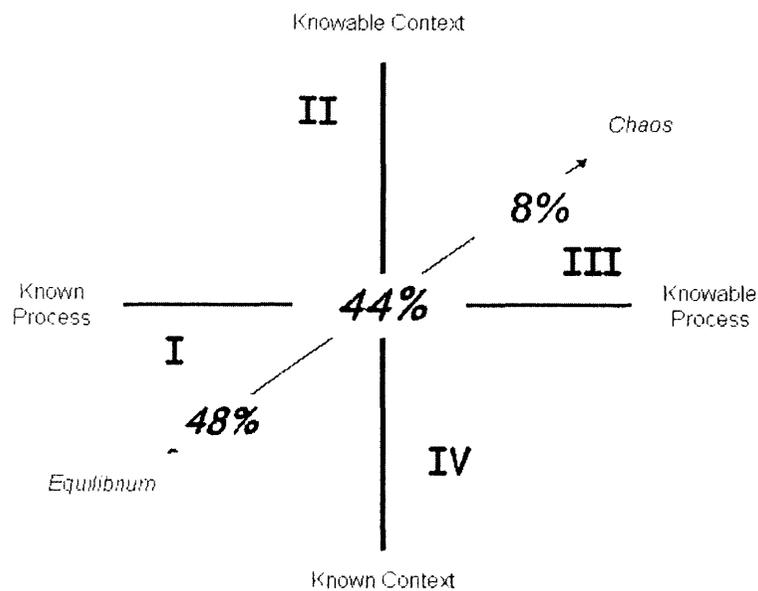


Figure 3. Degree to which complexity is reportedly experienced in the workplace on quiet days

On the other hand, in those environments formed by what respondents claimed were their busiest days, in Figure 4 below we see that eleven respondents (42%) stated that their experience was that the environment could be characterised as chaos, twelve respondents (46%) reported it as complex, one (4%) as changeable and uncontrolled, and two (8%) as stable and controlled. This is summarised in Figure 4. While these results are important to our understanding of the extent to which the complexity theories are relevant in Australia, it appears that because of the wide spread of responses, and the differences between the groups, it may not be possible to make any generalisations regarding the way and the degree to which the complexity theories impact upon others in similar workplaces. Nevertheless, even with this limited range of data trends appear that reveal issues important to the design and development of competency-based training that in the literature have not previously been explored.

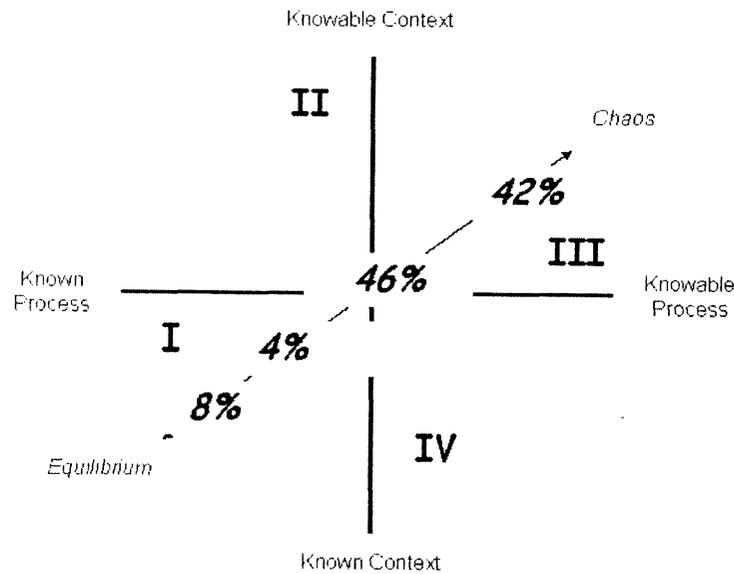


Figure 4. Degree to which complexity is reportedly experienced in the workplace on busy days

For example, while a little less than half of the respondents from Goodwin Village (42%) stated that their easiest days were stable and controlled, the same number stated that they were, to a greater degree, changeable and irregular while one went so far as to say that they were to a greater degree complex. A wide variation that, in quantitative terms might render aspects of the data irrelevant to this study, however in qualitative terms paints a very important picture.

In the environment described by these respondents, all were carrying out the same tasks and held the same responsibilities for the outcomes, although only the team leader was responsible for signing off on the work of the others and reporting this to her higher authorities. On reviewing the data against the demographics of the Goodwin group, however, those stating that their quiet days were relatively stable and controlled were not team leaders who one would expect would be capable of controlling and stabilizing situations and environments, but were carers who were either experienced registered nurses or had significant life experiences (e.g., as a parent). The respondents stating that the quiet days were to a greater degree changeable and irregular were relatively new to the profession while the respondent

stating that the quiet day was to a greater degree complex was a team leader who, while an experienced nurse with significant life experience, had only held this position for three months.

On further analysis of these data, and from discussions held with the focus group from the aged care centre, what was found was that the notion of what is or is not a complex environment is just as much a matter of perception and experience as it is a phenomenon influenced by external and workplace systems and events. Moreover, while perception may play a part in determining one's reaction to complex and chaotic working environments, and particularly the perception of the needs of others in, for example, a superior/subordinate work relationship, the environment itself can also be a significant player in the degree of complexity found there, and in particular the environment created by the way in which the organisation conducts its business and the way the staff react to it.

This phenomenon was not restricted to the aged care centre. It was also apparent in the data that emerged from Groups 2 and 3.

At Table 6 (p.163) it is seen that six of the nine participants from Group 2 stated that their quiet days were stable and controlled while a further two stated that their's were to a greater extent changeable and irregular. The remaining participant noted their quiet days to be to a greater degree complex. While this implies that unlike Group 1 the majority of the Group 2 respondents felt that their workplace was, on a quiet day, stable and controlled, the demographics of this group show them to be members of a large public sector organisation whose work on those days is, according to them, centred primarily on maintaining the status quo in an environment where the procedures and workplace guidelines are put in place to ensure stability in a controlled workplace. In other words, such stability is externally imposed on their environment unlike Goodwin where participants claimed they had to stabilise and control the workplace first. According to the respondents of Group 2 in these situations they were able to catch up on work they did not have the opportunity to finalise in the past, and simply ensure that the objectives of their superiors continued to be achieved.

On such occasions, according to respondents from this group, they were not 'customer-centric' except insofar as their immediate manager was their customer

and/or by achieving his or her objectives a customer was satisfied, unlike the respondents from Group 1 whose work days revolve around the needs of their customers or residents first and their organisation second. The individuals or groups for whom respondents were applying their skills and knowledge, and their needs as either customer or superior – or both – also appear therefore to play a significant role in the way in which complexity and chaos in the workplace is created and/or perceived. To test this, data from Group 3, made up of respondents from both the private and the public sector, were reviewed and analysed against that gained from Groups 1 and 2.

While respondents from Group 2 were all working for the same employer and therefore subject to the same working guidelines and procedures, respondents from Group 3 were not. No two respondents from Group 3 were working for the same organisation and only three of them were working in fields that were in some way related (the telecommunications industry). This immediately took away from the study a variable common to all responses from the previous groups, that being that their day-to-day activities were all framed within the same workplace and subject to the same rules. Where there was common standing was in the fact that all Group 3 respondents had been trained through the same program therefore their base level of skills and knowledge, as defined by the curriculum against which all were trained, was the only variable common to them all. And while all agreed that the complexity theories were relevant to their workplace (see Tables 6 and 7), the data reflected a wide range of opinions as to the degree of the complexity experienced.

Half of the respondents in Group 3 (50%), for example, stated that they were experiencing, to a greater or lesser degree, environments that were changeable and irregular. Slightly less (40%) were experiencing an environment that was stable and controlled but only to a lesser degree while the remaining respondent stated that his work day was to a lesser degree complex. This spread of responses was similar to that presented by Group 1 therefore of interest was whether or not the reason for such a wide range of responses was similar or different to that gathered from the group drawn from the aged care centre.

A review of the demographics relating to Group 3 showed that the reasons for such a spread of responses were not in all cases the same as those found in Group 1. For

example, the respondent in Group 3 rating the environment on an easy day as very stable and controlled was founder and CEO of a very successful entrepreneurship over which she revealed, on later questioning, she has total control of the day-to-day decision making and customer responsiveness. In other words she had almost total control over her work and environment. On the other hand, and as was noted earlier, the team leader from Group 1 who had similar authority found her workplace to be complex and bordering on chaos. Even though she had similar authority insofar as decision making went, and applied the same processes when analysing a situation and determining the most effective course of action, the outcomes of her decisions could have additional and more far reaching impacts on those with whom she was working. This flow-on effect created, in her environment, additional complexity not felt by those with greater control over their environment and whose decision making requirements centred on simple yes/no outcomes.

Of the other three respondents from Group 3, two reported that in such conditions their workplace was stable and controlled because they were employed in statutory authorities. As their decisions were well supported by the organisation for which they worked, the environment they encountered on an easy day was therefore subject to a high stability and control. This was a similar situation reported by the two respondents from the Goodwin Aged Care facility who also stated that the environment that they experienced on quiet days was also stable and controlled, but in this case it was more through their own efforts than anything imposed on the environment by the organisation concerned.

The final respondent from Group 3 who reported that his workplace was to a lesser degree stable and controlled was at the time of this study employed in a small but successful organisation in which he too states that he has significant control over his workplace. The reason for this, according to the respondent, is because of the procedures and guidelines that are rigidly set by senior management within that organisation, not by his own innovation and control, and these guided his day-to-day actions. As a result the amount of instability he experienced daily was less than that which others with less control reportedly felt. While management set the guidelines by which he worked they also, according to the respondent, accepted liability for the outcomes therefore reducing the amount of complexity he was subject to.

The remaining respondents from Group 3 who stated that their workplaces on an easy day are changeable and irregular, on the other hand, were, except for a university lecturer, employed in Federal or State Government departments. Here, while there were certain guidelines by which they had to abide, their workplace was subject to a higher degree of instability insofar as what was required of them daily. In short, they were expected to work within these guidelines while at the same time remaining flexible and responsive to their immediate supervisor's needs. For example, one respondent who stated that his workplace on such a day was complex was employed by a private telecommunications company with significant responsibility for customer service but in a manner guided by organisational policies and procedures. As such, his workplace was subject to almost continuous change of a type and frequency that was unpredictable and therefore uncontrollable.

The conclusion reached here is that the degree of control one is given over one's environment may play a significant part in determining whether or not a greater or lesser degree of complexity is experienced. This, however, is tempered by the individual's preparedness and ability to use this responsibility in the achievement of goals and objectives important to him/her on quiet and on busy days and her/his confidence to do so. For example, in the aged care centre the team leader was governed by the same policies and procedures as the rest of her staff but while they felt that the environment on a quiet day was relatively stable and controlled, she felt that it was complex and bordering on chaos. The significance of the data only emerges when confidence and capability are factored into the question of why one would experience a higher degree of complexity in the workplace while others do not.

In Group 3 it was not their confidence and capability that triggered a higher degree of complexity in the workplace but the extent to which, under their organisation's guidelines and procedures, they were allowed and encouraged to apply them. They were held back and thereby experienced a higher degree of complexity, not by their own capability but by what they were allowed to do thereby creating for them a higher degree of complexity in their workplace than was experienced by others.

Insofar as generalisability goes, the data shows that the degree to which complexity impacts upon a workplace on a quiet or relatively less busy day may not be limited to an industry or organisational level (as is the case with the current approach to

competency-based training which is designed at that level). It may instead be more influenced by an individual's – or a team's – confidence based on their experience and life skills, while for others it may be governed by the amount of control they have over the environment and the way in which their work is carried out. Those with self-governing, and thereby self-emerging, workspaces may find the environment more stable and controlled while those who work to externally induced procedures and guidelines less so. From the data it appears, however, that it is their ability and freedom to apply their skills and knowledge in such an environment – and not the skills and knowledge themselves – that determines how complex this environment is. (See also section 4.3.5.)

Between these three groups was a consensus that the complexity theories were appropriate to their workplaces even on those days that they contended were easy, however the reasons for the complexity and the degree of complexity felt differed between them. Respondents from the aged care centre (Group 1), for example, contended that the complexity was not just generated by the responsibility they were given to tend to the needs of their clients (the residents) but also the confidence and life experience that individuals brought to the task. The group from DEWR (Group 2), on the other hand, stated that the complexity arose more from the continuous need to satisfy their immediate manager while responses from the final group (Group 3) were split depending on whether the respondent was from the public or from the private sector. Those in the public sector agreed with respondents from Group 2 while those from the private or semi-private sector (e.g., from a statutory authority) suggested that stability occurred through the degree of control they have or are given over the decisions they make. Common to all groups, however, is the link between (externally or internally induced) individual control over one's environment and the degree of complexity experienced - an explanation, perhaps, of the significance of frustration in determining an individual's capability to carry out certain tasks.

4.3.5 Complexity as an individual construct

Finally, another point that emerged from the data and which on the surface at least should be considered when defining the complexity of an environment is the individual's reaction to the environment and the impact that this has on the degree to which the individual experiences complexity in her/his workplace.

In Table 6 (p.163) it was reported that respondents from Group 1 (the aged care facility) gave a wide range of responses to the question of where, in the matrix, they situated the environment experienced on a quiet day. The lack of consensus on what characterised a quiet day suggests that complexity may be just as much in the 'eye of the beholder' as it is in reality. As one respondent from the aged care centre stated:

'I'm pretty good at time management but I'm not very good at delegation. I don't like asking people to do things. I've never been really good at doing that. Having the guts to stand up to people who say (for example) they don't like dogs (and won't have them on the premises) . . . You can be taught theories and scenarios but you can't really know what it is really like until you do it. And what your response is going to be. You can think what your response is going to be. You can think: "Oh yes. I've been trained to do this and I can go and apply it", but it doesn't always work like that because there are so many variables' (GX01).

Another respondent from the same work area stated:

'(My) training really prepared me for all my shifts and my work because I got the background knowledge and I got the confidence and I know how to communicate when things go wrong and I know how to contact people because I have that background training . . . I can talk (with distressed residents) and I feel more confidence and less worried . . . During the day there are so many staff but at night when I'm on my own I have to deal with things myself – there's no alternative. So my background (helps me deal with these). Not my training background but my education, my communication skills, so I can apply the things that I learned in my training even though they weren't gained during nursing training . . . such as time management which I learned from my school teacher and prioritization and planning which I learned from my parents who were farmers' (GX06).

From this it may be concluded that training, confidence and experience play a part in determining the extent to which an environment is complex or chaotic, however was it a phenomenon also evident in other professional areas? A respondent from Group 3 stated that:

‘Politics – big and little ‘p’ . . . can make for a very tense work area . . . Because we are driven on one side by the government of the day and on the other by people like (industry organisations), keeping a neutral playground is sometimes very hard, especially when people inside the organisation are getting their knickers in a twist because they are also trying to keep all of these players happy. This can sometimes manifest itself as in-fighting and back stabbing which really gets up my nose’ (OX30).

Another respondent from Group 2 also stated:

‘I think the most important things I have to do on (busy days) is figure out what I need to do and whether or not I’ve got the skills to do it or pass the problem on to somebody else to look after. The trouble is none of the courses I’ve done so far talk about that or even give you the skills to do it’ (DX13).

This supports the contention in the literature that studies into complexity should not overlook the fact that the systems that can be characterised as such are not just the technical and business systems but also human. The complexity of the ‘human system’, effected as it is by the experiences it has undergone in the past and its reaction to current situations, appears to be another dimension that must be considered when defining what is and what is not a complex environment and the impact this has on CBT. Further research is needed to gain a better understanding of exactly how important this is, however even with this limited data it is clear that the notion of complexity and complex environments cannot overlook the degree of complexity that individuals and teams bring to it or experience by it and what this means for the design and development of competency-based training programs.

This conclusion emerged not just from the interviews and the focus groups but also from the observation of Group 2 in which there were several examples of where and how individual capability (based on life and work experience) influenced an individual’s reaction to complex situations. For example, on one occasion a work team was observed preparing to undertake a project that had a relatively fixed completion date but for which, they later told the researcher, they did not have the training to accurately identify the project’s objective, the confidence to ask their superior manager for greater guidance in determining this, or the skills or knowledge to develop and implement a plan to achieve it. Because of this they were unwilling to commence the project and as a result they had, by the time of the observation, experienced a significant amount of stress individually and within the team. When they were brought together by their manager to resolve the problems associated with

their failure to commence the project the atmosphere was very tense and the two main project members, that is the ones who should have been leading the project team, tried to sit as far from their manager as possible.

As the discussion began to close in on the reasons, stated above, as to why the project had not commenced, the interactions became heated and the two project team members very defensive. Their body language suggested that they were not open to the discussion and were unwilling participants. Finally, after about half an hour when the discussion had become quite argumentative as each member sought to explain, on the one hand, why the project was important and, on the other, why it could not commence at this time, one of the team members confessed the reason why the project had been consistently delayed. She later told the researcher that the reason why she had not spoken up before was because she felt pleased that she had been given the task and did not want her manager to feel that his decision in giving it to her was wrong. She felt she'd been treated with respect and did not want that respect to be withdrawn if it became known that she was not sufficiently competent to achieve the objective she had been given.

As soon as the real reasons for the delay were divulged another team member suggested that they employ a consultant to assist them to explore the parameters of the project and help them identify a way forward. The manager immediately agreed to this idea and led the group in a workshop to develop a plan for making this happen.

In this study the environment was becoming more and more complex and unpredictable as each person sought to protect their position insofar as the urgency of the project was concerned. None appeared to be seeking a solution as much as they were trying to use their argument to maintain the status quo which would have led to further delays in the project. It was not until one member provided an alternative solution that the impasse was overcome and the situation stabilised to the degree that together they were able to work towards a solution.

A review of the competency standards against which these team members had been training revealed that certain skills and knowledge found there implied an honesty in seeking feedback and guidance from one's superior manager is important, but it does not describe how to do this in environments in which people are becoming

argumentative and defensive or unwilling to openly share concerns and issues. To avoid such situations, two respondents from DEWR stated that:

‘My role is 80% people management ...client relationships, teamwork, providing resources, putting out bushfires (and) dealing with the executive and the Minister’s office. It is really communications, interacting with others, building and maintaining relationships...and to a lesser degree, applying my technical skills’ (DX08).

‘(On the quiet days it is all about) pacing yourself, knowing what things you can achieve and what you can’t, (applying) reasoning skills and ... to a certain degree just cruising and maintaining that busyness so that you’re not bored but you’ve got more flexibility in what you undertake’ (DX09).

As the question central to this aspect of the study is only whether or not the complexity theories are relevant, not the impact that environments characterised as such have on Australian workplaces, further testing of this data were not carried out using, for example, t-testing to conduct a probability analysis of the likelihood that certain degrees of complexity would result in the need to apply a range of skills and knowledge. Such research may be a useful follow up to this study if the exact nature of competence, and the training appropriate to achieving such competence, is to be defined. For the purposes of this study, therefore, a practical implication of these data are that the environment plays a significant part in determining the skills and knowledge that are appropriate at any given time, however it is not just the actual complexity of the environment but also one’s perception of that complexity and how fit one is to deal with it – itself an issue that adds to or detracts from the complexity of the environment.

4.4 QUESTION 2: IN ENVIRONMENTS THAT COULD BE CHARACTERISED AS COMPLEX AND CHAOTIC, WHAT SKILLS AND KNOWLEDGE DO INDIVIDUALS APPLY?

Throughout the interviews respondents were asked to describe the skills and knowledge they apply in workplaces that they experience on quiet days and those that they experience on busy days. The terms quiet and busy were used to describe environments that were controlled and stable on the one hand and complex and chaotic on the other and, when used in conjunction with the matrix described above, was a short-hand way of differentiating between the two.

To enhance the validity of both the data gathering and the data analysis process, all interviewees (except those from DMO and the DEWR focus groups) were asked what skills and knowledge they apply in environments that could be characterized as complex and chaotic. To further enhance this validity the DEWR and DMO focus groups were also asked what skills and knowledge experienced and professional practitioners would observe other applying in such environments, and notes of what the researcher observed during the observation were kept and referred to during the data analysis. In doing this it was possible to triangulate the data between what the respondents stated they apply, what others stated that people such as the respondents apply, and what the researcher observed them applying.

The question of whether or not the complexity theories apply to workplaces in Australia was, subject to the limitations of this study, answered early in the analysis and described in the previous section. To summarise, on being asked to describe the environment experienced on a quiet day, half of the respondents stated that it was changeable and irregular or complex (the other half stating that it was, to a greater or lesser degree, stable and controlled), while most (88%) stated that on a busy day the environment could be characterised as complex or chaotic. It was concluded therefore that insofar as this study goes the complexity theories are applicable to Australia, a conclusion that accorded with the literature in which it was stated that no workplace could be wholly stable and controlled to the extent that no complexity existed there.

Accepted also was an understanding that the degree of complexity experienced by respondents, and therefore the skills and knowledge that they applied, on quiet or busy days depended on a number of factors. For example, the environment experienced on a quiet day differed in many ways to that experienced on a busy day, especially in the need to rely on others (such as an immediate manager or an organisation's policies and procedures) to direct what was to be done or to act independently and/or in the absence of such direction. Further, the degree of complexity that respondents experienced on either day was not just bordered by the nature of the organisation in which they were employed and objectives they were expected to achieve there (and those for whom these objectives were important), but also their own life experiences and capability in achieving them.

To more fully understand how individuals may be trained to a level of competence whereby they could achieve objectives in environments regardless of the degree of complexity experienced there, it was important to identify the skills and knowledge that respondents stated that they have had to learn and apply in similar environments. This, it was felt, would provide a useful starting point for an understanding of whether or not others could be trained in these or similar skills using a competency-based approach.

Because it was also important that the data emerged naturally from the answers given by participants and from the observation, responses to the question of what skills and knowledge individuals apply in environments characterised as complex and chaotic were unprompted. Neither the interviewees nor the focus group members were given a list of skills and asked to select those that they apply in these environments, nor was a checklist used by the researcher during the observation. The data that emerged from asking the question about the skills and knowledge they apply in their work, on both quiet and busy days, therefore were based on their experience and their way of describing the skills.

A summary of the responses is presented at Appendix L. While using respondents' own voices to describe the skills and knowledge that they apply provided a rich range of responses there are some that appear to be duplications of statements given by other respondents but worded differently. Such duplications have been retained and, except for the responses drawn from the focus groups and the observation, no attempt has been made to paraphrase responses without the approval of the respondent who first offered it. Unless they were exact matches or sufficiently clear to see an obvious match with other skills already noted, those given here are as they were expressed by the respondents. While this has resulted in a lengthy list of the skills and knowledge that respondents claimed they apply in complex and chaotic environments it has allowed for an interpretation of significant trends that will be discussed in the next chapter.

Interviewees and focus group participants were also asked which of these skills they would suggest are the most important. Their responses again were unprompted and to enhance our understanding of them they have been grouped under three broad

headings of leadership, business skills, and understanding and working with organisational policies and procedures.

Leadership

- Giving instructions ('Telling people to bugger off' – GX01).
- Seeking information and knowledge.
- People and management skills.
- Delegating tasks to others – downwards to subordinates and upwards to superiors.
- Understanding and drawing on life experiences.
- Using common sense.
- Interpersonal skills.
- Leadership.
- Keeping focus on the long-term objectives.
- Applying a sense of purpose and urgency when leading people.
- Managing and leading a team.
- Self awareness.
- Self development.
- Varying work to make it interesting (for self and others).
- Leading/managing upwards.
- Getting and using feedback from others using interpersonal skills - working with/through people.
- Prioritising work and training others.
- Listing tasks for others to do.

Business skills

- Keeping to routine.
- Prioritising tasks.
- Time management.
- Workflow management.
- Customer service and customer relations.
- General management.
- Estimating, Scheduling.
- Resource management.
- Time management and reprioritisation.
- Preparation and planning prior to people joining (the group or organisation).
- Planning and catching up on unfinished work.
- Reflecting on what could have been done better.
- Taking time to do things right.
- Being visibly more proactive.
- Situational awareness.
- Understanding what one is trying to do, to achieve.
- Having a clear plan.
- Understanding how businesses work (possessing business acumen).

Understanding and working within organisational policies and procedures

- Organisational skills.
- Knowledge of relevant procedures, processes, legislation, policies, culture, structure of organisation.
- Know who to talk to.

Similar responses also emerged from the data gathered during the DMO focus groups.

While some respondents suggested that such things as reflection and varying work to keep it interesting were important, in the main reported was their belief that being able

to lead others in the achievement of business related goals and objectives was more important in environments experienced on quiet days. Such comments were supported from observations conducted in the workplace and during Goodwin and DEWR focus groups where, for example, the nominated leader was observed to step back and support the others as they worked towards whichever outcome they were pursuing at the time. This appeared to be an empowering act which allowed others to gain experience and skills in leading work teams and at the same time gain knowledge of the processes to be followed when doing so. It may have been that the people concerned were doing this because they were aware that they were part of an observational study, but it also appeared to be an intuitive action, not something that they had been told to do or felt that they should do it because they were taking part in a research activity. The short span of time over which the observations were conducted was insufficient to confirm this.

Insofar as the skills and knowledge applied on busy days is concerned, emerging from the data were the contention by respondents from the aged care centre that of importance in complex environments was the ability to take one's time and keep to routine regardless of what was going on around them. While it was clear in earlier responses that being able to react quickly and efficiently to emerging issues was an important part of their response to hectic or chaotic situations, being able to do so deliberately and in accordance with established routines was according to them even more important.

A similar response emerged from the data gathered from the other two groups interviewed. Both agreed that being able to take a strategic view of the situation, and their response to issues emerging from taking such a view, were important. For example, strategic thinking and strategic decision making are, according to their responses, important in environments that are hectic and chaotic and it is from this that their actions will be determined.

Leadership that involves creating a greater 'sense of purpose and urgency' in which people are supervised rather than managed, was also reported as important when priorities are constantly changing and patterns of work and need are unclear. Also emerging from responses to this question was the importance of being able to say 'no'

– a competency that according to respondents helps maintain stability in situations that are characterised by changing priorities and increasing demands.

In light of these responses, the documentation upon which was based the training of these respondents was also reviewed to determine which, if any, of these skills were covered during such training and their subsequent on-the-job assessment. In doing so it emerged that there was nearly twice as many skills that respondents from these groups claimed were important enough to apply in their normal (albeit complex) workday than was detailed in the standards against which their training was conducted (57 skills noted compared to 23 covered in the standards on quiet days and 76 and 18 respectively on busy days). Moreover, without reference to the skills previously identified by respondents as applied on quiet days, the focus groups from DEWR and DMO noted 47 skills that were the same or similar but of which only 17 could be found in the competency standards or the training program (see Appendix L). On busy days there were 31 skills noted that were the same or similar of which only 7 were found in the competency standards. These findings are summarised in Table 8.

Table 8. Summary of responses to question of skills and knowledge applied on quiet and busy days.

	Skills and knowledge applied in environments experienced on quiet days		Skills and knowledge applied in environments experienced on busy days	
	Number of responses	Skills and knowledge covered in training course	Number of responses	Skills and knowledge covered in training course
Total responses from interviews and focus groups	57	23	76	18
Number of same or similar responses between interviews and focus groups	47	17	31	7

Numbers in boxes indicate total responses

In this table it can be seen that the number of skills and knowledge described by respondents as applied on days that were quiet and those that were busy far exceed those that the documentation shows were detailed in the standards against which their

training had been conducted. That there is a difference between the skills and knowledge that the interviewees stated they apply in environments experienced on the various days and what the focus groups expected to see others apply in similar environments will be discussed shortly. Of interest, however, is the gap between the skills and knowledge that both groups state are applied and those covered during the training.

In the case of the total responses, nearly two thirds of the skills and knowledge stated as applied on quiet or busy days were not covered in the training – 60% and 64% respectively. Clearly such a difference between the skills and knowledge contained in the training that respondents had undertaken and what they state are applied in their workplace has significant implications for the way in which training is designed, and because it is central to the issue of the complexity theories and their impact on the way in which competency-based training is designed and conducted this will be discussed in the next chapter.

Having said that, insofar as any generalisation that the skills and knowledge applied in one workplace are applicable and appropriate to others is concerned, there is no clear trend in the data to support this. What is clear is that there are significant differences in the skills applied in the aged care centre (Group 1) and those applied in, for example, DEWR (Group 2), even though respondents from both organisations claimed that there are certain skills and knowledge that they apply in their respective complex environments. While it could be claimed that this is because of the professional or vocational area in which respondents were trained, these differences are just as pronounced in the data gathered from Group 3 respondents who had all attended the same training and were employed in similar professional positions.

Further, there were also differences between what respondents stated that they applied in the workplace to achieve their objectives and those that others stated they would expect to see applied in the achievement of these same objectives (as gathered from the DEWR and DMO focus groups). And, as was noted above, in just about every case the standards against which the respondents had been trained contain far less skills and knowledge than those that they state they apply on the job – in environments that are found on both quiet and on busy days. From the data, therefore, while all respondents agreed that the skills and knowledge that they must apply in

environments that are at the least changeable and irregular, and at worst chaotic, are additional to those in which they had been trained, there is no wide ranging consensus on what these are.

Where this is most obvious is in the skills that respondents stated they apply in environments that are experienced on busy days. For example, the responses given by respondents from the aged care centre tended towards those appropriate to problem solving, forming and maintaining interrelationships, and maintaining control while those of the DEWR groups included more team based and environment awareness skills. (Environment, in this case, meaning the workplace – i.e., the business in which the organisation is involved and its policies, procedures and working methods.) This was also apparent throughout the observation where it was noted that on those occasions when (internal and external) pressure was being applied to individuals and teams to achieve better and quicker outcomes (i.e., the environment was becoming more complex) they tended to draw together more closely as a group and become more focussed on immediate priorities and shorter-term objectives. Their ability to function more effectively appeared to be maximized whenever time was taken to discuss complex issues, draw on team and individual experience to facilitate a response, and then form a plan to develop and implement whatever was required to address the issue concerned. In other words, their effectiveness appeared to be enhanced when they created an environment that was relatively stable and controlled and thereby more conducive to effective decision making and planning.

The DMO and DEWR focus groups were also asked what, in their opinion and experience, were the skills and knowledge they would expect to see being applied by others who they would consider are competent in the workplace. Both groups suggested that skills and knowledge in leadership, managing knowledge and communications, and information sharing within and between teams were important. While the data emerging from the DMO focus group highlighted skills very similar to those revealed by the interview respondents and the observation, less emphasis was noted on the ‘softer’ skills such as empathy, interrelationships and team maintenance. As this group was made up entirely of males, however, most of whom had a military background but all of whom were at the time of the study working in a defence environment, this outcome is not surprising. This meant, however, that not all of the

data provided by the DMO focus groups could be analysed against that revealed during the interviews, observation and Groups 1 and 2 focus groups without acknowledging the environment from which it emerged and interpreting the data with this in mind.

In analysing responses to this question it appears that most widely reported were the skills that are cognitive rather than behavioural and centred on returning to or maintaining a stable and controlled workplace to make sense of a situation and from this more effectively decide on a course of action that enables them achieve predetermined or emergent goals and objectives. This, in the voices of the participants, echoes the concerns expressed by the critics in the literature that the way in which CBT is applied in Australia over-relies on behavioural skills in the standards that underpin it.

When asked whose objectives they were more concerned with achieving in environments that were characterised as either quiet or busy, all respondents from the Federal or State Government organisations (including those in Group 3) stated that they are achieving their immediate manager's. Those in the private sector stated that their client's (or, in the aged care centre, the resident's) objectives were paramount, although one or two did state that in achieving their client's objectives they were also achieving their organisation's. A summary of the responses to this question is found at Table 9.

While these results are important to our understanding of the extent to which the complexity theories are relevant in Australia, it appears that because of the wide spread of responses, and the differences between the groups, it may not be possible to make any generalisations regarding the way and the degree to which the complexity theories impact upon others in similar workplaces. Nevertheless, even with this limited range of data trends appear that reveal issues important to the design and development of competency-based training that in the literature have not previously been explored.

Table 9. Objectives respondents state they achieve while working in environments that are quiet or busy. (Duplicate responses excluded.)

Group	Objectives	
	Quiet day	Busy day
1	<ul style="list-style-type: none"> • Employer - when sticking to policies • Client (resident) and then organisation as a whole • In calm times everybody's objectives are worked towards • Client then organisation • Clients when communicating 	<ul style="list-style-type: none"> • Person in immediate need • Resident's then organisation or resident as client
2	<ul style="list-style-type: none"> • Organisational objectives as they are filtered down to branch, Section and individual levels • Client objectives – 'but these change along the way' • Team • Boss as a client • The organisation through the business plan • Own - self-improvement and achievements 	<ul style="list-style-type: none"> • Minister • Parliament • Secretary • Executive's and then corporate business needs • Boss or other major stakeholder whose boss is 'on their back' • Client (who may or may not be the boss or immediate supervisor) • Self • Immediate supervisor/line manager • Broader client group
3	<ul style="list-style-type: none"> • Immediate supervisor • External customers (although work has to be carried out within fixed guidelines and processes) • Balance between organisation and client; end-customer (i.e., customer's customer) • Customer and stakeholder • The organisation • The client (i.e., the purchaser of the goods or services) 	<ul style="list-style-type: none"> • External customers [although work has to be carried out within fixed guidelines and processes] • External customers • Internal customers (through monthly reporting) • Project (objectives) • Customer • 'The organisation's (objectives) -- always the organisation's'
4	Group 4 did not take part in interviews	

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

Group 4 – Defence Materiel Organisation

4.5 QUESTION 3: WHERE AND HOW WERE THESE SKILLS AND KNOWLEDGE GAINED?

Competency-based training has, at its core, the standards against which those undertaking the training are to be assessed to measure their competence. The way in which these standards are currently developed involves capturing the skills and knowledge applied by others in similar workplaces or industries. Standards developed

following these processes were employed in the training and assessment of all respondents and interviewees in this study.

As has been seen there is a significant number of skills and knowledge that respondents claim that they have had to learn beyond those covered in their training to competently achieve the outcomes for which they are responsible. Most of these were not covered in either the training they received or the standards against which they were assessed. As stated in Chapter One, this study is not an investigation into the current VET system which, by extension, includes why certain skills or knowledge were or were not included in competency standards or training processes, therefore the reasons for such failings will not be further explored. Where examination is required, however, is in the way in which respondents claimed that they have had to learn these missing skills and knowledge so that future iterations of competency standards and training programs may include such means where appropriate. The rationale for doing this is to enhance our understanding of the way in which a competency-based approach to training can support the development of such competence and where, if any, changes need to be made to the concept and application of CBT to achieve this.

As stated previously, in gathering and analysing data on the skills and knowledge that individuals from the aged care centre and DEWR stated that they apply in environments characterised as complex, a review of the documentation used in their training showed that only 40% of those reportedly applied by respondents on quiet days and 36% on busy days were contained in the competency standards against which their training had been carried out. The observation of Group 2 conducted by the researcher revealed that these figures may be lower still. When asked, however, where and how they learned those skills and knowledge that were not covered during their training, 47% of respondents (51) stated that they either did not know or they learned them 'on the job'. Only 23 (25%) responses were that they learned these additional skills through training or training undertaken in previous positions. Applicant's responses to this question are summarized at Table 10.

Table 10. Responses to the question of where/how the skills and knowledge not covered during training were learned.

How skills and knowledge were gained	Group					Total
	1 (Interview)	1 (Focus group)	2 (Interview)	2 (Observation)	3 (Interview)	
During assessment processes	7		3		5	15
Watching and listening to others	3		4	1	6	14
Trial and error/learning by doing	4		3		6	13
From experience and other jobs	5		2	1	3	11
Previous or other training	1		4	1	5	11
By adapting skills to new situations and circumstances	3		1	1	2	7
Life, including raising children	2	2			3	7
Instinct and intuition	4		1		1	6
Preparation began with schools/parents	2		1			3
Don't know			1		1	2
Self development through organisation's performance management system					1	1
Self taught					1	1
Total responses						91

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

These figures reflect the number of times the source of learning was mentioned during the interview, not the number of respondents who reported it as the means by which they gained the skills not covered during their training. Some respondents, for example, mentioned more than one source of their learning and each has been summarized here.

The source of learning generating the most responses (16%) was the assessment processes (i.e., the competency-based assessment respondents took part in subsequent to their training) and from the data it was clear that learning effectiveness was enhanced by its application. From a question in which interviewees were asked to reflect and comment on the positive outcomes of the on-the-job assessment, comments received included the following:

‘At the end of the course we had to show physical evidence that we understood the processes (and that) we understood what was going to be needed of us in the workplace if we had to do this. (This) was excellent

because I had to go off on my own and learn through this process (and) how to do ... certain tasks' (GX01).

'What I found most helpful what that it wasn't so much a test of my competence but a means (for) learning those things that you don't know so that you can apply the skills covered during the training. For example, learning who to turn to when problems arise was something that I had to learn to get enough evidence together for the assessment' (GX02).

'What I liked about it is that I was forced to think about how to relate the competency itself into actual practice' (GX05).

'The assessment process helped the information (standards, training, competencies etc.) make sense and simplified the processes for my customers. (It) taught me to be concise and straight to the point' (OX27).

These responses were validated through the observation of Group 2 where it was noted that those undertaking assessment appeared motivated to experiment with their newly acquired skills and knowledge and as a result of this identify further learning needs. Such needs were openly discussed with others (including past students or supervisors/managers) and not the trainer or assessor, even though they were prepared to respond wherever necessary, except in cases where neither they nor others within their immediate work community were able to identify and apply the skills and knowledge concerned.

It was also noted during the observation that not all subjects appeared either competent or confident enough to ask questions or share their concerns with others and therefore they were not as effective, at first, as others who were open about their learning needs. The question of why this was so was not pursued as there were too few instances to lead to an assumption that such an issue was widespread. On reflection, however, it is clear that the notion of 'learning to learn' is not one that, as trainers traditionally held, is relevant only to training or learning but to work in general. A review of a number of competency standards revealed that in those created overseas (notably in the UK) the concept of self-development is one that is held as important at all levels in most professions, but this is not so in Australia. This concept was certainly not evident in the standards against which the aged care sector and the project managers were trained and assessed.

The observation also revealed that many within this group were not only self-learning but also self-assessing as they applied the skills and knowledge learned during and

after their training, coupling these with the knowledge they had already gained through experience and previous training. This self-assessment appeared to help them make sense of what they had learned or were learning as they tried out their skills and knowledge, and as they confirmed its appropriateness in the environment encountered at any given time. For example, some of the group being observed found during a particularly busy period that the complete range of skills they were taught during their project management training could not be applied because of time constraints so they adapted what was taught to the situation and in doing so were able to achieve their objectives.

This issue was also raised with the focus groups drawn from Groups 1 and 2. While discussions with these focus groups confirmed that formal and informal training prepared them for the technical side of their function, the skills and knowledge they required to adapt their technical expertise to the needs of their workplace were learned from actually doing the job, and it was the processes of competency-based assessment that they stated helped them do this. A review of the competency standards against which the training undertaken by Groups 1, 2 and 3 had been conducted, however, revealed that the skills and knowledge to make these adaptations were also not included there. For example, the skills to evaluate one's own performance in adapting previously learned knowledge to new situations or to seek feedback on such performance were not contained in either the aged care or the project management standards. All three focus groups (i.e., those from Goodwin, DEWR and DMO) suggested that the ability to do these is a competence possessed by those who, in their opinion, are highly effective in the performance of their jobs. This makes it all the more curious why it has not been included in the standards against which they were, and others continue to be, trained.

To explore whether or not other training courses had provided respondents with the skills and knowledge to adapt previously held knowledge to new situations, interviewees were asked to reflect on other competency-based training they may have undertaken in the past. A summary of their responses is at Table 11 (p.196).

Like the previous question this was not asked of the DMO focus group because the purpose of those participants was solely to gather data on what they expected to see in competent workplace performance. It was, however, included in the interviews to

determine respondents' experience in competency-based training in a broader range of subjects than just that or those essential to their current function and through this identify whether or not the skills they required to more effectively learn on-the-job had been gained there. Sought for further discussion and insights was any comparisons they could make between the type and quality of training they had received and conclusions as to whether or not it prepared them for tasks and activities carried out in workplaces that could be characterised as complex and chaotic.

Table 11. Other courses attended

Organisation/ facility	Course	Level
Aged care facility (Group 1)	Business Administration	Certificate IV
	First Aid	Certificate
	OH&S	Certificate
	Community Welfare	Certificate IV
	Nursing	Advanced Diploma
	Problem Solving	Certificate
DEWR (Group 2)	Train the Trainer	Certificate
	Leadership and Management	Certificate IV
	Assessor and Workplace Trainer	Certificate IV
	Government Studies	Diploma
	Building	Certificate
	Clerk of Works	Certificate
	Government Procurement and Contracting	Certificate IV
	Management and leadership	Certificate
Others (Group 3)	Assessor and Workplace Training	Certificate IV
	Project Management	Advanced Diploma
DMO (Group 4)	As the purpose of this group was to elicit data based on their current position and experience, and not their previous training, this question was not asked.	

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

Group 4 – Defence Materiel Organisation

Not all of the respondents had undertaken other CBT courses yet from the data all were capable of adapting their skills (gained through training or life experiences) to new situations. While the competence to do so was not included in their training it appears that the ability to adapt and apply previously learned skills was inherent within those participating in this study. The data were therefore again reviewed to determine whether or not those who had undertaken other CBT courses were more effective at doing this, but no evidence of this was found. If anything, it appeared

from the data that having undertaken other CBT courses added to the complexity of the environment, not lessened it, because it implied a level of competence that respondents found was inappropriate to their functions or which allowed them to take on greater responsibilities for which their (current) training had not prepared them. They then had to either ‘unlearn’, or learn innovative ways of applying, what they had been taught whether during their recently completed training or other courses that they had attended.

For example, there was a significant breadth of training experience that respondents from Groups 1 and 2 brought to their employment. This was particularly so in Group 1 who were all employed at the same tasks but whose training and qualifications ranged from an undergraduate degree in nursing to certificates in aged care or business administration. Respondents from Group 1 felt that such a diversity of backgrounds and experience had the potential to increase the complexity of a workplace environment by enabling them to take on tasks that they otherwise might not have felt confident undertaking. This was confirmed through the focus group who added that such experience allowed for staff to take the lead in certain circumstances (e.g., complex or unfamiliar tasks) even though it was not their function to do so. Similar data emerged from other interviews, focus groups and the observation of Group 2 implying that a useful competence under such circumstances was not simply the ability to do the task but also the ability to take on more complex tasks (even though they are not trained to do so) or, from a senior staff member’s position, recognise such talent, nourish it and step back while the now more capable person takes over.

While it is well known that these are traits common to all effective workplace leaders, a review of the competency standards against which the training of all participants had been carried out again failed to identify where these had been included. This highlighted the failure of the competency standards to fully capture the skills and knowledge required of competent workplace leaders and managers. For example, respondents in Group 2 who had undertaken a wider range of training than just that which formed the basis for their current function felt it ‘rounded out’ their range of competence and enabled them to be more effective in their roles. While individuals felt this degree of competence, however, from their responses it appears that those

around them did not. This was exemplified during the observation of this group in their workplace where it was noted that those with such experience and qualifications were in only a few instances asked to lead discussions or activities within their qualified area. Given that a central tenet of good leadership is to allow staff to work to their optimum capability, being denied such opportunities has the potential to increase frustration and workplace complexity, an issue confirmed by one respondent who was frank enough to reveal that such dissatisfaction was the reason for her applying for positions outside of her current work area. This led to the conclusion that the failure of the competency standards to fully and accurately describe the responsibilities of managers and leaders has the potential to increase the frustrations and complexity of the workplace for others. Again, an example of where workplace complexity can emerge, not just from the systems and life experiences within it but can also be externally imposed, on this time unintentionally.

Comparing the data emerging from Group 1 with that of Group 2 it was clear that an essential element of complexity in the workplace is the norms, or accepted work practices, and the effect they have on individual motivation, confidence and competence (using the NTB's 1992 definition). This also suggests implications for the application of recognition of prior learning (a peripheral but important adjunct to competency-based training), particularly in its use in identifying skills and knowledge essential to effective on-the-job performance but which are not detailed in the competency standards against which an assessment is to be carried out. The potential implications of experience, complex workplaces and the impact they have on the way in which competency-based training is applied in Australia will be discussed in the next chapter.

A practical conclusion from this is that the skills and knowledge individuals learn to enhance their on-the-job performance in environments that could be characterized as complex and chaotic can be gained from many sources. For example, a group of three participants was observed 'brainstorming' solutions to an issue that none of them had the experience to adequately address and overcome. (Another, more detailed, observation report on a similar incident is at Appendix D.) The primary source is, according to the data, the self-managed assessment processes that respondents applied intuitively and those that support competency-based training. While the two are very

similar the former is unstructured and based on the individual's perception of the immediate requirements of the job, while the latter is structured and centred on standards of competence that others have determined are relevant to that function. As this question was asked only of those who had in the past undertaken a competency-based training course it is not yet known whether or not a similar conclusion would be reached using data presented by respondents who had not undertaken a CBT course but who had taken part in a competency-based assessment for other purposes (e.g. performance review, recruitment, professional certification etc.).

4.6 QUESTION 4: COULD SUCH SKILLS AND KNOWLEDGE BE GAINED THROUGH THE PROCESSES OF COMPETENCY-BASED TRAINING?

While an answer to this question could be a simple 'Yes' or 'No', what the data reveals about the nature of complexity in the workplace and the influence that individual capability and life-skills has on the degree to which it impacts on their daily activities, including the training they receive, means that the answer is not easily arrived at.

In reviewing and analysing the data concerning this question, the starting point was an image of the way in which respondents reported their experiences with competency-based training. Of importance was the question of whether or not the competency-based training that participants had undertaken for their current position had, in fact, prepared them for that function. After all, this is the stated aim of competency standards and competency-based training. (See the definition in Chapter One.) It was felt therefore that only through an examination of their current or recent experiences would it be possible to fully understand the basis upon which their responses were made to this broader question.

Three critical areas were examined: Whether or not the competency standards against which their training had been conducted were difficult to understand, whether or not the competency standards adequately covered the skills and knowledge they required to perform their function, and whether or not the training they received adequately

prepared them for the tasks they were required to perform in the workplace. The responses to these questions are summarised at Table 12

Table 12. Summary of responses regarding adequacy of competency standards and training

	Group	No	Yes	Not sure
Did you find the competency standards difficult to understand?	1	4	2	1
	2	1	7	
	3	8	2	
Did you feel that the competency standards against which the training was conducted adequately covered the skills and knowledge you need to competently perform your job?	1	5	2	
	2	2	6	
	3	8	2	
Did you feel that the training you received against these standards adequately prepared you for the projects and work you were asked to undertake either during or after the training?	1	2	5	
	2	8		
	3	10		

Legend:

Group 1 – Goodwin Village Ainslie – aged care facility

Group 2 – Department of Employment and Workplace Relations – federal public service

Group 3 – Mix of public and private organisations

Numbers in boxes indicate total responses

These questions were asked of participants after they had completed their training and were actively applying their skills and knowledge in the workplace. Of interest is that there is no broad agreement on these questions. Group 2, for example, for whom the competency standards and their training had been contextualised to their organisation and specific workplace needs, reported that they had difficulty in understanding the standards even though they, more than either of the other groups, felt that the standards adequately covered the skills and knowledge they required on the job. Having said that, this group also reported earlier (see Appendix L) that they applied many more skills on the job than did either of the other two groups, a point supported by their unanimous agreement that the training did not prepare them for the work they were required to do on their return to the workplace.

Both Groups 1 and 3 reported that the standards didn't cover the skills and knowledge they required in the workplace but had opposite views on whether or not the training they received prepared them for their job. In reviewing the data gathered during all three focus groups and reflecting on similar differences reported by individuals in Group 2, where the difference appears between these Groups 1 and 3 is not so much in the way in which the training was conducted but in what occurred once the formal training was completed.

For example, reported earlier is that respondents from Group 1 stated that the training they had undertaken – both the academic training (those undertaking the Bachelor of Nursing) and the vocational, Certificate III course - had been presented by a wide range of subject matter experts, and their assessment throughout their training was primarily of workplace practice coupled with mentoring and coaching from experienced staff members. According to respondents their assessment was not of what they may have done in the past (i.e., recognition of prior learning was not a factor in their assessment) but of what they were actually doing to apply the skills and knowledge covered during the training. Respondents from Group 2, on the other hand, had also earlier suggested that these were aspects of their training that could have had greater emphasis placed upon them. In searching for answers to how they could have been improved, a review of their training documentation showed that recognition of prior learning was included in their assessment processes and they were therefore not required to apply all of the skills and knowledge against which the training was carried out. As a result their assessment was not wholly of how and where they applied the skills and knowledge covered during their training (aside from the fact that many respondents reported that the standards included a number of competencies that they do not apply in their workplace) but where and how they may have applied them in other contexts, in other situations and in other environments.

While this is a legitimate, and quite strongly encouraged, aspect of the current approach to competency-based training, it does not explain why Group 3 (also having recognition of prior learning as a significant element of their on-the-job assessment), with similar results to Group 1 regarding the relevance and understandability of the competency standards, unanimously agreed that the training prepared them for their jobs. The training this group had undertaken was primarily a distance education

program with less interaction with the trainer than either Group 1 or 2 but with a higher degree of motivation towards self-learning and experimentation. As every other aspect of the training was the same as that received by Group 2 a conclusion here is that the training better prepared them for their work *because* it was a distance program and therefore the participants required greater self-sufficiency and discipline in applying the learning to their requirements. Self-learning, experimentation, self-sufficiency and discipline, in the same or similar terms, are some of the avenues by which respondents had earlier reported that they had learned the skills and knowledge not covered during their training but which were important enough to need to learn to competently carry out their functions. (See Table 10 p.193.) Are these the new competencies required for complex environments? This will be discussed in the next chapter.

From an analysis of the data it appears that the most successful approach has been to provide training and coaching by subject matter experts during and subsequent to the formal portion (i.e., the face-to-face element) of the course. In addition to this all assessments should be wholly of how individuals apply their skills and knowledge on the job and learn those which they do not possess but which are nevertheless important to their performance. From a respondent who did not receive such support came the following comment:

‘What I think would have been really helpful (during training) would be to actually bring more people in and give (learners) more of an opportunity to hear their life experiences . . . and their case scenarios, and lots more time for questions and answers from nurses about their personal experience . . . A lot more dialogue, conversation, questions and answers, because that’s how I learn. When I have a problem I like to go to someone and say: ‘This was my problem - how could I do it better next time?’ There was none of that in the nursing courses. There (was) the tutor or the teacher or the course convener giving all the information, but there’s not much dialogue between people. There’s all this story telling: ‘This is what happened to me when blah blah blah’. ‘When you have a person come in like this then you’ll see blah blah blah’. But then it would have been nice to have someone else, or other people to say: ‘Oh yes, that can be the case but sometimes this happens.’ And there was really none of that’ (GX01).

This conclusion is based on the apparent differences in the responses between the groups have not been created by the concept of competency-based training but in the way in which it is applied. For example, when respondents understood the standards against which their training was conducted there was a higher likelihood of an

agreement that these standards adequately covered the skills and knowledge they required in their workplace (even though respondents also reported having to learn and apply additional skills to more competently perform there). A practical conclusion, therefore, is that there may be two levels of standards required for workplace functions: those which cover the basic, 'getting started', skills and knowledge, and those which cover the more advanced competencies associated with applying these basic skills in a variety of contexts, for example those associated with self-learning and experimentation. As one respondent put it:

'When you're working in a team there is usually someone that you like what they're doing and you want to aspire to be like that person. How you aspire to that may not even be set in concrete but there is something that you like about that person and you want to emulate. Then you'll find nurses who act in a very unprofessional manner, not perhaps so much with clients or with patients but within the staff team and you see people kind of shying away – and it seems to me that there's a huge amount of learning to do from a very professional person, someone who does their job very well, and covers all the areas in that kind of work you'd like to aspire to' (GX03).

And another:

'Some of the past training has definitely given me some skills to draw on. My life experience has given me some skills to draw on. Everyone's had different life skills. A lot of my life skills to communicate. .. I had a mad mother (she has a mental health thing going on) and I had to learn to deal with all kinds of things and learn to communicate. At the time I didn't have a formal structure around that communication but I did learn those things and when I got into academic learning those informal – those things that I thought were informal – were given some structure to work with and I understood why I did things that way. I didn't learn things formally at first: A lot of it came naturally and then I put them into practice. I started practicing it because I'd found out it worked with my mother and then I was able to put it into some kind of structure and then I kind of built on it from there' (GX05).

The respondent went on to explain the importance she places on learning from others and from life:

'Life experience is huge, and I know that is why they take a lot of mature age nursing students now because they have a lot of life skills to draw on. But one of the skills that I have learned very much is to draw from the people around me because I know that I don't know everything and I know that the people around me have had a huge amount of life and formal training and that I can learn from them all the time. Not just the carers but the residents and the patients in the hospital. Sometimes they know more than you what is going on and you can ask them. Some patients will sit in the hospital with their laptops and they'll be looking up all kinds of things about diseases and cell structures. So you're learning from them as well. But I think that's a very important thing

that you learn from all the different skills that you have around you otherwise you end up being an island and no-one else wants to work with you because you can't take in other peoples skills and make them part of your own' (GX05).

At this stage a useful question to ask is whether or not there would have been greater uniformity throughout the results to the questions posed to respondents about the standards and their training had they included all of the skills and knowledge that respondents needed in their workplace, including those described in the above comments? Would this have made the training more appropriate to their needs? This is a hypothetical question for which no answer was sought in this study, however experience from other fields (e.g., the military) shows that to try to train individuals and teams in everything they need to know at the same time and at the beginning of their career means that they will spend their time doing nothing but training, never really certain that what they're being trained in is going to be sufficient for the task/s ahead. Besides, as one respondent (OX31) stated, to include every competency up front raises the risk that trainees may both be confused over what is important now and in the future, and upon reaching a point in time when such skills are needed forgetting of what had been taught.

Clearly a competency-based approach to training is appropriate but training in what and at what point in time? In determining an answer to this question, two important aspects of competency-based training had to be investigated: how competence is defined in environments that are complex and chaotic, and what changes, if any, would be required to the way in which competency-based training is applied in Australia to make it appropriate to such environments. These will be addressed separately.

4.6.1 How is competence defined in complex and chaotic environments?

In Chapter One the definition given for competence is that it is the skills and knowledge that are at the level required for the competent performance of certain functions within the workplace (from ANTA 2003e). The National Training Board guidelines (NTB 1992) stated that a measurement of competence should be that it

includes task skills, task management skills, job/role environment skills, and contingency skills – skills that include both behavioural and cognitive elements.

While the critics contend that these definitions have never been fully implemented, resulting in the notion of competence in Australia as being more closely focused on behavioural rather than cognitive skills, data gathered throughout this study consistently highlighted the cognitive nature of competence in environments that are complex and chaotic. On the days that respondents claimed were quiet and relatively less hectic and those that they stated were busy and verging on chaos, the skills to reprioritize tasks, resolve problems with clients and team members, adapt previously held knowledge to new situations were consistently mentioned, some saying that the only way in which they could competently apply their technical skills was by the application of their cognitive skills. In other words, to apply certain skills they had to first think about which skills were required, whether the skills were fully or partially required (i.e., do all of the task or only part of it), identify options for future actions, and so on. This was especially so in environments that were reported as being to a greater degree complex or chaotic.

This confirms the validity of the NTB's definition in that the notion of competence includes both behavioural and cognitive aspects, but is it appropriate in environments that may be controlled and stable on some days or in certain situations and characterised as complex and chaotic on others? As was revealed in the literature, the complexity theorists would suggest that the definition is appropriate to neither. To them, because the environment in which an individual's skills and knowledge are applied is itself self-organising and in a state of constant reformation, there is no point in time at which such a definition can be applied, more so if the standards against which such an assessment is to be made are based on the skills and knowledge possessed (some time in the past) by others who applied them in other environments. To explore this further for its relevance to this study, the data were reviewed with the intention of identifying whether or not the NTB's concept of competence and its definition of competency-based training and assessment (definitions that in similar form have been carried on by ANTA) are appropriate to complex environments.

Throughout the study respondents reported that to competently perform in the workplace they had to not only apply the skills that they had learned during training,

they had to also apply them in a variety of contexts and in teams, and where necessary identify and apply other skills (sometimes those that they had not been trained in) that were more appropriate to the situation. This accords with the NTB's concept of competence, that is it includes the skills to do the task, the skills to manage the task, the skills to handle any contingencies, and the skills to apply them in a variety of contexts, jobs and environments. This was confirmed through the observation and the data gathered from all three focus groups.

While the data gathered during this study supported the NTB's concept of competence, the way in which respondents claimed that their competence was assessed differs somewhat to the way in which both the NTB and ANTA suggest it should be carried out. In both the NTB Policy and Guidelines (1992) and later ANTA guidance is the inference that competence can be recognized through an assessment carried out against relevant competency standards (including those incorporated into a training package). The data, however, from both the respondents and the literature suggest that because of the ever-changing environment experienced in the workplace that is generally more complex than it is stable, competence using the traditional definitions can never be achieved.

On the surface this appears to contradict the data gathered earlier that showed that most respondents learned the skills and knowledge they required during their on the job assessment against the standards. While reflecting on this, and considering the data that emerged from this study showing that learning to learn was a natural part of their daily activities, it appears that the assessment processes were not so much a test of what an individual knew and could do, but a process that shaped what needed to be learned and supported the individual as she/he set about learning it.

As was noted above, respondents from Groups 1, 2 and 3 stated that the competency standards against which they were trained and assessed failed to include skills and knowledge that were important to their needs on the job, a point supported by Group 4 who, in their agreement on what they would expect to see in competent performers, included those that were not detailed in the training package. Moreover, both the interviewees and the focus group from Group 2 stated that there were aspects included in the standards that they just did not do in their workplace yet there was an expectation that to be competent at their job they must be assessed against them.

The accepted definition of competency standards is that they describe the skills and knowledge required in 'the workplace'. The question that this suggests is, if competency standards are based on highly regarded performance by practitioners in certain fields, in environments and contexts that are important to them, in whose workplace are others deemed as competent once their assessment is completed? Certainly not their own because a review of the documentation showed that both the aged care and the project management standards were based on best-practice performance by others of those professions at different times and in different contexts and environments. The standards, according to them, therefore meant very little to respondents because the skills and knowledge required in their respective workplaces were in many respects different to those detailed in the standards, yet to be deemed competent under the current Australian approach they were required to be assessed against them and no others.

This, in practical terms, suggests that there are aspects of a competency-based approach to workplace competence that are not appropriate in a complex environment. For example the notion of replicability and predictability – that certain skills and knowledge can, predictably, be replicated in different workplaces. How this situation is viewed in the literature and what it means to the concept and application of CBT will be discussed in the next chapter. If this is accepted, however, where the need for investigation remains is in the appropriateness of any on the job assessment that individuals undertake against such standards of performance, and in particular whether or not the assessment process is more effective when applied as a shaping and learning activity rather than one in which current competence is tested.

Not discussed at length in the literature, but clearly important to the notion of workplace competence, is that in the current approach to competency-based training an assessment of individual skills and knowledge can be determined through a one-off assessment carried out at a given point in time, either at the conclusion of the training (as occurred with the aged care employees) or at some time in the future (as occurred with the remaining respondents). Respondents commenting on this were clear that in their opinion this form of assessment did not measure their competence against the needs of their workplace (as stated in the NTB and ANTA definitions) but solely

against the standards which, as we have seen, were not wholly in line with these needs. For example:

‘(The assessors) assess everyone differently because they follow different nurses. You’ve got no-one who can tell you are competent because they have only worked with you for one shift or two or have never worked with you (therefore) they can’t say you’re competent so you’ve got to be assessed by the principal academic. (Where I did my training) it is different (and) there the assessment is on the procedures you do. And because competency is such a broad term, for example time management, the assessor has to follow you for the entire shift and she follows everyone for the time management competency’ (GX06).

Other respondents had a different experience of the assessment:

‘The assessment was great because it was used as a learning tool, not a testing tool. It didn’t feel like an exam because throughout the workshops and mentoring sessions I was really encouraged to stretch myself to learn and apply those things that were in the standards. The assessment really was cumulative in that it was done as a consequence of all the things I’d learned and done, not just as a one-off thing based on what I already knew and had done. I have done other courses where this happened and I didn’t think it felt right. Giving me a piece of paper for what I could already do didn’t leave me with a feeling that I’d actually accomplished anything’ (OX12).

‘Continuous assessment against the one level of competence (was the most difficult part). Assessment against graduated competence, that is skills and knowledge that get progressively harder or more complex, would have been more helpful’ (OX8).

‘(Since undertaking my training), in increasing my own experience and knowledge and challenging myself in project management I sometimes ask the question: “When do I really become competent? How do you qualitatively and quantitatively measure whether or not somebody has these standards?” People would regard me as a competent project manager but at the time I felt that I still didn’t have this perfected’ (OX31).

This last response provides perhaps the strongest clue as to the nature of competence and where/how an assessment of such competence can best be conducted in a complex environment: at what point in time is competence determined, and what if the person concerned does not believe she/he has at the time of assessment achieved a level that she/he believes is a sufficient measure of competence even though the assessment may show him/her to be competent against the accepted standards? Moreover, if as respondents previously stated, the skills and knowledge to be competent at one’s task are constantly emerging and based around the need to react to

situations and issues that are unpredictable and often unfamiliar. at what standard is this assessment to be conducted?

All respondents agreed that the skills and knowledge against which they were assessed were insufficient for their needs, those of the environment in which they found themselves on quiet and busy days, and those of the organisation in which they were employed. The way in which respondents addressed this was, as many stated, a case of 'learning as you go along', an action that implies determining what must be learned arises out of a self-assessment that is reflective, continuous, and adaptive to new situations and environments (including those that are formed by the adaptation and application of new or previously held skills and knowledge). This accords with the concept of transformative teleology offered by Stacey (2001) as the most sensible approach to learning in complex environments. A review of the training documentation, however, found that the skills and knowledge to do this was not contained in the standards against which the respondents' training had been developed nor were they were assessed in their ability to carry this out when being tested for their competence. Yet, according to respondents, it is one of their most important competencies.

A practical conclusion is that because of the constantly changing skills and knowledge required in environments that range, on different days and in different situations, from stable to chaotic, the NTB and ANTA definitions of competency-based assessment are not appropriate. What is required is a definition that recognises and acknowledges the need by individuals to understand the skills and knowledge that they possess (regardless of where they were learned), identify those that the situation and environment require them to possess to effectively and efficiently (i.e., competently) achieve their objectives there, and adopt those that they do not possess or adapt those that they do to achieve competent performance.

To that end, a new definition of competence may be required to adopt a competency-based approach to training to meet the needs of those whose environments can be characterised as complex and chaotic.

4.6.2 What changes, if any, are needed to the way in which competency-based training, as it is applied in Australia, is conducted to make it appropriate to such environments?

In searching for an answer to the research question noted in Chapter One, this study set out to investigate three aspects of competency-based training that are closely linked but are rarely examined together: the standards upon which the training is based, the training events, and the workplace in which individuals and teams apply their skills and knowledge. Underpinning this research was the widely accepted theory, confirmed again throughout this research, that people learn from a wide variety of sources and not just formal and informal training, many of the skills and knowledge they need to do their job. The questions posed to respondents reflected this.

As was noted above, a practical conclusion drawn from an analysis of the data gathered during this study is that the way in which competency-based training was applied to meet the needs of those employed in the aged care sector and in the broad field of project management in public and private organisations, was appropriate. Moreover, when greater emphasis was placed on individual needs in applying such competence, that is the effort was put into using the post-training assessment as a learning rather than a testing activity, it was very effective. Where gaps were reported was in the skills and knowledge that respondents claimed that they needed to be wholly effective in their workplace, not just at the level to which they were trained but at the level required of them in environments ranging from stable to those characterised as chaos.

Data gathered from a review of the standards upon which was based the training received by respondents showed that nearly two thirds of the skills and knowledge they required on the job were not included in the training they received nor were they assessed as possessing them to be deemed competent at their profession. As this is widely reported in the literature there was no intention throughout this study to investigate why this occurred, only that it was so. As a consequence this line of enquiry ended there. To identify and address this issue, particularly insofar as it relates to the widely accepted national VET system, future research should be carried out to reveal the reason/s why there is such a disconnect between what individuals

need to do on the job and the standards against which their competence at that job are measured and assessed. In the meantime it is clear that the standards underpinning the competency-based training packages for the aged care sector and project management, as they are currently written, while providing the basic skills in these areas, do not contain those required to describe competent performance in their application.

But what of the training itself: were the processes adequate to the needs of respondents? In most cases respondents claimed that the training did prepare them for the function that they were to fulfil, with the only dissenting voices being heard in Group 1. This group was almost unanimous in its concern about the way in which their training and assessment was conducted and the standards against which they were designed and carried out.

For example, the environment in which respondents from Group 1 worked places a strong emphasis on people skills while the standards upon which they were trained are primarily technical and clinical in their focus. Groups 2 and 3, on the other hand, stated that the training adequately prepared them for their work because both their function and the standards upon which the training was developed are technically focussed. What was missing was the same or similar ‘people’ type competencies that Group 1 stated were missing but, in their case, these only become more apparent as contexts and situations unfolded. As a consequence, Groups 2 and 3, unlike Group 1, were not able to be more explicit as to what these competencies were.

A practical conclusion, therefore, is that the concept and application of competency-based training was adequate to the needs of respondents, only the standards against which their training was conducted did not accurately reflect the skills and knowledge they needed not just for the technical aspect of their function but also the cognitive and ‘people’ elements of competence. Moreover, in the case of Group 1 the way in which the training was carried out was at a level which did not motivate or enhance learning.

This lack of a cognitive focus to the training accords with much of the criticism about the way in which CBT is conducted in Australia, however according to the data it may not be possible to identify, prior to or during the training, what these cognitive type skills are. The complexity theorists contend that such predictability is not possible in

complex and chaotic environments, however respondents were able to point to the objectives that needed to be achieved in such environments and, from this, further research may be able to highlight the skills and knowledge required to achieve them.

The way in which respondents claimed that they gained the skills and knowledge they required in environments that ranged from stable to chaotic was through self-direction and experimentation. To meet the needs of individuals and teams whose current and future workplaces may be also characterised as ranging from stable to chaotic, a solution may be to include in the standards the competencies associated with learning what skills and knowledge are required and then going about learning them. In doing this it may be possible to overcome the problem of what skills and knowledge should be included in the competency standards underpinning certain competency-based training programs and providing the yardstick by which on the job competence is assessed.

4.7 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Because the notion of complexity and chaos in an organisational environment is not yet a topic widely discussed in management training or in the development of vocational training and education programs in Australia, it was necessary to couch this study in a context with which the respondents were not familiar, that is their workplaces and the quietness or busy-ness of their working day.

It became very clear early in the study, however, that as a concept complexity is an issue relevant to all workplaces to one degree or another and once explained and demonstrated was very quickly understood by respondents. They were also very quick to identify aspects of their workplace and work environment that would accord with the characterisations given by the complexity theorists once the indicators had been pointed out to them.

Because their responses to the question of the applicability of the complexity theories to their workplaces were universal (although differed when questioned on degree), it was found that focussing on the concept of competency-based training in a variety of contexts allowed for a wider exploration of the generalisability of the conclusions that arose out of this study. It was found that in doing this it was possible to gain a broader

understanding of the implications of the theories that surround this phenomenon and thereby form conclusions on whether or not these conclusions may be as relevant to other workplaces and work environments.

The decision to explore the phenomenon in an aged care facility and in public and private organisations, for example, as limited as the number of respondents may have been, suggests that the research findings are generalisable but only within the limitations expressed by the complexity theories themselves, that is that such environments may be both familiar and yet unfamiliar thereby limiting what is or is not predictable.

As this study only sought individual perceptions of how relevant the theories are to an Australian workplace, the findings of this research reflect experiences and perceptions that are limited by the relatively small selection of respondents and the vocational areas from which they were drawn. While the results suggest a link between stable/complex environments and the way in which individuals and teams learn in the workplace, other variables should be considered to gain a more informed view of the main drivers of learning and how it can be externally influenced.

Individual and collective motivation to learn, for example, should be investigated, not in a theoretical and generalisable setting but in specific environments and subject to varying conditions and situations. In doing so other variables and systems that impact upon individual and collective performance will be considered, such as organisational processes and reward systems. This, by necessity, also means investigating competence not just at one level of the organisation but at all levels as it is such competence that understands and creates these systems in the first place.

Further, the findings of this study reflect the thoughts and beliefs of respondents as they were expressed at one point in time and with limited preparation. They were elicited through interviews that were unstructured thereby allowing for responses that were framed within the respondents' experience and attitudes, but were expressed without detailed reflection or consideration. While the implications of the complexity theories on the way in which competency-based training in Australia is applied are as a result of this study clearly defined, exactly how they are addressed may be better served using a more quantitative approach.

4.8 CONCLUSION

From an analysis of the data gathered throughout this study it is clear that insofar as the environments experienced by the respondents in this research are concerned, the complexity theories are just as relevant to public sector and private organisations in Australia as they are to those studied overseas. Moreover, while the complexity theories imply a concept that is generalisable in its relevance to a modern understanding of the workplace and the way in which individuals and teams learn and grow, this study showed that not only is this concept relevant to Australia, there are also aspects of complexity that are not yet addressed. The degree to which complexity is present in a workplace on days that are quiet and those that are busy and, for example, where and how the application of individual and collective skills are aimed at achieving different outcomes or objects are not addressed in the literature. They are, however, clearly important to an understanding of the impact that the complexity theories have on the way in which competency-based training is developed and applied.

In searching for an answer to the question of the implications of the complexity theories to the way in which competency-based training is applied in Australia, this study has enhanced our understanding of the skills and knowledge required of individuals and teams working in environments that could be, on the one hand, stable and controlled, and those that could on the other hand be complex and chaotic.

This means that the systems driving such organisations, including their training systems, are subject to the same phenomena as those described by the theorists and should therefore be taken into account investigations are carried out into these systems and the way in which they influence work and workplace behaviour.

In the next chapter the implications of these findings will be discussed and recommendations for future research made.

CHAPTER FIVE

CONCLUSIONS AND IMPLICATIONS

5.1 INTRODUCTION

Steven Johnson, in writing about Jane Jacobs' treatise on city neighbourhoods, describes a new way of understanding and acknowledging the important contribution that the theories of complexity and chaos makes to the way in which we can understand how communities learn and grow. To Johnson, community growth and learning occurs through 'random local interactions leading to global order; specialized components creating an unspecialised intelligence; (and) neighbourhoods of individuals solving problems without any of these individuals realizing it' (Johnson 2001:93-94).

Johnson used this to describe the way in which Jacobs viewed the phenomenon of simple interactions at street level that cause evolutionary growth of communities. According to him, Jacobs' studies showed that random interactions between the main actors creates communities of interest which in turn result in the formation of cities and the emergence of unique persona and culture.

Johnson equated Jacobs' work to that of Deborah Gordon of Stanford University who, at the time, studied behavioural ecology and the collective intelligence of ant colonies. According to Johnson both Jacobs and Gordon were searching for an answer to the same question: how members of communities instinctively know what to do, and who should do it, based solely on the sometimes fleeting, sometimes fixed, interrelationships that are formed with others that they meet as they move across the landscape of their daily lives. In his view the conclusions that emerged from their studies were formed not by considering the phenomenon using traditional models but by '...thinking about a social problem using the conceptual tools of emergence (that)

sheds genuinely new light on the problem, and on the ways it has been approached in the past' (2001:94).

The contribution that the study described in this thesis makes to the field of competency-based training emerges from it being viewed in a similar way. Throughout this research it was found that the need for a 'genuinely new light' is strongest when viewed from the gap in the literature regarding the impact that the complexity theories have on the way in which competency-based training is applied in Australia.

This study is distinctive in that in seeking to bridge this gap it brings together fields that have traditionally been treated as separate phenomena – training and learning – and situates them in a context that receives little attention throughout the literature reviewed for this study. It also situates this exploration within contemporary theories regarding workplace complexity and knowledge management that are largely replacing the Taylorist management models that dominated the 20th century.

By doing so this study has highlighted the important link between competency-based training and competency-based assessment and suggests that the failure to fully implement them both has itself been a contributing factor in the complexity and chaos that characterises the vocational training environment in Australia today. Of prime interest are the definitions that underpin CBT and CBA and the effect that the way they have been applied has had on the achievements made by these approaches to workplace productivity and individual or team competence.

In Chapter One it was revealed that the impetus to conduct this study was triggered by a question similar to that pursued by Jacobs and Gordon, that being why and how people instinctively know what to do in the workplace even in the absence of a blueprint or the training with which to do it. This is a well known phenomenon but throughout the literature there is little evidence of any investigation of a causal link between the training given to individuals and teams, especially competency-based training, and the degree of learning that must take place on the job so that individuals and groups may be sufficiently competent to achieved the outcomes that they and others desire. Many studies have suggested that the explanations of how this occur are based on theories that underpin learning, knowledge management and the complexity

sciences, however, none has described exactly what skills and knowledge must be learned or the way in which on the job learning may be stimulated or enhanced by formal training. This study, therefore, sought out the implications of these theories for competency-based training as it is currently applied in Australia – wherever and for whatever reason it is applied.

On this point it is acknowledged that the primary context within which CBT is applied in Australia is the national vocational training and education system but this study is not of that system, only the aspects of it (such as the development of competency standards and their use in nationally endorsed training) that relate to this approach to training. Having said that, reflections on this system could not be avoided because a limitation of this study is in the lack of research into where CBT is conducted outside of national VET system. Therefore, by default the implications and conclusions arising out of this study are more relevant to the Australian VET system than to other contexts within which CBT in this country is applied simply because it does not appear to be being applied in any other context. This is not to say it cannot, or indeed it is not, being applied in other contexts. It is just that in the literature relevant to VET in Australia it is not revealed or acknowledged.

Noted also in the literature review is the lack of evidence of where researchers and VET decision makers have taken into account the complexity theorists view of the workplace for which a competency-based approach to training is designed and conducted. From the lack of discussion or emphasis on the subject it could be assumed that there is a limited understanding of exactly what this environment looks like or the emerging theories that describe it. The only other explanation for this gap in the literature, although the least likely, is that despite the outcome of any CBT activity being competence in such an environment, it is not viewed as sufficiently important to warrant discussion.

In uncovering these implications this study has provided a picture of CBT beyond the simplistic criticisms found in the literature of what is missing from the current approach and has pointed to where responses to these criticisms may be found. In bringing together these concepts a new model has emerged that illustrates why the current approach to CBT is open to such criticisms and more importantly how they

may be addressed through the adoption of an approach that acknowledges the complexity sciences in the definition of workplace needs.

In Chapter Two the theories and practical research that provide the dominant image of the complex and chaotic nature of the workplace were explored in parallel with that which describes the way in which competency-based training is currently applied in Australia. This allowed for the emergence of a picture of the workplace as described in the complexity theories and of the training that, it is claimed, prepares individuals for work there. Within this picture, however, it was clear that there was a gap in descriptions found in the literature of the environment described in the complexity theories and that towards which the current approach to CBT is aimed.

Missing was evidence of where these theories – or any other theories about the workplace or work environment – have been taken into account when designing both the content and the processes of this training, and of the results that such a design has had on both the processes of CBT and their outcome. While within the literature there were many contentions that such a consideration underpins the development of competency-based training programs, particularly those created as part of the national VET system, there is on the other hand evidence in the literature that it does not. What may have swung the balance of evidence in one direction or the other, but noticeably missing from the literature, were the views of those who undertake such training and are expected to apply the skills and knowledge that competency-based training processes decree are sufficient to their needs in the workplace. As the end-users of this training it logically is their perspective that is most important when it comes to whether or not it has delivered on its promises yet in the literature such a view is noticeably silent.

In Chapters Three and Four the search for the missing elements of this picture were described. In this chapter we will return to the research question and discuss how the results of this search fit together to create a complete picture of the impact that the complexity theories have on the way in which competency-based training is applied in Australia and what we can learn from this.

5.2 CONCLUSIONS ABOUT THE RESEARCH QUESTIONS

In Chapter One it was seen that this study sought an answer to the question of the implications that the complexity theories have on the way in which competency-based training is conducted in Australia. In order that this question be fully explored a number of sub-questions were also defined and used in the literature review described at Chapter Two and the analysis of the data gathered throughout the research described in Chapter Three. They also provided guidance throughout the reporting of the data analysis in Chapter Four.

The data emerging from this research, as well as revealing the implications that the complexity theories have on the way in which CBT is designed and implemented in Australia, highlighted the gaps in the literature regarding this question. Further, the data also underlined the importance of acknowledging and addressing these implications if a competency-based approach to training and the assessment processes that support such training is to fully realise the objectives of their adoption and implementation.

While the emphasis in this research has been on the way in which CBT is applied in Australia, these implications may well have relevance to the way in which this approach is applied in other countries and in particular to the vocational education and training systems they employ. Given that the systems adopted by, for example, New Zealand, the United Kingdom and South Africa are similar to those followed in Australia, and that the complexity theories are postulated by their authors as universally relevant, there is a likelihood that the conclusions reached as a result of this study are not limited to CBT as it is applied in Australia but also as it is applied anywhere. This, however, is based on a limited degree of research and the generalisability of these conclusions and the contribution that they make to our understanding of the processes and benefits of competency-based training will be addressed below.

As to the importance of the research questions, emerging from this study are the following: firstly, the basis upon which a competency-based approach to training and assessment are built include a number of critical definitions. These were described in Chapter One. In searching for an answer to the research questions it became clear that

the current definitions that underpin competency-based training are insufficient for the achievement of learning and workplace needs beyond the immediate future. This has a significant impact not just to the way in which CBT is applied but also to the wider national VET system in which it is carried out. Secondly, there are a number of criticisms of the way in which CBT is designed and conducted (e.g., too behaviourist, not aligned with workplace needs) but these do not explain in any depth what the exact criticisms are or how they may be overcome. Emerging from this research is an image of an approach to CBT that not only expands on the issues central to these criticisms, but also could potentially satisfy both the short and long term needs of individuals and groups undertaking training. In other words, in seeking an answer to the research questions this study both provides a response to the critics of CBT and proposes an approach that more fully rounds out what their criticisms are and how they may be overcome.

In exposing these so too do we expose the gap in our understanding of not just the limitations of our current approach to CBT but also the potential means by which these limitations may be addressed.

In analysing the data gathered throughout this research, the following conclusions have been reached:

- ***The complexity theories are appropriate to an Australian context.*** While the number of respondents taking part in this study was not large in comparison to major research studies, their positive response to the question of the relevance of the complexity theories to an Australian context was unanimous. This provides a high degree of confidence in the proposition that the theories that arise from the complexity studies are appropriate to public and private organisations in this country. This relevance is not just to the work environments from which standards of performance are derived and in which individuals are expected to apply their skills and knowledge, but also to the processes and underpinning definitions that shape the way in which competency-based training is designed and implemented in this country and the purpose to which it is put.

This is an important conclusion because accepting and acknowledging these theories allows for a much clearer picture to be built of the work environment in which all attendees at a CBT program will be expected to apply their skills and knowledge. Nowhere in the literature is such a picture found. Ironically, the nature of complexity means that a universal picture is not possible anyway. That all work environments are complex and ranging in complexity from stable and controlled to chaotic is perhaps the only aspect of their training that is common to all CBT participants in all vocations and professions. Therefore claiming that one image of a work environment is going to be relevant to all participants is ignoring the platform upon which the complexity theories are built. What trainers and training designers must do is accept that the only commonality between them is that they are not only different in fact they are also different in each participant's perception. Armed with such knowledge course developers, trainers and VET decision makers can potentially achieve a higher degree of confidence and effectiveness in their programs because they will be more capable of designing training around the actual, rather than the perceived, and more focussed than general, skills and knowledge that each individual and team requires on the job and in the context or environment in which they will be applying them. As will be discussed below, accepting that these theories are appropriate will also address many of the criticisms levelled at the current approach to CBT.

- *That the majority of the skills and knowledge that individuals and teams need to apply in complex environments are not learned during training courses developed using the current CBT approach and definitions.* Critics of the way in which CBT is employed in Australia have long claimed that, amongst other things, it is too behaviourist and lacking in the cognitive skills required of competent on the job performance. The conclusion reached as a result of this study supports this, but of significance is that it also gives greater clarity to the cognitive type skills and knowledge that the critics claim are missing from the current competency-based training approach.

This study sought to identify the skills and knowledge that respondents cited as important to competent performance (their own and that observed in others)

in work environments that in their experience are complex and chaotic. In doing so this study highlighted the degree to which the competencies important to their workplace requirements had not been included in the performance or competency standards that underpinned the training that they had received.

Having said that, the limited range of skills groups from which were drawn respondents and training programs for this study means that this conclusion cannot be generalised across all industries and work environments. A wider study will be required to determine that. Nevertheless, even if the percentage of skills and knowledge missing from other competency standards or training packages is lower than that found in this study then it still raises the question of their appropriateness to vocational or professional training – especially to the way in which CBT is defined as providing the skills and knowledge required of competent workplace performance.

- *Competency-based assessment is an important means by which skills and knowledge are learned for, or adapted to, the needs of the workplace.* There is very little in the literature that explains competency-based assessment as anything but a means for evaluating skills and knowledge gained as a result of training. The data gathered throughout this research, however, shows respondents claiming this approach to assessment as the primary means by which were gained, on the job, the additional skills and knowledge that they needed to be competent in their workplace. On closer investigation it was found that such on the job learning was possible because the assessment that respondents undertook occurred not once (as is the current practice) but progressively over the space of up to two years after their formal training had been completed.

To most respondents the skills and knowledge covered during their training were a satisfactory introduction into their chosen field but to these they had to add further skills and knowledge to be competent, and not just trained, at their tasks. As these additional skills and knowledge were not taught during their training the claim by respondents is that they gained them through a process of identifying what level was required by them in their workplace, what they

currently possessed, and the means to bridge the gap between the two. The most ideal method for bridging this gap, according to the respondents, was through the process of formal (competency-based) assessment.

This conclusion highlights the importance of competency-based assessment as a learning rather than just a testing tool. It encourages trainers and assessors to use CBA as a means of contextualising training and making it more real to participants. It also provides a strong link between training and learning, and in accepting this a platform upon which a seamless approach to them both may be built.

This conclusion also suggests that the definitions appropriate to competence in training are not the same as a definition of competence in on the job learning. If it is more widely accepted that the complexity theories are relevant to the way in which the workplace is defined, so too will it be possible to differentiate between the competence required during and as a result of training, and the competence required in a workplace that is lacking in control and stability. Given such volatility, this conclusion implies that in such environments competence may not necessarily be the end-state of training and assessment but the means by which such a state is arrived at.

- *Aside from the definitions that support it, the concept and application of a competency-based approach to training and assessment could potentially define and provide the skills and knowledge required of individuals and teams working in complex and chaotic environments.* This study determined that the complexity theories are appropriate to an Australian workplace, however the current approach to CBT is limited in its ability to adequately address the competence needs of those who work there. In doing so the question arose of whether or not a competency-based approach to training was capable of preparing individuals and groups for environments that are complex and chaotic. The answer to this question was an unequivocal ‘Yes’, but with certain caveats. Chief amongst these is the need to address the definitions that underpin the processes used in defining the notion of competence as the failure to do this appeared to be the primary concern to critics of the way in which CBT is currently applied. Of importance also is that any definition of

competence and, by extension, competency-based training recognises and acknowledges that the workplace is not static in which predictable skills and knowledge can be applied to the achievement of predetermined goals and objectives, but one which is, to a greater or lesser degree, in a constant state of turmoil and change. Only by accepting this and adjusting the definitions can the skills and knowledge required of competent performers in such an environment be defined and used as the basis for the training.

Coupled with the previous findings this conclusion provides a framework for CBT activities that are designed to meet future workplace needs. Because it is built around a proposed definition of competence that is emergent and evolutionary it does not treat competency-based training and assessment as a one-off activity but as a critical mainstay in the concept of lifelong learning.

These are the principal conclusions arising out of this study. The contribution that this research makes to the field of study will be addressed below following which these implications will be discussed in the context of the research questions and the conclusions reached as a result of the data analysis.

5.3 CONTRIBUTION TO THE FIELD OF STUDY

The contribution that this research makes to the field of study is twofold: firstly to our understanding of complexity in the workplace and what it means to the way in which competency-based training and assessment practices are designed and applied. Secondly, the contribution that this research makes is in clarifying the concerns raised by the many critics of the way in which CBT is currently applied in this country.

This study explores the relevance of the complexity theories to CBT as it is applied in Australia and at the same time highlights the impact of these theories on this form of training. In doing so it investigates issues that have not been considered in the literature reviewed in Chapter Two and provides a framework for further study into the nature of competency-based training as a means of enhancing workplace outcomes. Of importance is the way this study clarifies the nature of complexity and

the impact that theories about it have on the way in which competency-based training is conducted.

As noted in Chapter Two, throughout the literature the terms complexity and chaos, and their relevance to the work environment, are used with no qualification as to the nature of the work concerned or the geographical or professional region in which such environments can be found. In the literature the concept of complexity is situated by the authors in varying contexts making it difficult to discern whether or not the concept is applicable to all organisations, institutions and contexts, or a phenomenon that has been observed in different guises but not thought of as universal.

All of these views are, however, based only on theory. In the literature reviewed at Chapter Two there are only two instances of where research has been carried out to define what complexity means to individuals and their day-to-day functioning and on the job learning, and to provide real-life case studies and examples of complex systems or environments (Lewin & Regine 1999 and Svensson et al. 2002). In the main it is expected that insofar as the other studies goes readers will contextualise the theories within their framework to make sense of them and apply them to contexts and situations with which they are familiar. In short, these theories, while different in their focus, are expressed in a way that implies a generalisable concept that is not limited by physical or vocational boundaries but instead is applicable to all work environments.

In Chapter Two it was also noted that amongst other things this study aimed to build on calls by Scott (2000) and Chappell (2002) for an examination of the complexity theories and their impact on education and training in Australia. These calls, however, were primarily from the point of view of the impact that these theories have on those who are employed in the VET sector. Therefore, this study sought to conduct a broader investigation to uncover the implications of these theories to a wider range of fields than just the education and training fraternity. In doing so the following contributions to the field of study have been made:

- ***The complexity theories are seen as relevant to an Australian context.***
The context within which the complexity theories are placed differs markedly throughout the literature, for example between theorists such as

Stacey and Snowden whose body of work concentrates on complexity as a philosophical construct, and Haeckel and Underwood who position it within the framework of management systems and processes. This study concluded that these theories, despite their diversity, are relevant to the Australian context, however, in gathering only a limited range of data this study was unable to provide sufficient evidence that they are generalisable across all workplaces, organisations, industries and professions.

- ***The need to more closely define the work environment in the design of competency-based training programs is established.*** The form of competency-based training adopted in Australia is widely accepted as appropriate to all workplaces and industries whether private or public sector. What was not clear in the literature, however, is whether or not the adoption of such an approach to training is seen as most appropriate to work environments that are characterised as stable and controlled or those viewed as complex and chaotic, or both. There are claims that CBT is only appropriate to stable and unchanging environments but this was not backed up by the literature as a whole. There were also claims that such environments were the focus of the standards against which such training processes were – and still are – designed and conducted, but again this is not borne out in the wider literature.

Having said that, nor was there any evidence in the literature that the work environment (as described by the complexity and management theorists reviewed in Chapter Two) has ever been considered as an important element of CBT even though the definitions underpinning it contend that they should be. Highlighted in the literature, however, are the importance of, and the issues that are raised when, considering the complexity of the work environment in the design and implementation of a competency-based approach to training and assessment.

- ***The theories underpinning the complexity sciences describe a concept that is not solely single dimensional but potentially multi-dimensional.*** With few exceptions (notably Stacey, Shaw and Griffin), in the literature is an implication that the notion of complexity and chaos that, while

emergent and lacking in control, is principally of a single dimension which, when its patterns and rules are understood, may be patterned towards a defined outcome. Evidence in this research, however, is that some environments are naturally more complex than others, often influenced by the addition of the human element of complexity based on the nature of the work carried out there and the personalities and experience of those undertaking it.

This additional complexity appeared to be determined more by the degree of (real or perceived) control individuals have over their work and the freedom (and confidence) they have to apply this control to their work practices. This study has provided a starting point for addressing the question of whether complexity and chaos are single dimensional (as implied in the literature) or with the addition of the human complexity element are in fact multidimensional. The outcome of such a study is potentially a competency-based training and assessment system that supports the provision of training and learning that meets the needs of individuals and groups working in environments that may be found anywhere along a continuum from stable and controlled to chaotic.

- ***Redefining what is meant by competence can potentially address the criticisms of the current approach to CBT and at the same time create a platform upon which may be developed an approach that supports learning in complex work environments.*** Throughout this study it became clear that the concept of a competency-based approach to training, and especially to competency-based assessment, were not themselves the cause of concern of the critics. As highlighted in the data, the main area of concern appears to be the definitions used when creating the standards against which such training is conducted and the way in which assessment after the training is carried out. In other words it is not the process that appeared to be of concern but, because of their definition, the inputs and the outcomes. The contribution that this research makes to the field of study is not only in a clarification of what these criticisms are, but also in the proposition of a definition for competence that shapes the design of

CBT in a way that is more relevant to work practices and addresses the concerns of the critics. Such a definition underpins training that gives prime concentration on the skills and knowledge required in complex and chaotic environments and complements, but does not replace, that which underpins competency-based training as it is currently applied (i.e., in vocational and professional training institutions for the purpose of providing a qualification). In doing so this definition provides a framework around which formal and informal training may go through a seamless transition to workplace learning and on the job competence.

These implications and the contribution that this research makes to the field of study may be further defined when examined in the context of the research questions.

5.3.1 Question 1: Are the complexity theories relevant to Australian workplaces?

To generate data for analysis against this gap in our knowledge respondents were asked a number of questions. These questions, while not directly concerning whether or not the complexity theories were applicable to their work environments (the time to explain what these theories were and then ask the question made this the least preferred option to gather this data), were those that could only be answered from experiences gained in such an environment. For example, when presented with a matrix in which was listed situations drawn from the literature that described workplace issues evident in complex environments, all respondents agreed that they matched those that they experienced in their workplace. None stated that these issues did not apply to them. In fact according to respondents the relative stability or complexity of these issues and situations determined whether or not their day was quiet or busy – but even in its most stable condition the workplace retained a semblance of complexity as described in the theories.

Even though the number of respondents was much too small to make sweeping generalisations about the relevance of the complexity theories to an Australia wide context, that all respondents agreed that the issues and situations described in the matrix were appropriate to their workplaces was sufficient grounds upon which to

base a conclusion that the complexity theories are appropriate to work environments found in Australia. Moreover, not only could it be concluded from the data that the theories are relevant to an Australian context, they are also relevant to both private and public organisations and for-profit and not-for-profit institutions. In terms of this study, this general agreement meant that for the purposes of further analysis it was accepted that all responses would be framed within experiences gained in work environments described by the complexity theorists as stable or complex and chaotic.

While it would have been easy to halt the data analysis at this stage and accept that the relevance of the theories to an Australian context, there also emerged in this research an aspect of these theories that does not appear in the literature, and one that has a significant impact on whether or not a competency-based approach to training is appropriate to environments that these theories describe. This is the way in which complexity is both experienced and perceived in different circumstances, by different people, in the same organisation and while addressing the same issues.

This notion added another dimension to the concept of complexity that was not addressed in the literature described at Chapter Two. When comparing the way in which complexity was described by respondents in this study with the descriptions found in the literature, it became clear that the theories described in the latter are in many ways linear and static in that they describe complexity as a single dimensional concept. On the other hand, the workplace or work environment described by respondents was multi-dimensional, including not only that which arose out of the interactions that occurred between humans and the system within which they worked, but also the perception that some respondents had of the environment.

It was also clear from an analysis of the data that the notion of multi-dimensional complexity can be viewed differently depending on the individual concerned. Furthermore, from the data it is not only different on days that are quiet and those that are busy, it also differs in its effect on different people, and it differs because of the effect that different people have on the environment and in particular on the degree of complexity experienced by those around them.

Moreover the experience and confidence of the people concerned also appears to play a part in how stable or complex the workplace and its environment are. Regardless of

whether or not the day is quiet or busy, the degree of control one is given (or one takes) over their environment, and the degree of confidence that the individual has on the occasions that this occurs, also plays a significant part in determining whether or not the individual experiences a greater or lesser degree of complexity on any given day.

That is one aspect of this multi-dimensional view of complexity. The other relates to individual perception.

Respondents to this study provided several examples of where two people, subject to the same workplace constraints and tensions, viewed the environment differently. While one viewed the workplace and its environment as relatively stable another viewed it as complex and chaotic. This introduced a multi-dimensional view of complexity. Also reported were examples of where, when situated in a group, the degree of complexity experienced by individuals impacts on the way in which complexity is experienced by the group as a whole. This is similar to the outcome reported by Svensson et al. (2002) and described at Chapter Two.

This experienced or perceived complexity has important issues which should also be considered when it comes to such aspects of a competency-based approach to training and assessment as the recognition of prior learning, or the generation and assessment of evidence of skills and knowledge that have been gained in different contexts and environments. Without a clear definition of what is meant by a complex (or chaotic) environment, it appears from the data that evidence of performance in such an environment will always be tainted by personal reaction to the complexities experienced there. Such reaction includes confidence and individual capability, and may be the most predominant difference between two people who would otherwise be granted the same recognition.

For example, potentially, two people may bring forward for assessment evidence gathered from similar tasks and experiences in the one workplace but in doing so may well be seen to be at two different levels of competence. Under the current approach to CBT and CBA such a differentiation would not be made, but if environmental factors were written into the standards against which such training and assessment are carried out (as was proposed by the NTB in 1992), the ability to discriminate between

individuals with the appropriate experience and confidence and those who do not will be increased. With consideration of the impact that complexity and complex work environments have on individuals even the least rigorous of assessments may differentiate between those who are competent for certain tasks or jobs and those who are not even if both share the same experience.

5.3.2 Question 2: In environments that could be characterised as complex and chaotic, what skills and knowledge do individuals apply?

This question arose from the need to define the skills and knowledge applied by respondents in workplaces that they reported as complex and chaotic, and those in which they had been trained.

Respondents involved in both the aged care sector and the management of projects in a wide range of contexts all agreed that understanding the environment is an essential step in being able to determine what they must do to address issues as and when they arise. This was also an important message in the complexity literature. Competent performance means that while the context or environment is clear (albeit complex or chaotic) the behaviour required there is as yet not fully understood but is learnable. And when learned and applied it can be adjusted in form and content to meet further, emerging needs. This is another example of what Stacey calls a *Transformative Teleology* – knowledge that grows towards a future that is itself under constant construction, if only through the possession and application of that knowledge.

What, then, underpins competence in such contexts or environments? As was noted in Moor's model at Figure 1 (p.85), context or environment in which individual and team skills and knowledge are applied range from stable and controlled at one end of a continuum through complex to chaotic at the other. As was discussed in Chapter Four the data showed that there are many factors that influence where, on any given day or time of day, complexity of any degree (stable or chaos) may be experienced. While this is not discussed in the literature what emerged from the focus groups (and most strongly from the group drawn from the DMO) is that such complexity can be experienced over long periods or for short periods within an environment that is otherwise stable and controlled. In other situations a task – or even part of a task –

may itself be complex and bordering on chaos even though the environment in which it is being carried out is stable and controlled. Also emerging from the data is the contention that at any point in time this may be reversed – the task may be controlled and relatively simple but the environment may be complex.

Regardless of where and when it is experienced, the data tells us that individuals and teams apply skills and knowledge during periods of high complexity and chaos that are different to those that they apply during periods of stability and control. From a competency point of view, another important question, therefore, is whether or not such skills and knowledge can be predicted and thereby captured as competency or performance standards for use in a CBT program. While this will be discussed more fully at 5.3.4, the answer to this question is as complex as the issue.

As was noted in Chapter Two, the complexity theorists have mixed opinions on this. On the one hand some (notably Stacey and Snowden) contend that future performance cannot be predicted, others contend that the environment can. Moreover, all of the theorists agree that while the exact nature of the skills and knowledge required to address issues in contexts or environments that are at the moment unknown, what is certain is that the issues will be addressed. In other words, while the exact skills and knowledge that individuals and teams must apply are unknown, what is known is that they will do *something*.

In the literature this is about as far as the discussion takes us insofar as the skills and knowledge required of future performance goes. The argument put forward by the complexity theorists in not progressing the investigation past this point is that the future is unknown (but, for some, e.g. Snowden, knowable), therefore, it is not possible to predict what must be done to perform competently at that time. This is borne out by the data gathered throughout this study, but what was derived from an analysis of this data was that this is true only if the means for predicting future skills and knowledge follows the current linear pathway of identifying and copying exactly what other competent performers do, in a behaviourist and process-oriented fashion, in the contexts and environments that they have experienced. The data that emerged from this study showed that for respondents this approach resulted in less than 40% of the skills and knowledge being to the standard they required in their workplace.

As was noted in Chapter Four, in reviewing the list of the skills and knowledge that respondents stated that they applied in environments that were experienced on quiet days and those that they experienced on busy days it is clear that they fall into three broad categories: leadership, basic business skills, and working with organisational policies and guidelines. While a review of the literature revealed that the skills and knowledge associated with these are described in the competency standards and training packages used in the development of the training received by respondents, the data gathered during this study showed that the way in which they were applied involved a wider range of competence than was described.

Leadership, for example, was only briefly touched on in both the aged care and the project management standards, but it was an element of performance that most respondents stated is of greatest importance to their effectiveness in environments that were stable *and* those that were complex or chaotic. The actual skills and knowledge that they needed to apply as both leader and led, however, differed depending on the situation, the environment and the circumstances at the time. Furthermore, the outcomes desired of the application of leadership in such environments, and the actual skills that they applied, differed not only between environments but also between people: the person applying the leadership skills (and her/his confidence and experience), those who were subject to their leadership, and those – organisations and individuals – who benefited from the competent application of such skills. The difficulty in relating this to the literature is that except for that which describes research carried out into the functional approach to leadership, it is described there in very linear and single-dimensional terms, and implies that if certain skills and knowledge are applied an outcome that somehow enhances the workplace is achieved. Even the popular Situational Leadership theories espoused for over two decades now contains within them a relatively high degree of if/then causal relationships.

Under the current approach to CBT in Australia the standards against which such training is conducted are modelled on what other supposedly competent performers have done in the past and, therefore, contain both predictability and replicability – concepts that the complexity theorists reject. That there is more to leadership than applying a linear set of activities in a predictable environment is clear from the data and supports the view that competence, like complexity, is multi-dimensional and

context/environment dependent. In other words despite what is written in the competency standards, and despite what others have done in the past, the skills and knowledge an individual needs when applying leadership at some future time are not yet known – or are they?

Let us return for a moment to a point made above, and one at which the literature reviewed for this study leaves the issue of skills and knowledge required of future performance. In both the literature and the data it is clear that when confronted with issues that must be overcome in a complex environment, individuals and teams will do *something* even in the absence of training to do so. However, so far as describing what this *something* is, the literature is silent. This was not, however, the case in the data gathered during this study.

In almost every instance, the skills and knowledge that individuals stated that they applied on such occasions were drawn from their understanding of the situation at the time based on their experience of this or similar situations experienced in the past. Whether or not they applied these skills, or the way that they applied them, depended to a significant degree on their confidence to address the issue, a confidence gained through addressing similar issues in other or similar contexts.

For example, one respondent from the aged care centre stated that there were times when in applying leadership in the workplace she required the skills, and the confidence, to tell others to ‘Bugger off!’ so that she could get on with the job at hand. It was her inability – or lack of confidence – to do this at times that added to the complexity of the environment in which she was working. As this arose in a focus group meeting, another participant was able to respond from her experience. She stated that in similar situations she didn’t need to do this because others instinctively knew to leave her alone when she was busy.

In analysing these statements against those that they had earlier made when individually interviewed, it was found that the former respondent was only relatively new to her position and generally took a cautious approach to her tasks, an approach with which most people working with her were familiar and supportive of. On the other hand, the latter respondent was sufficiently confident to approach her tasks directly and with little time for discussion and other such niceties. Those around her

knew not to offer assistance because she would simply push them out of her way. Two different approaches to the same task, in the same complex environment, but because of individual personalities and confidence made more complex in the case of one respondent and less so in the case of the other.

Again, we return to the question: Is it possible to predict the skills and knowledge needed to address issues in such circumstances? From the complexity theories it appears that it is possible if such predictions are referring to a known individual, a point made earlier in the discussion about the emergence of personality and experience in defining complex environments. If, on the other hand, these skills and knowledge are being described for application by other unknown individuals then there is less chance that they will be as successful in applying them.

Predicting the skills and knowledge that individuals will need, in the future and in environments that range from stable to chaotic, is possible according to the data, but only when this data are used to address a gap in the literature regarding predictability. This is the lack of understanding about the way in which future performance can be captured and planned for, even if at the time such performance – or the environments in which such performance will be conducted – are not yet known.

An analysis of the data emerging throughout this study confirmed the contention put forward by Kurtz and Snowden (2002) that when confronted with new or unfamiliar situations individuals will seek out the skills and knowledge that they require to address them. Kurtz and Snowden suggest this will come from others (or the environment) while respondents added to this their own experience and previous training.

What is learned, and the motivation to do so, may come from the environment (as Turney et al. n.d. and Kauffman 1995 contend) but the confidence to do so, according to research participants, can only come from within themselves and from their interactions with the environment in which they are working. Having said that, such confidence is also impacted upon by the environment thereby suggesting that not only are skills and knowledge without context insufficient, so too are skills and knowledge without confidence. Confidence, therefore, makes up an essential element of the

environment in which individuals must work daily, again adding another dimension to the notion of complexity that is not addressed in the literature.

In considering this in relation to the two respondents from the aged care sector discussed earlier, it is clear that both of them were comfortable with their leadership style, as presumably were those whom they led, because it was based on a high degree of self-awareness and self-confidence. While their training may have been of different leadership styles, applied in situations similar to those that they may expect to experience, the actual application of this competence was far simpler and based on a few simple understandings, the first one being that *I am who I am and if you can understand that you will understand everything that I do from now on.*

To return to the example noted earlier of the way in which leadership skills were applied by certain respondents, in the competency standards against which their training was designed it was found that the skills and knowledge described there are almost lockstep and procedural. They implied a checklist approach to leadership wherein if certain actions are taken then certain other outcomes will be achieved. While, on the surface of it, this may appear to be very linear and single-dimensional it is the way in which all competency-based training is currently designed in Australia: a set of standards (in the form of a National Training Package) are derived from examination of what others have done and training is instituted to help individuals and teams attain this level of competence. But respondents in this study claimed that this is not the way they address the needs for leadership in their work areas. In the case of the aged care centre the skills that respondents claimed that they primarily applied were those that centred on identifying the immediate needs of their staff or their client (the residents in their care at the time), reflecting on the needs or objectives of the task they were undertaking, interrogating everything that they had been taught for an appropriate response, and then applying it. These four actions were, according to respondents, sufficient for work environments (including the needs of others who took their cues from the actions of their leader at the time) that were both controlled and stable *and* complex and chaotic.

A similar response emerged from the data gathered from the DEWR and DMO focus groups and the interviews. Here, for example, it was found that on quiet days, or days in which the environment is relatively stable and controlled, the skills and knowledge

reportedly required were those that centre on maintaining the status quo such as making sure that one's immediate manager's or supervisor's needs are being met. Exactly what these needs are cannot always be predicted, but what can be predicted is that there will be needs *and* they must be met. On the other hand, on busy days or those that could be characterised as complex and chaotic, the skills respondents claimed that they needed to apply included constantly reprioritising work to bring stability to the environment so that effective and informed decisions could be made about where to go to next, but again to ensure that their client's expectations were met.

From the data it appears that these actions could be condensed to three simple rules: identify the need, interrogate the data bank for examples of similar situations and the responses made, and apply the results within the parameters set by the environment. If it doesn't work then there will obviously emerge another need, therefore, the processes will start all over again. When viewed as a level of competence that individuals must aspire to it is clear that the skills that must be taught to attain them include, in the case of identifying a need, such things as customer service, observation and analysis techniques, communications, and so on. All of these were identified by respondents as important to their competence on the job.

The need to consider this in its application to competency-based training is important for two reasons: firstly all of the complexity theorists agree that there are very few rules for the way in which complex systems and environments emerge and are managed and, secondly, it allows for an approach to determining the skills and knowledge required in any context to be a matter of self-discovery achieved through emergent learning – or as Stacey (2002) describes it, through a *Transformational Teleology*.

The examples used here are very simplistic and to some a naïve description of the way in which leadership is defined and applied, but they emerged both from the data gathered throughout this study and in the literature in which the exploits of great leaders are described. In the case of both the aged care workers and the project managers the basic skills (i.e., those that are contained in the current standards or training packages) are in the view of respondents essential to competent performance

but only until such time as they are applied and a new image and environment emerges. From that point on respondents claimed that different skills are required.

When we examine the literature relating to the competency standards upon which CBT programs are developed, we see an attempt to break down into more easily described and, therefore, manageable elements all of the skills that, through an analysis of what others have done, are defined as essential to training. While such an approach may maintain control over the direction in which the training is heading, it is clear from the data that it does not generate the freedom of learning that individuals, through this study, claim are important to competent performance.

From the data there is a number of skills and knowledge, primarily those of a cognitive nature, that respondents claimed must be applied in environments that are to a greater or lesser degree complex but which are not detailed in the standards against which individual training is conducted. While this is not in itself a revelation, what is revealing is that there are so few of them and that the skills and knowledge that are missing are not generalisable but reportedly strongly influenced by the environment, and the individual's reaction to that environment, at any given time.

From the data it is clear that the current competency standards or training packages are sufficient for the needs of individuals undergoing training but they are not, as the ANTA definition tells us, adequate for the workplace. To overcome this there is a need to apply a level of competence sufficient to identify the nature of the environment in which one's skills and knowledge are to be applied and where necessary stabilise it to a point where effective decision making and problem solving can be carried out. From the data it also appears that it is the environment itself, and the individual's reaction to that environment and her/his preparedness to deal with it, that will determine the nature of these skills and the way in which they are applied, and that to guide them in doing this only a few simple rules need be considered. The implications of this on current policies and future research will be discussed shortly.

5.3.3 Question 3: Where and how were these skills and knowledge gained?

Underpinning the competency-based approach to training as it is carried out in Australia is the accepted belief that if competency standards describe the skills and knowledge required of a competent employee in a workplace, and competency-based training is training that achieves this level of competence (ANTA 2003e, and Tovey 1997, Smith 1998 and others who repeat this definition), then theoretically to be trained using CBT is to be competent. As widespread as this belief is, nowhere in the data is there evidence – even in a theoretical sense – that supports this contention. Nor, on the other hand, is there evidence of where it has been questioned.

In the literature there are a number of well established theories regarding learning in both a general sense and in an academic or teaching environment, however, there is no similar theory regarding training. There are accepted definitions (e.g., competency-based training provides for the achievement of skills and knowledge defined in competency standards) but no theory that, for example, links training with learning and vice versa. As a result little is known, even on a theoretical basis, of how – or even whether – training and competence are related, and more importantly whether or not (as Schofield and McDonald claim) CBT achieves what it claims it achieves. Without such evidence it is difficult to determine the basis upon which this contention is made or the evidence for it being an accepted fact. According to the data emerging from this study further research is required to test this contention.

The data emerging from this study suggests, however, that the way in which CBT is currently being applied as part of the national VET system such competence is not possible without further study or the application of skills and knowledge gained in a wide variety of situations and contexts. Admittedly, the narrow range of respondents used in this study means that such a result is not generalisable across a wider population; however, the fact that all respondents provided similar data suggests that research using a wider population base may well support this outcome.

As was noted in Chapter One, the concept of how learning occurs on the job is not yet sufficiently well understood to describe clearly the links between vocational training, higher education, and the workplace. This is perhaps one area in which theories regarding training can be developed through further research. What was clear in this

study, however, is that there is a link and the implications arising out of the data are that it is of sufficient importance to be not overlooked when designing and implementing competency-based training programs.

Having identified where respondents learned the skills and knowledge they needed to competently perform in their workplace it would have been easy to halt the data analysis at this point and delegate responsibility to later research for uncovering more about how individuals and teams bridge the gap between what they are trained in and what they need to learn to be competent at their jobs. After all, the research question at the centre of this study is not of how learning is gained on-the-job but of the impact that the complexity theories have on the way in which competency-based training is conducted in Australia. We have already seen that there is a disconnect, in theory at least, between training and on-the-job learning, therefore, it would simplify this study if concentration remained only on training and not learning. The difficulty is, according to the complexity theories the two cannot be separated even though, in the literature, this is constantly the case. Moreover, participants in this study were adamant that the only way in which they could competently apply the skills and knowledge they learned during their training was to overlay it with a significant amount of on the job learning – learning what they didn't know, learning where to find what they needed to know, and bridging the gap between the two by learning the skills and knowledge appropriate to their workplace needs. Therefore, examining CBT in light of these theories is critical if their full impact is to be understood. The question is, is this a complexity issue or one more related to training?

If we change what we believe competent performance to be, from one of given and predictable skills and knowledge to that of unpredictable skills and knowledge capable of being made known at some later time through the application of a third level of skills and knowledge (i.e., those that have been learned either during the training or subsequent to it), then the question of predictability becomes moot. While we might not be able to predict exactly what people will do under new and emerging situations, the argument that Stacey, for example, might use against the definitions currently accepted of a competency-based approach to training, is that we can predict that they will do something – and perhaps this 'something' should be the focus of

competency-based training processes. If only we could figure out what this something is!

This is a point on which the literature is silent, just as it is silent on what occurs once formal training has ceased for the learner and she/he returns to the workplace. Here is where individuals enter that period between when information is gathered from emerging data (i.e., that which was taught during the training and that being gained through contextualising it to the workplace) and turned firstly into knowledge and then wisdom (as the knowledge management commentators such as Kurtz and Snowden, and Lave and Wenger tell us) or simply as learning becomes intuitive as Turney et al. suggest. While the data gathered during this research showed that this is exactly what has occurred, and occurred in such a way as to benefit the individuals concerned, the question still remains of what this means to the theories that underpin the way in which CBT is applied in Australia. Clearly the concept of competence as it relates to complex environments must be addressed as there now appears to be emerging two different states: competence for training and competence for learning – what individuals and teams must be trained in and what they must learn (and how they must learn it) to be competent at their jobs. Are these the same or are they different? As this has the potential to question the current theories and practices this will be further discussed at section 5.6 below. In the meantime it is important to investigate whether or not the skills and knowledge that individuals and teams really need to be competent can be taught following the processes of CBT.

5.3.4 Question 4: Could such skills and knowledge be gained through the processes of competency-based training?

It was noted earlier there are three critical elements to a competency-based approach to training: the competency standards (or national training package) against which the training is designed and undertaken, the training itself, and an assessment of whether or not the training has been assimilated evidenced by the level of skills and knowledge participants can demonstrate as equal to that described in the standards.

From the data it is clear that participants in this study did not find the competency standards, as descriptions of skills and knowledge that they would require on the job,

to be of concern. Some said that they were difficult to understand while others contended that there were elements within the standards that were not relevant to, or they did not do in, their workplace. All, however, said that there were further skills and knowledge over and above those found in the standards that they had to gain to competently perform their tasks in the workplace but insofar as their training went, none felt that the standards did not capture at least some aspects of their profession.

With the training there was, again, no concern expressed by participants regarding its effectiveness as a vehicle for transferring skills and knowledge, nor was there mention of concerns regarding the way in which these were assessed during and at the conclusion of the training. Some participants did state that the quality of the training and assessment could have been better but overall it appears that the processes followed met their needs. Where there was a concern, it appears from the data and the literature, is in the philosophy of competency-based training and the accuracy of its definitions. In particular are the concerns about the over-bureaucratisation of CBT and whether or not in following this approach to training the eventual outcomes are what those applying this approach initially set out to achieve.

These concerns have been raised for over a decade now by the critics noted earlier and throughout this study in the data which clearly shows that CBT fails in its claim to provide the skills and knowledge required to ensure competence in the workplace. It may provide, as the definitions given earlier state, the skills and knowledge needed in the workplace but the notion of competence, not just from the definitions but also in logic, is that these are not at a level at which individuals and teams can competently perform the tasks or functions for which they have been employed. If they cannot, or if they must gain further skills and knowledge not covered in their training, then the notion that the training was competency-based is seriously challenged. This is what is meant by the philosophy of CBT.

Therefore, to fully understand whether or not the skills and knowledge required of individuals and teams in complex environments can be achieved through competency-based training it is not the practice of CBT that must be addressed but its philosophy and the definitions that support it.

There is significant discussion in the literature on the ways in which learning is gained and enhanced in environments that are complex, where group interactions abound, ideas are discussed and debated, and learning emerges and grows through experimentation and reflective feedback. This is not found in the literature on training but on learning and knowledge management, and while this is not widely referred to by the authors concerned with training, nor on the other hand is training given any prominence in the literature on learning.

This has significant impact on the question of whether or not skills and knowledge required of individuals performing in complex environments can be gained through competency-based training because there is little guidance in the literature on how this might be carried out. Theoretically it is possible but as was stated above there is no theory supporting training, and in particular competency-based training. Philosophically, if we are to accept that learning is emergent and grows through self-organisation in environments that are themselves in a state of constant movement, then there is potential for this to occur. The only real indications of the possibility of this occurring, however, is from the data gathered from respondents, and in particular that which describes for us exactly how the skills and knowledge they required, subsequent to their formal training, were gained.

As was noted earlier, the skills and knowledge respondents claimed that they had to learn subsequent to their training fell into three broad categories: leadership, basic business skills, and working with organisational policies and guidelines. While each of these was found to be grounded in the standards against which their training had been conducted what was of importance to respondents was how to translate and implement them in the context and environments that they experienced in their workplace – and not just in stable and controlled environments such as those experienced during their training, but also in those that are complex and at times chaotic. For, as was noted above, the focus of the skills and knowledge applied under such circumstances can differ quite dramatically.

To return to the point made above, none of the respondents in this study was critical of the way in which their training was carried out (although some did say that they had experienced better trainers), nor was any of them critical of the standards against which they were trained, even though there were reports of more contained in the

standards than was required in the workplace. Where respondents stated that they had problems was in learning how to apply the skills and knowledge they were taught and how to gain or adapt the additional competencies that they needed to effectively and competently perform in the workplace. Therefore, the skills and knowledge that respondents appeared to need subsequent to their training more than others were not those specifically required for their work (for nobody could predict what these were), but those that centred on their ability to learn these when and where they were required.

It will be recalled that respondents claimed to apply different skills and knowledge, or the same skills and knowledge but with a different focus, in environments that are in certain circumstances quiet and in others busy. It will also be recalled that between respondents, and between work environments, these skills and knowledge differed not in type but in where and how they were applied. Further, it will also be recalled that the degree of control an individual had over their environment, and the confidence to apply their skills and knowledge, had a significant impact on the level of complexity experienced at any given time. A conclusion from this is that not only are the skills and knowledge required of individuals different to those required by others, the contexts and environments in which they apply them – complex in either perception or reality – are also different. No two definitions of what constitutes competent performance are, therefore, the same, yet under the current CBT processes all were assessed as competent.

Taken together this infers a high degree of difficulty, not to mention unpredictability, in defining which skills and knowledge are going to be required by which individual or team at what point in time in their workplace. Nevertheless, taken together they also provide a philosophical framework that, as the complexity theorists contend, on closer inspection lead to patterns which suggest a way in which the skills and knowledge needed of competent performers can be described.

From the data it is clear that what respondents needed to learn was not just the skills and knowledge they individually and collectively required to enhance and maintain their on-the-job competence, they also needed the skills and knowledge required to learn what these were (or confirm that what they already knew was appropriate in certain circumstances). Further, they also needed to adapt those they were taught

during their training to their workplace either during the competency-based assessment conducted following their training, through self-assessment and reflection of what they knew and ways in which they could apply it, or from talking with others. All of these avenues to learning are well described in the learning theories and in the literature regarding communities of practice and knowledge management so there is nothing new here. That such learning builds on what is previously known in a context wherein such a growth of knowledge is essential to individual and collective survival is also well known from the literature on eco-systems, sociology and complexity so, again, nothing is new. What is new is the need to look at these theories together to understand competency-based training, and in particular how communities of practice can theoretically become a self-organising, adaptive eco-systems that rearrange their knowledge and capability, to explore and address issues as they arise in environments that fluctuate between controlled and stable, and those that are characterised as complex and chaotic.

Such adaptiveness, self-organisation and growth within a living system that itself possesses the same characteristics sees the emergence, according to the literature, of new knowledge and the potential for higher forms of learning. This concept has been described as far back as Darwin yet has never been explored for its relevance to VET and competency-based systems. It certainly does not feature in the national VET system or the policies that support it, yet from the respondents it appears to be exactly how they identified and learned the skills and knowledge they required in their workplace.

This leads us to believe, then, that in complex environments the skills and knowledge required of a competent individual or group are not necessarily those that they must apply in their workplace but are those that they need to learn what it is that they must apply and how. Could it be that this is the 'something' that individuals do, as is claimed in the complexity literature, in environments that are unfamiliar to them and outside those in which their skills and knowledge were taught? It would certainly fit in with the notion of competence explored earlier.

Considering 'something' as a competency has implications for the way in which competency-based training is currently designed and applied. Throughout the literature is the notion that when confronted with unfamiliar situations individuals will

always react to make sense of their environment and, as a result of this sense-making, decide on options for future actions. After reviewing all of the national training packages developed and endorsed until 2004, it is clear that in the current approach to competency-based training there have been attempts to capture this sense making and describe it as skills and knowledge that individuals can apply and be assessed as competent against. This has not, however, been as successful as it could otherwise have been as is exemplified in the vocational fields that are the subject of this study.

It is accepted that there are many reasons why competency standards have been developed around a relatively low level of performance that is found within the greater majority of workplaces. According to ANTA and other documentation describing the national VET system, the primary reason for this is for standardization of skills and knowledge that can lead to transferability of skills and knowledge across contexts and environments – an important element of the national VET system. Throughout the data gathered during this research, however, what was found to be common across all respondents was that their training was missing not just the basic skills and knowledge (i.e., those important for transferability), but also those required to competently apply new and more contextually-specific skills and knowledge in environments that respondents experienced in their workplaces. In other words, the skills and knowledge that were missing were those that, from a VET systems point of view, were essential to its very existence.

Had their training included these skills and knowledge then it is likely that the outcome of applying this level of competence would not be a tangible product or outcome but a reflection on the skills and knowledge that they possessed. Such reflection would, theoretically, have included an identification of the skills and knowledge that they needed to apply in any given context or environment and a cautious application of them, seeking as they did feedback on the relevance and appropriateness of what they were doing to identify future requirements.

On analysing the data gained from participants in this study it appears that if there were anything ‘standard’ about their performance it was this. While respondents claimed that there were certain skills and knowledge that they had to learn and apply to be more fully competent at their tasks, the predominant skills and knowledge they

required included how to determine what these are and where to find them. This was another point on which all respondents were unanimous.

This gives rise to two questions, the answers to which could potentially give greater understanding of a model that addresses the impact that the complexity theories have on the way in which CBT is currently applied:

- Can such a standard be described as skills and knowledge and thereby be incorporated as a new or supplementary standard of performance that others may be assessed against? and
- Could it support a competency-based approach to training needed by individuals in complex and chaotic environments?

The answer to both questions is clearly ‘Yes’, and there are examples of where this has been successfully carried out in the past. Therefore, the practical conclusion arising from this is that competent performance includes the skills and knowledge associated with taking what one already knows (i.e., what they’ve been taught), identifying and interrogating what one needs to know to competently perform in the workplace, and adapting or adopting those which are known by others or which are learned through experimentation and feedback.

In other words, competence is not a single event but an emergent phenomenon that can only be measured over time. This fits in very neatly with the complexity theories put forward by Stacey and Snowden in which learning is emergent and perpetually under construction – often by its own momentum – and that knowledge until it is needed is only supposition.

5.4 CONCLUSIONS ABOUT THE RESEARCH PROBLEM

Emerging from this study is a new way of thinking about competency-based training and how it might contribute to the learning that individuals and teams undertake in the workplace. It is based on a greater understanding of the workplace for which individual skills and knowledge are learned and the role that the environment plays in shaping both what is learned and how.

Competency-based training is conducted as a means of providing skills and knowledge for individuals and teams in preparation for their employment or greater responsibility in particular vocational or professional functions. From the data it is clear that for the respondents in this study such training is generally carried out in environments that are relatively stable and controlled, supported by a competency-based assessment to confirm that the skills and knowledge have been assimilated and applied in the workplace. The implications arising from an analysis of this gives us an opportunity to view this concept from a different perspective and suspect that competency-based assessments are carried out in work environments that are not as stable as those in which training is conducted. If this is the case it means that even assessing skills gained as a result of training places those being assessed under additional tensions and work environment issues for which their training may not have prepared them. While this has implications for the way in which CBT is conducted it is not a call for an overturning of the way in which it is carried out. It is, instead, a signpost to the reasons why CBT has not, as some researchers contend, achieved its objectives and area in which further research may provide some illuminating results.

What might be found, for example is that CBT might be more effective if the standards against which such training is carried out are more reflective of the work environment described in the complexity theories. This may include the skills and knowledge that support a description of competence that is not linear and mechanistic as critics contend is currently the case, but those that are capable of changing and growing as the needs of a self-organising and ever-changing workplace demand. It may also be found that a more accurate measurement and evaluation of such competence might be found it was assessed on the job and over a period of time rather than as a one-off test as competency-based assessment is currently applied.

In the meantime, the standards of performance that underpin the current approach to CBT, and the way in which such training is carried out, need not change. This study has shown that despite the critics the training and the standards that they achieved were appropriate to the needs of the individuals taking part in this study. Where the true competence arose, however, was not through their training but in the ability of these individuals to recognise the level to which their training had taken them (just as

they recognised the level to which their experience has taken them) and to initiate actions to bridge the gap between where they were and where they needed to be to competently perform in the workplace.

The results of this study, and the advances that they bring to the field of study beyond that found in the literature, are the following:

- a clarity in the link between training and on the job learning;
- an understanding of the nature of competence in complex environments;
- an understanding of the skills and knowledge individuals will always require when translating their competence from that gained during training to that required on the job;
- the importance of competency-based assessment as a tool for learning in complex environments; and
- a proposition that complexity is multi-dimensional rather than possessing a single-dimension.

If these insights are accepted then accepted also must be the argument for a revised approach to the notion of competence and how it is defined. Again, this is not a call for an overhaul of the current approach to competency-based training and assessment but for a recognition that competence in a complex and chaotic environment is different to competence in one that is characterised as stable and controlled – and in particular one in which training as carried out.

In the current approach to CBT an individual need demonstrate competence only once, and even then against a set of standards that are based on what others have done in the past and in different contexts and environments. But, according to data that emerged from this research, a competent person is one who demonstrates competence over and over, with the skills and knowledge that underpin this competence changing as new environments are encountered/created and reactions to them adjusted. The environment in which work is carried out is under constant change and renewal and being competent at one point in organisational time is no guarantee that someone will be competent at another, or even at the same time as this person is judged as

competent in different environments or addressing different issues. Sir Winston Churchill, the great British leader during World War Two was found to be not as competent at leading his nation either before or after the war. The same skills and knowledge applied in different contexts showing a marked degree of difference in competence.

The definition of competence given in the literature, when compared to what respondents in this study claimed competence meant to them, shows that it is a concept that is appropriate to predictable and stable work environments where the skills and knowledge of others (as described in the standards against which an individual's or a team's training has been carried out) may be capable of being applied, but only in the short term. Over the longer term the notion of competence is that it centres on being able to reflect on what one knows, on what one needs to know to address new and unpredictable situations, and what and how one must learn the skills and knowledge required to bridge the gap between the two. By considering competence in the workplace in such terms it may be better defined in both what it could mean to other individuals and teams who apply it and to those who rely on such competence to meet their needs (e.g., clients, supervisors, subordinates, and so on).

While the current approach to CBT extends only as far as the culmination of training (i.e., individuals are competent only insofar as the learning objectives goes), the critics studying the workplace to which the training participants have returned quite rightly point out the gaps between what they were trained in and what they need to know to be competent in the work environment. They are, however, criticizing individual competence as realised through the application of a concept that does not have, as its objective, such application. Competency-based training, under the current definitions, does not aim for anything more than competent application of those elements covered in the training. This study has shown that competence in the workplace is a different matter altogether.

Therefore, there is a need to consider the notion of competence as a result of training and competence in the workplace as two different phenomena because, as this study shows, while the former is predictable and may be based on what others have done in similar circumstances, the latter is not. By applying a new definition that relates wholly to the workplace we may be able to more accurately describe what

competence is to each individual when skills and knowledge are being applied in stable or complex work environments and thereby retain the current approach to CBT. At the same time it is possible to understand what it takes to be competent in a work environment that may be anything but stable and controlled.

From the data it appears that competence, in a workplace that could be characterised as a complex environment, is not the possession of skills and knowledge as determined in any set of competency standards (as is the current definition used in CBT), nor is it the ability to apply what one has been taught during a particular training program or course of education. It is the emergent and evolutionary ability to adapt one's skills and knowledge, no matter where they were learned, to meet emerging and ever-changing situations. Competence, it appears, is an emergent and increasingly individual and team capability to adapt current competence (not what one has been taught but what one knows and can do regardless of where/how it was gained) to complex and asymmetric situations, contexts and environments. It is applied by scrutinizing and reflecting on these skills and knowledge to identify what one needs at any given point in time, to decide what skills and knowledge are important and what are missing, and bring into play those that have been learned in other contexts, situations and environment to fill the gaps.

In other words, competence is not the desired end-state but the means by which such an end-state is achieved.

Admittedly the number of respondents in this study is not sufficiently large to suggest that this definition is applicable across all contexts and workplaces, however, it does provide us with a theory that can be tested in any vocational or professional field and work environment. In accepting this definition it is theoretically possible to identify the skills and knowledge that, even using the current approach to CBT, can form the basis of training for any individual or team currently or in the future working in environments that may be characterised to any degree as complex and chaotic. From an analysis of the data gathered from the respondents these are:

- the skills and knowledge to understand the complex nature of one's work environment;

- the skills and knowledge to interrogate what one already knows and evaluate this against what one needs to know in such an environment; and
- the skills and knowledge to learn what one needs to learn and apply this in ways that are appropriate to the work environment at any given time.

These, after all, appear to be the rules that individuals use to determine the skills and knowledge they need to address the complexity and chaos found in a modern work environment.

In keeping with the theories put forward by complexity theorists concerned with the implications of chaos and uncertainty in the workplace, these simple rules underpin what is observed as competence in any work environment and at the same time allow for the creation of new competence as and when it is required. Moreover they can form the basis for training that can be carried out subsequent to any CBT program to prepare individuals and teams for the challenges of applying their newfound skills and knowledge in, as the complexity theorists put it, novel and unpredictable ways.

To test the validity of this, what will be required is the translation of these into terminology appropriate to a competency-based training program, and their piloting through training and on-the-job competency-based assessment. Here we are suggesting that there may be two definitions of competence, but can two definitions survive side by side in a competency-based training system? Further research is needed to fully answer this question. What may be of assistance in this is the search for further explanations about the potential application to learning of the processes of competency-based assessment, the processes that respondents in this study claim provided them the most opportunities to enhance their on-the-job performance. Such a broadening of our understanding may potentially explain how emergent and evolutionary competence can be both applied and measured for its relevance to workplace needs.

While assessment throughout a competency-based training program is against the standards upon which it is designed (i.e., as learning outcomes), competency-based assessment is against the needs of the workplace which respondents in this study claimed included many more skills and knowledge than were covered in their training. In the past this difference has seen much criticism arise over the supposed failure of

the CBT processes to address the real needs of a modern and technologically sophisticated workplace. Emerging from this research, however, is the contention that these critics may have been measuring, to use a colloquialism, apples with oranges, and that competence under training has significant differences with competence on-the-job – the first of which is what is meant by ‘competent’.

Such an assessment should not be of what participants know or have been taught but of the outcomes of the application of the skills and knowledge contained in the standards against which their assessment is carried out. In doing this assessors need to be aware that no two outcomes will be the same – between individuals and teams or between situations and issues they address. Because of this such an approach to determining and applying competence has a greater potential to be relevant at any level of an organisation or profession because it is based around an individual’s or team’s needs in environments or situations experienced by that person or group alone. The real competence, therefore, is not of what they know but what they do in the application of both behavioural and cognitive skills – exactly as the National Training Board first defined competence in 1992.

The contributions that such an approach can potentially make to our understanding of competence in complex environments are as follows:

- Return on investment analyses, at both local (i.e., organisational) and national levels of the application and use of competency-based training can be more effectively targeted at the points in time when such investments are actually made – investment in the training and/or investment in the translation of this training into on-the-job competence. It was seen in the literature where measuring the effectiveness of training is not the same as measuring the effectiveness of on-the-job competence, therefore, with a greater understanding of the different forms of competence it is possible to discriminate between and thereby measure the two.
- Competency-based training can potentially have a greater impact on, and thereby give greater meaning to, the ability of individuals and teams to address the real skills shortages as pointed out by the critics and in the ACCI and BCA (2004) report. Because the current approach to CBT is that each training

course is based on standards of competence that hypothetically are appropriate to the workplace, a recognition of the need for, and the application of, an additional level of training that prepares individuals and teams for their particular work environment can theoretically better prepare them with the skills and knowledge they require regardless of their workplace or the level and quality of the training they have received. This has a better chance of success because the learning will be guided by each individual's or team's understanding of their work environment and the additional or enhanced skills and knowledge they need to competently perform there. They and their work environment will develop the curriculum and drive what is learned and applied.

- The acceptance of the need to view competence in the workplace as different to competence under or as a result of training can potentially form closer and more demonstrable links between training and learning. It can also potentially see competency-based training, as a continuum across both training and learning, actually achieve its defined purpose: the provision of skills and knowledge required of competent workplace performance. Throughout the literature training and learning have been treated as two different and separate undertakings – one directed and driven by a trainer and the other by the individual concerned. It is even acknowledged in the literature that learners will take what they want from training, discarding the rest as (at the time) superfluous to their needs. By adopting a definition of competence at work that complements a definition of competence under training, trainers and training designers are potentially better able to understand and bridge the differences between the two (as experienced by the individuals and teams concerned) and help facilitate solutions to meet their needs on-the-job and in pursuit of goals and objectives important to them.

The question cited in Chapter One as at the centre of this study is of the impact that the complexity theories have on the way in which competency-based training is conducted in Australia. The outcome of this study is a new way of thinking about CBT and the role that on-the-job learning has in supporting this approach to training and the individual and collective competence that forms as a result.

This study was of a limited number of individuals in different work environments. It is accepted that the data that arose from this research are such that the generalisability of their experiences and contentions may, without further testing, be seen only as appropriate to them and their work environment. This research does, however, raise a number of compelling issues that have the potential to give greater understanding, and relevance to, a training process that for many years has been widely criticized as not being able to achieve the objectives for which it was designed and applied. It is to these that we shall now turn our attention.

5.5 IMPLICATIONS FOR THEORY

The implications of this study not only relate to the field of vocational training in which competency-based training is generally situated but also to our understanding of how learning occurs in the workplace. This has a number of additional implications not only for the immediate field outlined above but also for the wider body of knowledge. In particular organisational development and the emergent nature of business success.

Moreover the theories described in Chapter Two, similar to the literature on CBT and the national VET system, do not situate learning in any particular environment beyond stating that all learning is context dependent and influenced by the environment in which it is applied. The complexity theories, however, give a greater definition of such environments and in doing so provide a means for understanding more fully the impact that context and environment have on how learning occurs. It is perhaps because of this that these theories are lately being seen as important frameworks around which to build an approach to the way in which knowledge is managed and used throughout private and public organisations here and around the world.

Knowledge management, and in particular the way in which it can be harnessed as an important tool in the achievement of organisational business and strategic goals and objectives, is underpinning the notion of individual and collective competence and is being employed more and more as an major tool in organisational development and growth. To this is added the theories put forward in the complexity sciences to explain why, if it is to be truly effective, knowledge and learning can never be static but self-

organising and emergent in reaction to the needs of the environment in which it is situated.

The outcome of this study, as limited as it is through the small number of respondents and organisations involved, suggests a challenge to the notion that training and learning are not, in a competency-based system, inextricably linked as part and parcel of the same continuum. The data arising out of this study indicates, through both the literature and the experiences of the respondents, that together they are a continuum, not situated around what is taught but around what is learned – learned during training and learned on-the-job. The complexity theorists, and in particular Snowden, make this point strongly when they tell us that knowledge is a continuum between what is known and what is knowable – knowable through individual efforts to find answers to questions or through these questions being presented during formal or informal training and education. Either way training and learning are linked and should be accepted as such.

This was tentatively captured in Moor's model at Figure 1 (p.85). While Moor's ideas have merit, he was only hypothesising about the link between training and workplace activity in complex and chaotic environments, not stating a researched and demonstrable fact. Noted during the research conducted and discussed in the previous chapter is where Moor's model has a weakness, and that is in the use of the terms unknown context and unknown process to define the opposite of known process and known context. Moor also attempts to illustrate the context and environment at different points of the continuum between equilibrium and chaos by the nature of work carried out there (i.e., conventional versus complex tasks) rather than the complexity of the whole environment.

By using such terms Moor appears to attempt to describe a phenomenon where trained individuals undertake conventional tasks in environments where the processes/context are known but the contexts/processes are unknown, and tasks that are complex or carried out in complex environments take place in a domain where both the context and the processes are unknown. This suggests that individuals and teams, in this domain, know neither what to do nor where/when to do it. It also suggests that they are doing nothing about learning that which they do not know.

Such a concept became very clear in the focus groups and observation study described in Chapter Four where it was seen that when confronted with situations for which their training had not prepared them they drew on skills learned in other contexts or situations. The data showed that through discussion and reflection participants validated currently held skills and used them as the basis for future actions. Gaps between what was at the time known and what needed to be known in order to competently perform in the future were identified, measured and where possible bridged. Of importance was that in doing so participants in this study showed that learning in a complex environment was not single-dimensional. It was most effective when it occurred in more than one domain (of Moor's model) and at many points along the continuum, not just those at which the participants concerned felt comfortable. This was both observed and reported throughout this study, for example during group discussions where participants were both learning and at the same time teaching. Moreover, what was learned and how teaching was carried out depended to a large degree on the individual and her/his confidence and capacity for learning and applying what was learned in different contexts and environments. Complexity appeared to be even more complex than the literature suggested.

Having said that, Moor's model has the potential to provide a useful framework upon which to base further investigation into the impact the complexity theories have for competency-based training. It is, therefore, repeated here with some minor modifications.

In the model below, Moor's 'unknown' has been changed to 'knowable' (i.e., knowable context and knowable process). The reason for making this change is because it draws on Snowden's contention that while certain skills and knowledge are unknown, or the context within which known skills or knowledge are to be applied are unclear or unpatterned, they can be learned either through interactions with others, with the environment in which they are applied, or by experimentation. This clearly occurred and was reported during the research. Furthermore, adopting 'knowable' over Moor's 'unknown' also has the potential to suggest an evolutionary process through which learning is self-organising and emergent in environments that are themselves growing and adapting as a consequence of the application of what is being learned.

Changing the domain from unknown to knowable also infers a learning action on the part of the individual (construction) rather than a passive acceptance of the unknown and fits with the radical constructivist approach of von Glasersfeld (in von Glasersfeld n.d.). It also allows us to situate the contention by Stacey and Snowden that knowledge in the workplace is not gained solely in stable and controlled environments but also, and perhaps more so, in those that can be characterised as complex and chaotic.

This model also demonstrates where, if we accept the complexity theories, competency-based training can potentially be more closely aligned to the known skills and knowledge in an environment that is stable, controlled, and at a point of equilibrium, *and* the unknown but knowable skills and knowledge that are needed closer to the point of complexity and chaos. While considering the accepted theories that underpin how people learn naturally, it may be possible using this model to plot how, along the continuum from equilibrium to chaos, learning occurs in the workplace and from this use a competency-based approach (to training or assessment) to pattern learning and knowledge towards outcomes that are important to the individual and her/his workplace – regardless of the complexity of that workplace at any given time.

In doing this, it also may theoretically be possible to develop a competency-based training and assessment program that provides the appropriate skills and knowledge (and assesses their application) even when trainers and trainees don't know the exact nature of the skills and knowledge that will be required at some future point in time, or the goals and objectives their application is designed to achieve. For example, some respondents in this study stated that they needed a variety of problem solving and decision making approaches so that regardless of the complexity or otherwise of their future work environment they were prepared for it. Therefore, teaching several methods for solving problems and the contexts in which they are most appropriately applied might be a more useful form of competency-based training than teaching only one problem solving method (based on what others have done in the past) that would hopefully be appropriate to all future contexts.

This is not an attempt to predict the actual skills and knowledge that will be needed to achieve goals and objectives that emerge at different points of the continuum for, as

we have seen, such predictability is just not possible. It is simply that theoretically it may be possible to provide a competency-based training solution to achieve a level of competence important to the way individuals and teams discover and apply whatever skills and knowledge are needed at some future time. The only predictability here is that *some* skills and knowledge will be needed, not what they are, therefore, the individual and/or her/his team will need the competence and confidence to learn them, something that theoretically can be taught at the time that this lesson is needed. In this way the competency-based training approach will be one of ‘Just in Time’ rather than ‘Just in Case’ which appears to currently be the situation.

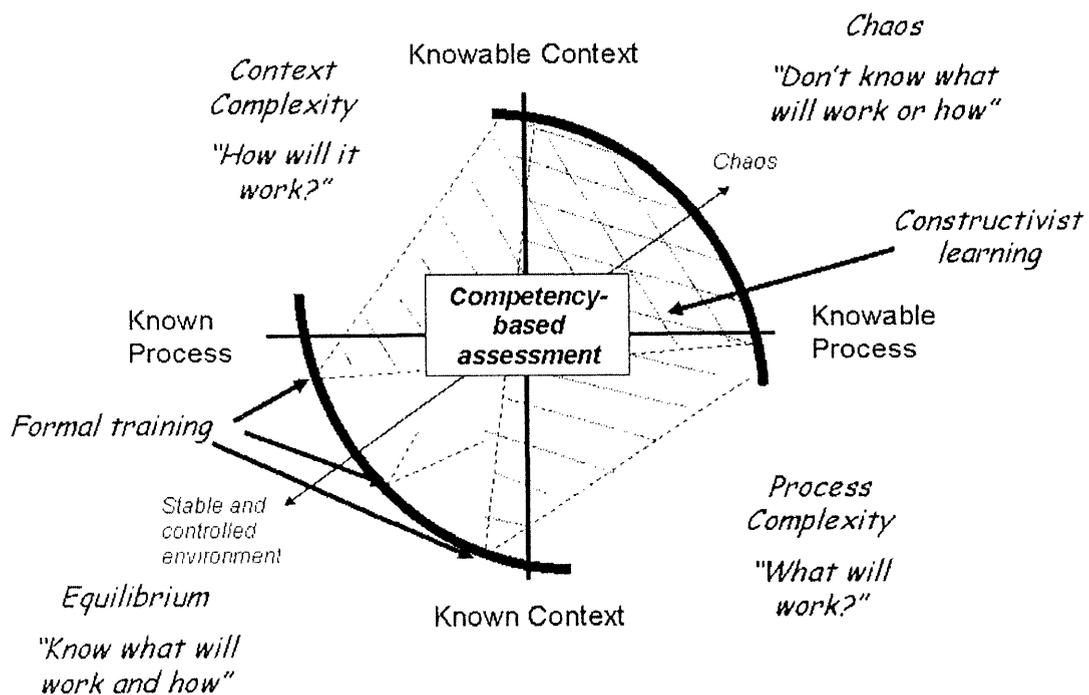


Figure 5. Adaptation of Moor's model to reflect research outcomes

This model also demonstrates a number of issues that are not evident in the literature but which emerged from the data gathered during this study:

- The link between training and learning, situated as they are along a continuum from stable and controlled environments to those that may be characterised as chaos. In illustrating this, the model at Figure 5 demonstrates an important

contribution that this research makes, and that is of the gap between where and how training is carried out, and where and how the skills and knowledge gained during such training are applied. That the environment is not the same in both cases is shown. Considered alongside the responses gathered from research participants in which they describe the difference in the skills and knowledge that they must learn and apply in a complex environment is a picture of the way in which competency-based training, as it is currently applied, fails to bridge this gap.

- The true nature of the environments in which training and learning occur. While the current approach to competency-based training is designed for an environment that is stable and controlled, the actual workplace performance is in an environment that is anything but. CBT, as it is currently applied, teaches known processes and contexts while leaving the pursuit of the knowable processes and contexts up to the individual upon her/his return to the workplace.
- The link between training and learning as a continuum from environments that are stable and controlled and in which training is conducted, and the environment that may to a greater or lesser degree be complex and chaotic in which individuals are expected to apply their skills and knowledge.
- The nature of the skills and knowledge required post training, including those that are needed by individuals and teams to determine what or how what they already know will work, and those that they require in an environment which is uncontrolled and chaotic. This enables trainers to design programs that contain elements of training and learning, the outcome of which is competence that enables individuals and teams to shape their environment and the skills and knowledge they require to competently perform there.
- Competency-based assessment as it is situated at that point along the continuum where it actually occurs, that is within a complex environment. It reflects the contentions put forward by research participants that the processes used in such an assessment contributed the most to their learning needs and allowed them to bring forward skills and knowledge learned in other

environments to their needs at the time. It demonstrates that CBA is not of training but of on the job skills and knowledge, and more importantly it shows that such assessments are not against standards detailed in the training but those required for competent workplace performance.

This model provides a framework for illustrating the gap between where competency-based training is currently applied in Australia and the real needs of workplaces that are characterised as complex and chaotic. It provides a guiding reference for situating competency-based assessment within such an environment along with a broad indication of the skills and knowledge that the respondents in this study claimed are applied along this continuum.

These issues are an important contribution to the study of competency-based training because they illustrate both the link between training and on the job learning, and the positive influence that can be imposed on them both by trainers and training designers.

5.6 LIMITATIONS OF THE MODEL

Even with the change from unknown to knowable a weakness remains in this model: it is only two dimensional. It shows the length and breadth of complexity but doesn't show the depth, particularly the depth of the individual capability and confidence. Moreover, it does not show the individual, team and business objectives that must be achieved when skills and knowledge are applied at different points along the continuum. Further work needs to be done to explore the impact that the complexity theories have in the self-organisation of work-related goals and objectives and the means by which individual and team confidence and endeavour can be shaped towards their achievement.

For the purpose of this study the outcome of the application of individual skills and knowledge, as they impact on higher level organisational goals and objectives, was not focused on even though, in competency terms, they are essential to the assessment of competence in the workplace. Instead tested in the research was the assumption that the goals and objectives individuals and teams were tasked with achieving were

shaped and prioritised by the same complex and chaotic burdens as the workplace in which efforts are being made to achieve them. For example, one respondent from the aged care centred recorded an incident where a patient became more aggressive and less cooperative as efforts were made to apply calming medication. Similarly a participant from the focus group drawn from DMO stated that even if his CEO took one of his team outside and ‘publicly executed him’ no-one would be any more motivated to work harder. Whether or not this was true it indicates a contrary personal position to that sought by the organisation which may reflect the motivation of this individual (and those whom he influences) to achieve certain outcomes.

What this means is that the skills and knowledge – and the motivation – to achieve one (individual or organisational) objective must theoretically change to satisfactorily achieve the same objective as it is influenced by changing environmental factors. While this illustrates the contention by the complexity theorists that the skills and knowledge needed to address a situation cannot be accurately predicted – even a situation that may have been experienced by the person concerned or others in the past – the question that remains is whether or not competency-based training could have prepared individuals for such environments.

This is a matter for further research. The links in this model between the environment and the training are well established in the literature; however, they are grounded in theory rather than empirical evidence. The research carried out as part of this study show that despite the limited evidence gathered there is potential for a new way to view competency-based training and the environment for which, and in which, it is conducted. But this does not mean that the current method needs to be overturned – simply accepted and used for the achievement of the objectives that it is capable of achieving.

Further study and research is also needed to gain an understanding of what this means in other contexts and professions. Additional research is also required to gain an understanding of whether or not it would be appropriate to, for example, apprentice training where the training and learning aspects might be more fully integrated into the one program. In this regard this model may provide guidance on how employers might best become involved in the training and learning that their apprentices receive and, through this, enhance their industry as a whole. Learning objectives, beyond

simple descriptors such as ‘experience’, might be given to employers and supervisors that enable an holistic training regime to be created and applied to all trainees. After all, the current demand for greater skills in Australia appear to be coming from the trades sector so this might be an opportunity to address and resolve their concerns.

The implications of the complexity theories for competency-based training reflect such a challenge. The challenge to accept that these theories are applicable also to the way in which CBT and its underpinning policies and practices are expected to support enhanced organisational and business outcomes in environments that are not solely those found in stable and controlled training contexts but also those in which participants must apply what they are being taught. If there continues to be a disconnect between the two then criticism of the way in which CBT is applied in Australia should be expected.

5.7 IMPLICATIONS FOR POLICY AND PRACTICE

Competency-based training is made up of three essential elements: a definition of competence that underpins the way in which the learning or training outcomes are described, the learning or training outcomes themselves, and the way in which the content of the training has been assimilated as evidenced by on-the-job behaviour. There is significant criticism in the literature regarding the outcomes of such an approach to training, centred primarily on its perceived failure to address the real needs of the workplace. Schofield and McDonald (2004) and two of the leading industry bodies in Australia (in ACCI & BCA 2002) further contend that the bureaucracy that surrounds CBT is stultifying what might otherwise have been achieved had the objectives of its implementation been more carefully considered. What was not questioned in the literature reviewed for this study, however, but has emerged from this study is the following:

- ***Has competency-based training been properly implemented?*** The definitions that support CBT are that it aims to provide skills and knowledge detailed in competency standards, and that these standards reflect the level of competence required in the workplace. As the participants in this study contended that the majority of the skills and knowledge that they required on the job were not

taught during their training, this suggests that either CBT cannot provide the skills and knowledge that individuals require in the workplace, or that there has been a failure to properly implement it in the first place. The conclusion of this study is that the reality tends to arise from the latter.

- ***Are the definitions used to support CBT, and by extension CBA, adequate?***

The definition of competence is that it reflects the skills and knowledge required in the workplace, but the respondents trained in the vocational fields studied in this research claim that this did not occur. Does this mean that the expectations of these definitions are too high or that their achievement is more illusory than reality? After all, there is no evidence in the literature that the objectives of competency-based training have ever been achieved, neither in the national VET system nor in those organisations that support such an approach to the training of their staff. From this study, however, it appears that the problems may not necessarily lay in the definitions used in the competency-based system but in the definitions that support these definitions. In other words, when claiming that CBT achieves skills and knowledge important to the workplace, which skills and knowledge are we talking about – those applied in stable and controlled environments or those applied during complex and chaotic times? Further, what kind of workplace are we defining – one in which there is a high degree of externally-imposed control over what staff do or one in which employees are given the freedom to create their own reality and achieve their objectives through self-organisation and close interrelationships with others? This failure to properly define the constituent elements of competence means that under the current definitions it may never be possible to achieve the objectives of a competency-based approach to training. The question is, could it ever, especially if the definitions against which such an assessment would be carried out are quite probably wrong?

Because competency-based training is, according to the policies that support it, a concept that is both directed and controlled by management and trainers alike, there are a number of practical implications that this study has for private and public sector managers and those who provide the training and learning activities for their staff. These are addressed below.

5.7.1 Public and private sector managers

It is often stated that the strength of the national VET system is that it is 'industry-led', in other words industry has the predominant say in how the system works and the outcomes it should achieve. It has been argued, however, that this strength is more perception than reality. This is not to say that such leadership is not possible from industry, just that outside of the main representative bodies (the various chambers of commerce, industry groups such as the Master Builder's Association, etc.) industry has never really taken the opportunities that have been presented to it to take on this role.

The role that managers in public and private organisations could and should play in the design and application of a competency-based approach to training is threefold: as current or potential participants themselves, as employers of individuals and teams attending work-related training, and as potential employers of those who in the past have undertaken such training.

As participants the following points are going to be as relevant to the training that managers and supervisors at all levels undertake as they are to the way in which they manage the outcome of supervising or employing others who have done the same. It is important, therefore, that they be reminded that these implications are as relevant to them as to their current and future staff.

For those who are currently supervising or managing staff undertaking competency-based training, the outcomes of this study imply the following:

- ***Individual and group learning is enhanced when management provides and actively promotes opportunities for it to occur.*** In the literature on communities of practice and collective competence the underlying message is that unless individuals and groups are given the space and opportunity to

pursue learning then there is a good chance that it will not occur. In the researcher's experience failure to provide this is not only limiting in the amount and quality of learning that takes place but can also be demoralizing and counter-productive to achieving work-related objectives. This study found that, in the experience of the respondents, in the absence of direction learning becomes self-organising in response to the needs of the work environment, and when leadership is provided it is enhanced as greater control over that environment is offered to the individuals and groups concerned. In an analysis of the interviews and workplace observations it appeared that greater confidence and competence was achieved by respondents when management actively shaped the degree to which learning occurred through the provision of time, space and opportunities to learn and practice what they had learned, and by actively encouraging individuals and teams to contribute to their own learning.

- ***Management should not only provide such opportunities but should also actively participate in them.*** In the observation study of one group of participants it was noted that the degree to which individuals and teams directed their own learning, and the quality of their input into the achievement of group objectives, was enhanced when their management team was involved. This team, by understanding their own limitations and what they needed to learn to better shape the work context and thereby create a more effective learning environment, were better able to shape and guide the learning that their teams were able to gain and apply. This learning was not in relation to their formal training but in ways in which the training could – and should – be applied in the workplace to achieve goals and objectives important to them all. Not only did this motivate the group but it also gave them a greater feeling of ownership and pride in their work. Whatever the outcome – whether it be success or failure – it was shared across the whole group.
- ***Management should understand that competence is not a one-off state but something that evolves over time in reaction to the work environment.*** It is often stated that employers seek qualified staff when carrying out recruitment activities. While individuals and teams can be declared competent at the

conclusion of a formal training program, however, competence on the job (if the conclusions of this study are accepted) is something that evolves through constant interaction with the work environment and others within it. For this reason managers should not decry an individual as not competent if they are not given the opportunities to be involved in such interactions or if their work environment is such that interacting within it is not encouraged or is, in some way, punished. Risk taking is an essential aspect of learning and growth and if this is stultified or discouraged then learning will not occur. In the experience of respondents in this study, individuals will constantly seek stability where they feel most comfortable and will not progress beyond it regardless of their previously identified level of competence and the degree of complexity encountered in the workplace.

- ***The belief in the concept that to be trained is to be competent should be discouraged.*** From this study the notion that to be trained is to be competent has been found to be incorrect. Not only does the literature state that over half of what individuals have been taught is irrelevant to their workplace, the respondents in this study claim that the majority of the skills and knowledge they required in their workplace were not found in the training they had undertaken. This does not, however, mean that the training or the standards that underpin such training must change, but that managers must understand that no matter how effective the training has been (or how qualified staff are) individuals and teams will still require certain additional skills and knowledge if they are to be fully competent on-the-job. These can be provided internally through formal and informal training or supplementary training can be provided by an external training provider. Either way individuals should not be treated as if they are fully competent simply because they've undertaken training. If the notions put forward above are accepted, full competence may never be achieved.

The outcomes of this study, while limited to those arrived at through analysis of the data emerging from the literature review and the relatively small number of participants, highlight the importance of the contribution that the work environment

can make to individual and collective competence. Such a contribution does not, however, occur without the active participation of management at all levels.

5.7.2 Training providers

These implications are relevant to training providers, and in particular in respect to the following:

- ***The outcome of a competency-based training event is not the culmination of learning but the beginning of a second phase of training which involves learning how to apply what was taught on the job and in a variety of contexts and environments.*** This presents significant opportunities for trainers and training designers to widen the impact they have on individual and collective competence in the achievement of business and organisational, as opposed to training or learning, objectives. From the data it doesn't appear that the way in which CBT is currently conducted has to change – simply that additional competencies can be introduced that assist individuals and teams to make sense of what they have learned and how it can be applied in those situations and at those times that they need to apply it.
- ***The concept that to be trained is to be competent must be avoided.*** The most significant impact that the complexity theories have on the way in which competency-based training is conducted in Australia is in the focus this brings to the way in which the standards that underpin such training are designed and in their overall purpose. In the past this has seen an over-reliance a degree of predictability and replicability that the complexity theorists contend is not possible. Therefore, in accepting that to be trained is not the same as being competent, trainers can avoid trying to provide all of the answers to the question of work-related training and instead focus on 'seeding the gap' in individual and team knowledge insofar as the skills and knowledge required of complex environments goes. In other words, rather than trying to teach all of the skills and knowledge that individuals and teams require in complex environments trainers should instead concentrate on creating a fertile environment where curiosity, and the means for satisfying this curiosity, can be grown. They can do this by 'seeding' the gap between what individuals and

teams already know (regardless of where this was learned) and what they need to know to address issues and situations as they arise in the workplace. In the first instance what they need to know is not the skills and knowledge to address these issues and situations but how to learn them – and from whom. This allows both the trainer and the trainee to enter the ‘knowable’ space.

- ***The outcomes of this study provide a framework around which training can be designed and delivered in a way that is more appropriate to learner’s needs in the workplace.*** This, again, provides opportunities for trainers and training designers to have a real impact on the way in which individuals and groups apply their skills and knowledge in the workplace – and what they apply – to achieve outcomes that are important to them. This not only enhances the trainer and training designer’s effectiveness, it increases their utility in organisational and human resources developments on which they have had little or no impact for example in the achievement of business and strategic goals and objectives.
- ***Training and learning should be viewed as a single continuum based on individual needs in environments that range from stable and controlled to complex and chaotic.*** From a trainer or training designer’s perspective this allows for programs to be developed that include not only formal training but also on-the-job learning activities, and in doing so produce results that in practice, and not just theory, impact on the needs of the workplace.
- ***The outcome of this study identifies opportunities for trainers to become more involved in shaping and directing individual and collective competence towards outcomes that are important to both learners and their organisations.*** Traditionally training is designed around the achievement of training objectives – in other words objectives that can be achieved through training. This has meant that trainers are not always seen as capable of impacting on an organisation’s outcomes because the role they play is aligned more with a training environment than with the work environment. The reality of the workplace is that more competence is achieved through learning that occurs subsequent to, in the current approach, formal training. Therefore, if a trainer is to be viewed as potentially impacting on an organisation’s

achievements it is on the workplace that she/he should be focussed. By implementing a program that, at one end of the continuum, is centred on what the trainer needs to teach and, at the other, is geared towards what the individual needs to learn, the trainer is capable of shaping and directing that learning towards not only what the individual or team wants to achieve but also what her/his or their organisation needs achieved. This, again, will demonstrate a degree of organisational effectiveness that trainers in the past have not been capable of.

In Chapter One the researcher's interest in why and how individuals and teams achieve a high level of competence even in the absence of training was described. This interest was similar to that of Jacobs and Gordon, described in the introduction to this chapter, whose studies of ecosystems lead them to an understanding of how communities are created and grow based on the simple interactions that occur naturally between individuals within a wider ecosystem. From this study it is clear that, similar to the findings of Jacobs and Gordon, individuals and teams learn the skills and knowledge important to them through their actions and reactions to and within a work environment that motivates them to learn and shape, through reflection and feedback, the level and quality of what is learned.

Does this mean that there is no role for trainers in the achievement of work-related goals and objectives once the formal training (as we traditionally understand it) is completed? The answer is 'No'. In fact the outcome of this study is an understanding of the many opportunities for trainers and training designers, but it does mean moving away from the traditional approach and adopting one that takes greater cognisance of the impact that the complexity theories have on the way in which training can be designed and presented.

5.8 IMPLICATIONS FOR FURTHER RESEARCH

This research has identified a gap in our knowledge of the most effective ways to design and conduct competency-based training activities that meet the needs of individuals and teams after their formal training has been completed, however, given the limited number of respondents and environments involved the issue remains of

how generalisable these findings are to a wider population. In this section the implications of this study on the selection and design of future research is discussed.

- ***Are the findings of this study generalisable to a wider range of professions and vocations?*** As noted above, the limited number of respondents and environments involved in this study means that the findings, while highlighting an important gap in our knowledge regarding the ability of competency-based training to meet real workplace outcomes, may not be generalisable to a wider population of individuals and environments. For these findings to be used as the basis for the introduction of a new approach to CBT that addresses the impact of the complexity theories further research should be carried out to ascertain whether or not the findings of this study are applicable to other professions and vocations (and in particular the trades).
- ***What changes must be made to the way in which competency-based training is currently designed and applied to accommodate the findings of this study?*** It would be too easy to see the outcomes of this study as a revolutionary new way of conducting competency-based training both within the national VET system and by organisations in individual workplaces. The data emerging from this study does not support any such move. In fact the data suggest that the concept and conduct of CBT within the national VET system is, despite the criticisms it has attracted, effective – but only so long as its limitations are understood. Such limitations include the failure of the definitions of competence, competency standards and competency-based training to accurately describe a concept that is required in a workplace that is characterised as stable and controlled at one end of a continuum and chaotic at the other. By refining these definitions to describe their exact purpose the gap becomes apparent between the current approach to CBT and the needs of individuals and groups working in environments that are not described within these definitions. Further research, however, is recommended to develop more accurate definitions and identify where, if at all, changes need to be made to the current approach to CBT to integrate within it the needs identified in this study.

- ***What is the relationship between competency-based assessment and competency-based training?*** In particular, can, and if so how, assessment be used as an activity that centres on learning as an extension to the training. The data gathered during this study showed that the greatest amount of learning participants did in the gaining of skills and knowledge important to their work occurred during their assessment. Should a wider acknowledgement of this as an important learning process be shown it will provide an argument for taking assessment away from being a testing process and introducing it as an adjunct to training.
- ***How relevant are the complexity theories to the workplace?*** Data emerging from this study indicated that the complexity theories in the literature tend to describe it in linear and single-dimension terms. An analysis of the data gained through the interviews and focus groups, however, showed that complexity in a work environment may be multi-dimensional depending on the individual, her/his work environment, and her/his personal reactions to them. To fully understand how competency-based training can be used to train individuals in the skills and knowledge they need to function in such environments it is important that a broader understanding is gained of whether or not complexity is multi-dimensional and, if so, what relevance this may have to the workplace in which individual and groups skills and knowledge are applied during and as a result of training.

5.9 CONCLUSION

In adopting a competency-based approach to the development and application of training for those whose work environments can be characterised as complex and chaotic, what issues remain to be addressed? Given that the notion of complexity and the skills and knowledge required to competently perform in environments characterised as such are issues important more at an individual than a collective level, there are two elements important to CBT that from the data should be considered:

- When developing the competency standards upon which the training is to be based, whose definition of the workplace is being referred to – someone who finds the workplace relatively stable and controlled and, therefore, does not have to apply a wider range of skills and knowledge over and above those that she/he learned during training, or someone who finds it complex and chaotic and must, therefore, draw on a wider range of skills and knowledge than those covered by her/his training. Both views of the workplace are valid but both cannot be used if the one standard is to be arrived at.
- When conducting an assessment of individual or collective competence against these standards will it also take into account confidence and life experience? If so, how are these described in the standards and what implications does this have for such things as recognition of prior learning? If they are not to be taken into account then why not? After all, from the data it appears that such personal aspects are critical to the degree of complexity those being assessed experience in their workplace. In the approach to CBT currently followed in Australia this is something that does not occur simply because, while the assessment processes allow for it, there is no standard against which to measure and assess such competence.

These issues only become important if the same processes used to create the current approach to CBT are followed in defining the standards and designing the training/assessment required to apply them. They become moot if we accept, as emerged from the data, that the skills and knowledge that individuals apply are not based on outcomes achieved by others but the processes that they follow in determining what these outcomes must be – and the skills and knowledge required to achieve them. This encourages the adoption of the skills to enquire what is needed to survive in the workplace and the knowledge of where and how to find them, even though these may not be known beforehand. This is the ‘something’ that individuals and teams do when confronted with new and unfamiliar environments and situations. Insofar as the assessment goes, the standard of performance under review will, if this approach is adopted, be centred solely on the individual and what she/he needs to do to be deemed as competent in the environment – as complex as it is in reality or

perception to the individual concerned – in which she/he is striving to achieve goals and objectives for which she/he has been given responsibility.

In summary, the implications of the complexity theories for competency-based training as it is applied in Australia are that the current approach is satisfactory insofar as its real purpose goes. It is defined as providing the skills and knowledge to competently perform in the workplace but to say that they can be modelled on what others have done, and contain any surety about their exact fit to future work needs, is incorrect. CBT as it is currently applied only trains individuals and groups to the level defined in the relevant competency standards, which themselves are not appropriate to future workplaces because they are based on what others have done in other contexts and environments – an aspect that complexity theorists reject as appropriate to future performance.

If, however, the standards of performance are developed around a few simple rules, such as understand the context or environment, interrogate what is already known, and from this identify the gap between what is known and what must be known, then the notion of competence in complex environments is made that much simpler. And once defined this can become an adjunct to the current system, not a replacement for it.

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APPENDIX A

MATRIX USED DURING INTERVIEWS

Stable/controlled environment		Changeable/irregular environment		Complex environment		Chaos	
(a) To a <i>greater</i> degree	(b) To a <i>lesser</i> degree	(c) To a <i>lesser</i> degree	(d) To a <i>greater</i> degree	(e) To a <i>lesser</i> degree	(f) To a <i>greater</i> degree	(g) To a <i>lesser</i> degree	(h) To a <i>greater</i> degree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Significant reliance is placed on policies and guidelines</p> <p>Work is straightforward and unvarying from day to day</p> <p>Work objectives and tasks are set well in advance and usually achieved</p> <p>Clients demands generally remain the same</p> <p>The same patterns of work activity occur day after day</p> <p>Decisions are easy to make and problems easily resolved</p> <p>Teams remain fairly static over long periods of time</p>		<p>Policies and guidelines are used for guidance only</p> <p>Work can vary from day to day</p> <p>Objectives and tasks are sometimes set well in advance but not always achieved</p> <p>Client 's demands sometimes change at short notice</p> <p>We generally know what is going to occur over the coming days</p> <p>Decisions are sometimes easy to make and problems easily resolved</p> <p>The make -up of the team often changes as the needs of the work change</p>		<p>Policies and guidelines only relate to the administrative elements of our work</p> <p>While we generally know what to do, we don 't know where and how we will be doing it until we get to work</p> <p>Objectives are usually set on a daily basis (or less)</p> <p>Client demands are always changing</p> <p>Each day brings something new or unfamiliar</p> <p>Decision making and problem solving involves elements of risk</p> <p>Who is in the team depends on the task or objective to be achieved</p>		<p>Policies and guidelines (where they exist) do not relate to our work</p> <p>We are constantly having to reset our priorities because new ones arise without notice</p> <p>It is no use trying to set objectives because they are rarely, if ever, achieved</p> <p>The clients are always changing</p> <p>It is impossible to predetermine what the pattern of work will be</p> <p>Decisions are made intuitively and problems resolved to the degree that time permits</p> <p>Teams work as individuals to do what they can</p>	

APPENDIX B

ORIGINAL QUESTIONS DEVELOPED FOR USE DURING INTERVIEWS

Name of Interviewee: Code:

Date of interview: Place of interview:

Tape recorded: Yes / No

In a complex and chaotic environment, is the current approach to Competency-Based Training and Assessment appropriate to the needs of individuals and teams at 'the edge of chaos' and, if not, what are the gaps between what is currently being done and what must be applied to facilitate the achievement of goals and objectives important to all levels of an organisation?

INTRODUCTION

This interview will take about 35-40 minutes. As mentioned in the Consent Form it is purely voluntary and you are free to withdraw without reason from the study any time you wish.

This research is investigating how knowledge is created and used in the workplace. It will be a simple process of observing the interactions that form at work during different scenarios and asking questions about how certain skills and knowledge have been learned. When all of the interviews are completed I will be asking people to help me clarify terminology or procedures that have been mentioned but I am unsure whether or not they are important to the research. If I were to ask you, would you be willing to take part in a small focus group at some time in the future to help clarify these things for me?

Because I want to make sure that I don't overlook anything in the answers you give I will be taping our interview. Do you have any objections to this? As it said in the introduction these tapes will only be held until such time as the research is complete and then they will be destroyed.

Finally, I may use quotes in the study report but they will be anonymous and without any details that may identify the respondent or their place of work. Would you have any objections if I used an answer you might give in my report?

THE STUDY

Questions for staff member:

1. What is your current position and how long have you been employed there?
2. What skills and knowledge were you trained in?

3. What have you had to learn since and where and how did you learn them?
4. On the attached graph, make a letter 'A' in the box that most closely describes the work environment on a typical day.
5. On the attached graph, make a letter 'B' in the box that most closely describes the work environment on a very busy, hectic day.
6. In broad terms, what skills and knowledge do you apply in your day-to-day work under the box with the letter 'A'?
7. Where did you learn these?
8. In applying your skills and knowledge in this context, whose needs were you primarily concerned with achieving?
9. What skills and knowledge do you apply during those times described under the box with the letter 'B'?
10. What things did you have to do to stabilise the situation so that you could, for example, make decisions?
11. Where did you learn the skills and knowledge to do this?
12. In applying your skills and knowledge in this context, whose needs were you primarily concerned with achieving?
13. Are these similar, the same, or different to those applied in other organisations similar to yours?
14. How did you know that what you were doing was the right thing to do in the circumstances?
15. Have you ever observed others applying their skills and knowledge in similar situations? Where did you observe them and what did you observe them doing?
16. Please describe any skills and knowledge that you don't have but feel could be helpful to you in your day-to-day work activities?
17. Are there any others issues about how learning is gained in complex or chaotic environments that you feel might be helpful to this study?

Additional questions for Manager/Team Leader

18. Thinking now of the organisation's business/strategic goals and objectives, how are these broken down and integrated into the day-to-day activities of staff?
19. What evidence do you look for, or do you see, that shows that these goals and objectives are being achieved?
20. In your opinion, does the current approach to training staff for their position provide them with sufficient skills and knowledge to achieve these goals and objectives? Please give examples.
21. What, if any, training, coaching, mentoring or on-going education is provided by your organisation to enhance the ability of staff to achieve these?
22. To what extent are enquiry, dialogue and debate encouraged in your organisation as a means of addressing and overcoming issues of concern?
23. Which of the following strategies do you use to facilitate ongoing learning throughout your organisation/branch:
 - The knowledge inherent in the group?
 - Collaboration within the group or between groups?
 - Enquiry, dialogue and/or debate?
 - Networks – internal/external?
 - Individual and group problem solving?
 - Role re-definition (by participants)?
 - Oral history (what can we learn from the past/present? How can we redesign things for the future)?
 - Encouraging individual and team learning to extend beyond the boundaries of the immediate job/task?
 - Using technology and bodies of knowledge (e.g., reports etc) as supplementary channels for learning and communication?
 - Encouraging mega-level thinking (e.g. 'What is my/our contribution to society or the environment?')
 - Encouraging macro-level thinking (e.g., 'How is this contributing to my/our organisation's output and mission?')

- Using older and more experienced staff to teach/train others (especially of values, culture, job/role environment skills etc)?

24. In what ways are these training/learning activities applicable in other organisations or environments similar to yours?

Thank you for your assistance

Comments:

APPENDIX C

**FINAL QUESTIONS USED DURING INTERVIEWS WITH RESEARCH
PARTICIPANTS**

RESEARCH QUESTIONS

Name of Interviewee: Code:.....

Date of interview: Place of interview:

Tape recorded?: Yes / No

The aim of the interviews was to seek answers to the following question:

In the complex and chaotic environment that characterises the modern workplace, was the current approach to Competency-based training appropriate to the needs of individuals and teams at 'the edge of chaos' and, if not, what are the gaps between what was currently being done and what must be done to facilitate the achievement of goals and objectives important to all levels of an organisation?

INTRODUCTION

This interview will take about 35-40 minutes at the most. As mentioned in the Consent Form it was purely voluntary and you are free to withdraw without reason from the study any time you wish.

This research is investigating how knowledge was created and used in the workplace. It is a simple process of observing the interactions that form at work during different scenarios and asking questions about how certain skills and knowledge have been learned. When all of the interviews are completed I will be asking people to help me clarify terminology or procedures that have been mentioned but I am unsure whether or not they are important to the research. If I was to ask you, would you be willing to take part in a small focus group at some in the future to help clarify these things for me?

Because I want to make sure that I don't overlook anything in the answers you give I will be taping our interview. Do you have any objections to this? As it said in the introduction these tapes will only be held until such time as the research was complete and then they will be destroyed.

Finally, I may use quotes in the study report but they will be anonymous and without any details that may identify the respondent or their place of work. Would you have any objections if I used an answer you might give in my report?

THE STUDY

1. What was the name of the organisation you work for and what industry group does it belong to?

2. What was your current position and how long have you held it?
3. You have been selected for this research because you have undertaken a competency-based training course as part of your career development. Which course did you attend and how long ago?
4. Have you done any other competency-based courses and, if so, what were they and how long ago did you do them?
5. Thinking about one of the competency-based training courses you have done, did you feel that the competency standards against which the training was conducted adequately covered the skills and knowledge you need to competently perform your job? If not, what was missing? Was there anything included that you don't do?
6. Did you find these competency standards difficult or quiet to understand? Please give examples.
7. Did you feel that the training you received against these standards adequately prepared you for the projects and work you were asked to undertake either during or after the training? If not, what other skills and knowledge have you had to learn, or to apply, to more effectively use those gained during the training?
8. Where and how did you acquire these?
9. Thinking now about the assessment processes, what aspects of the assessment do you feel were of most benefit to you?
10. Which aspects were least beneficial?
11. Thinking about other competency-based training courses you have undertaken, please consider again questions 5-10.
12. In your opinion, in what ways could these courses be improved to make them easier for you to achieve goals and objectives that are important to you and your workplace?
13. On the attached graph, make a letter 'A' in the box that most closely describes your work environment on a quiet day. Make a letter 'B' in the box that most closely describes your work environment on your busiest days.
14. In broad terms, what skills and knowledge do you apply in your day-to-day work under the box with the letter 'A'?

15. In applying your skills and knowledge in such an environment, whose objectives would you say you were primarily concerned with achieving?
16. In broad terms, what skills and knowledge do you apply in your day-to-day work under the box with the letter 'B'?
17. In applying your skills and knowledge in such an environment, whose objectives would you say you were primarily concerned with achieving?
18. How do you know when you are achieving them?
19. Referring back to the graph, in the environment described under the letter 'A', what skills and knowledge would you feel are most important (even though you might think that you currently do not possess them)?
20. Referring back to the graph, in the environment described under the letter 'B', what skills and knowledge would you feel are most important (even though you might think that you currently do not possess them)?
21. Thinking back on all of the responses you've given to this research, what inferences could you draw on the way in which the training you have undertaken has prepared you for working at 'the edge of chaos'? What more, in your opinion, could be done?

Thank you for your assistance.

Comments.

APPENDIX D

EXAMPLES OF DATA GATHERED DURING THIS STUDY

INTERVIEW NOTES

FIELD NOTES

OBSERVATION REPORT

INTERVIEW NOTES

Name of Interviewee: Code: ...OX 16.....

Date of interview: ...17/8/4..... Place of interview: ...Telephone.....

Tape recorded: No

The aim of the interviews is to seek answers to the following question:

In the complex and chaotic environment that characterises the modern workplace, is the current approach to Competency-Based Training and Assessment appropriate to the needs of individuals and teams at ‘the edge of chaos’ and, if not, what are the gaps between what is currently being done and what must be done to facilitate the achievement of goals and objectives important to all levels of an organisation?

THE STUDY

1. What is the name of the organisation you work for and what industry group does it belong to?

Centrelink. APS

2. What is your current position and how long have you held it?

National Program Manager Business Alliances. 18 months

3. You have been selected for this research because you have undertaken a competency-based training and assessment course as part of your career development. Which course did you attend and how long ago?

Dip PM 1998-2002

4. Have you done any other competency-based courses and, if so, what were they and how long ago did you do them?

Not competency-based. Done teacher training and other management training.

Thinking about one of the competency-based training courses you have done, did you feel that the competency standards against which the training was conducted adequately covered the skills and knowledge you need to competently perform your job? If not, what was missing? Was there anything included that you don't do?

Yes. Missing was some suggestion on how to modify tools and processes to meet emerging circumstances. Even though it was competency-based it was a bit theoretical – for example it taught the PM model but real life is not like that. Training suggested that all you needed to do was plan and allocate your resources and things would happen but that isn't the way it works in real life. You might have a steady team but in real life it is different. People keep moving in and out of the team and you have to train more. You are 'constantly having to adjust the model without compromising the principles that make the model so powerful.'

The course doesn't sufficiently emphasise the dynamic relationship between managing properly and the environment in which it is applied. You try to make trade-offs and adjustments without sacrificing the guts of what you're trying to do.

5. Did you find these competency standards difficult or quiet to understand? Please give examples.

The Assessment Record Book was relatively straight forward if it is taken in its broadest meaning. Some parts, however, were hardly touched or used for example procurement. In some industries/parts of industries some parts of the standards are more important than others. But, the wording doesn't show the relevance.

6. Did you feel that the training you received against these standards adequately prepared you for the projects and work you were asked to undertake either during or after the training? If not, what other skills and knowledge have you had to learn, or to apply, to more effectively use those gained during the training? (Prompts: Communications decision-making, working with others, teamwork, leadership.)

I did the course by distance, but yes it did prepare me adequately given the earlier caveats. I got more out of it because of my other training (e.g., management). Because I'd done other training I understood how to apply, and the limitations in applying, the models covered in the course – not by rote but by judgement. Also, what helped was other training in people management, communications, change management, organisational change, customer service etc. These were complimentary to the skills

covered in the course. Now, not everyone needs them but because I had them under my belt it helped put everything into context.

7. Where and how did you acquire these?

Previous training and in the workplace. Different jobs I've had. Watching others, experience, forming networks, internal feedback loops (reflection on own performance), talking to others, reviewing situation and trying new things.

8. Thinking now about the assessment processes, what aspects of the assessment do you feel were of most benefit to you? (Prompts: Defining the exact skills and knowledge, alignment against real workplaces and situations, assessment took into account my particular situations and circumstances, it was in my own time.)

Doing the project management plan (assignments), parts of the Assessment Record Book. It was a tedious process but a good reminder of everything that I'd done. I didn't learn from the ARB but it wasn't without value. The work based assignments were very good – and here is where I did most of my learning.

9. Which aspects were least beneficial? (Prompts: Understanding what the standards were trying to say, length of time, understanding what was required, finding evidence.)

See above.

10. Thinking about other competency-based training courses you have undertaken, please consider again questions 5-10.

N/A

11. In your opinion, in what ways could these courses be improved to make them easier for you to achieve goals and objectives that are important to you and your workplace?

Over and above what's already been said, no time/resource constraints rather than one big assessment. In other programs I had a number of assessments that were iterative and cumulative – that is they were staged. For example there could have been four stages that build up knowledge through the receipt of feedback over a period of time. The first one doesn't achieve many points/marks but the idea is to get feedback and prompts on how to improve. This could be a 600 word assignment on project management and where it fits in. Feedback is received and reflected on before the

next assignment that builds up to more complex assessment, for example the Scope of a project. The next assignment could be a full project plan with the fourth assignment looking at a project that the student has worked on in the past, how it was finalised and closed out, and any lessons that could be learned from this.

12. On the attached graph, make a letter 'A' in the box that most closely describes your work environment on a quiet day. Make a letter 'B' in the box that most closely describes your work environment on your busiest days.

A – (c/d)
B – (e)

13. In broad terms, what skills and knowledge do you apply in your day-to-day work under the box with the letter 'A'?

People skills, communications, liaison and negotiations, technical skills, planning, project change management, meetings. At this level we've got more time to think about decisions and get more information before making them.

14. In applying your skills and knowledge in such an environment, whose objectives would you say you were primarily concerned with achieving?

The organisation's.

15. In broad terms, what skills and knowledge do you apply in your day-to-day work under the box with the letter 'B'?

Same as 14, just working harder. Decision making and judgement get less information and through this bring a higher level of risk.

16. In applying your skills and knowledge in such an environment, whose objectives would you say you were primarily concerned with achieving?

The organisation's – always the organisation's.

17. How do you know when you are achieving them?

NA

18. Referring back to the graph, in the environment described under the letter 'A', what skills and knowledge would you feel are most important (even though you might think that you currently do not possess them)?

Feedback from people using interpersonal skills – the nature of my work is with/through people.

19. Referring back to the graph, in the environment described under the letter 'B', what skills and knowledge would you feel are most important (even though you might think that you currently do not possess them)?

Same plus extra element of decision making and judgements.

20. Thinking back on all of the responses you've given to this research, what inferences could you draw on the way in which the training you have undertaken has prepared you for working at 'the edge of chaos'? What more, in your opinion, could be done?

It provided some really good technical skills – but that's all. And if that's all the course purports to do it did it very well – but there is a bridge between having technical skills and being able to apply them. A program of mentoring would have been helpful, that is being given support in applying the skills and knowledge back on the job. This would have topped the course off.

Thank you for your assistance.

Comments.

EXAMPLES OF FIELD NOTES

November 2003.

Observation: Individuals and teams undergoing training have difficulty contextualising the skills and knowledge being covered because of their varying understanding of their own workplace, the context in which they will be applying their new skills and knowledge, and the limitations of their own ability to learn and apply this learning in new contexts. Just saying that training has got to include context may not be enough.

Observation: The gap between knowing how to do something (and knowing how important it is that it be done) and actually doing it is broadened by many things, at the heart of which is the inability to be innovative and new within linear and non-responsive work environments. Of particular importance is the way organisations, while trying to deregulate systems and delegate authority, add more regulations and criteria than was there before. As a result the most simple systems become complicated while the most complex of systems retain responsiveness and flexibility. The trainer's job, therefore, is to limit rules and regulations (i.e., tell people what to do) and seed the gap so that people learn for themselves.

Observation: The way competency standards are written in Australia (and in many other countries) shows they are modelled around what other people have done in the past and in contexts and circumstances that they alone have encountered. To use them as the basis for measuring what others will do in the future is to support the notion of replicability. Such a notion is impossible to sustain because of the workplace reality of complexity, chaos and 'sense and respond' work requirements, which means that contexts and circumstances cannot be repeated. As a result the skills and knowledge applied by others cannot be repeated and, therefore, cannot be used as the basis for assessment. Further, the answers to every situation can't be taught, but what can be taught and thereby assessed is the way in which the questions are framed. The future is unknown at this stage but is in the future knowable and this means that the competency standards should capture not what someone will need to do in the future (because we don't know what they will need to do) but how they can shape the processes they follow to do whatever it is they will need to do in the future. This means that there must be more emphasis placed on the management, creation and transfer of knowledge than on simply what others have done in the past.

Observation: Rather than simply capture past performance competency standards should be written in such a way as to exponentially increase performance (own, team's, organisation's) to achieve growth through feedback (performance appraisal, results etc.) and dialogue. This will see competence (parts and whole, individual and organisational) change as the patterns of interactions cause the emergence of self-organising attractors. Competence is maintained and grows through contextualised

responses to actions or gestures of others. However, such growth must be motivated (by self and others) if it is to continue.

Observation: Competence to achieve individual and organisational goals is all about patterned and patterning behaviour, not predicting skills and knowledge. Can we really teach skills and knowledge when neither of them become real until they are applied?

Observation: Competence only becomes competence through the actions of others, not just self (e.g., feedback, response etc.). My model implies a steady and rational (insofar as complexity can be rationally predicted) environment where positive fractals abound and growth is encouraged through the past and present behaviours of others. But what about negative or unstable fractals (e.g., unwillingness to participate)? Will competence drop to a level of equilibrium where the new and innovative use of skills and knowledge are not only inappropriate but also discouraged?

December 2004

Observation: The following definitions appear to capture what respondents, individually and in groups, do to enhance their competence and capability:

Competence is not the possession of a set of skills and knowledge as determined in any set of competency standards, nor is it the ability to apply what one has been taught during a particular training program or course of education. It is the emergent and evolutionary ability to adapt one's skills and knowledge, no matter where they were learned, to meet emerging and ever-changing situations. Moreover, it is the ability to scrutinize these skills and knowledge to identify what one needs at any given point in time, to decide what skills and knowledge are important, what are missing, and bring into play those that have been learned in other contexts, situations and environments to fill the gaps.

Is competence, in reality, evolutionary and self-organising where trainers are required to 'seed' the gap between what a person or team knows and can do, and what they need to know and do to learn what they need to know and do at some as yet unidentified point in the future?

Evolutionary Competence.

The emergent and increasingly individual or team capability to adapt current competence to overcome complex and asymmetric situations, contexts and environments.

EXTRACT FROM OBSERVATION REPORT

Team members: (Names supplied)

Location: (Location supplied). Business services offices

Activity: Workshopping a plan for their project (major refurbishment of government department). They have been presented with a new methodology for developing project plans and were using a project they were already working on as the basis for their learning the new way of planning. All members were gathered around a flip chart. One was writing on the chart. All were contributing to conversation.

Observation/s: Slow to get started. All were senior (one was manager, another was his deputy) with one member with over 30 years experience. The most vocal one led discussion in the beginning but others eventually took over. The manager allowed others to take the lead and sat back and watched others organise the team. He contributed but didn't take the lead – allowed other to. All experienced managers and experienced in managing projects, but no-one appeared to want to take the lead. They also didn't appear to be sure how to start or how their previous/current knowledge related to what they were doing. The problem appeared to be that they were trying to do was rather than go back to scratch and try to find a way forward, they were trying to fit the new methodology over their project in its current state. They perhaps felt they could save time by not starting all over again but in the end found that this was actually wasting time – but nobody wanted to point this out (if, in fact, they new). The competency standards against which their training was conducted clearly covered this but they appeared to not want to apply them. As an observer it appeared that their position in the hierarchy was limiting their willingness to accept the need to backtrack when an impasse was experienced.

Comments: All were following the new methodology correctly but didn't appear capable of translating the competencies needed to make it work to their current situation. They had the basic skills and knowledge but were missing the heuristic

problem solving skills and strength of individual leadership that would enable them to discover what they currently don't know and, from this, learn what they needed to know to make this new methodology work. One of the first things they needed to know was where to start.

Team members: (Names supplied)

Location: (Location supplied). Business services offices

Activity: Defining the scope of their project. They have been given a very unclear task in which even the objective is obscure and ill-defined. They have been given a very broad picture of what they have to achieve but, without a clear objective, they don't know either how they're going to do this or the resources with which they need to do it. The group is meeting around some desks pushed together at one end of a training room.

Observation/s: All members of this group are lower/middle level managers. All were contributing well to the problem and have identified the need to gain a clearer understanding of the objective before they can move forward. They brainstormed a solution to this and took a number of options to their manager for confirmation. It appeared that he too was unclear about what he wanted so was pleased that they were able to tell him. They also identified a number of subsidiary objectives which, if achieved, would have wider business benefits to the department. This also helped the manager to accept their suggestion as far as the objective went. They are all quick to contribute and apply both their existing competence and any new ideas or knowledge that others (in and outside of their team) are offering. They are not trying to look at the whole picture but are taking things one step at a time – not starting at the solution and working backwards but looking for the exact problem and then working forwards.

Exactly as it says in the competency standards. They appear more willing to listen than other groups and take things one step at a time. They don't have much data to work with so their early efforts are concentrated on sourcing and gathering the information they need.

Comments: This group not only concentrated on applying the skills and knowledge detailed in the competency standards, in doing so they were better able to concentrate on those not found in the standards but essential to the work they were doing and the environment within which they were doing it. For example, the environment was devoid of knowledge about what their objective was so they found that to apply the competency standards they needed to also apply skills and knowledge in lateral thinking, leadership upwards, and creating decision making to progress their work.

Team members: (Names supplied)

Location: (Location supplied). Business services offices

Activity: Creating a training program, an activity they've carried out many times in the past but one for which they have never been trained (despite their current function as training officers). They are currently applying project management skills in their task.

Observation/s: This group was very keen and were all contributing equally to both discussions and the gathering of information about their task. There appeared to be a high level of intuition within this group which saw tasks and activities carried out without the need for discussion or allocation of responsibility. They very quickly adapted to the task and applied basic training skills (such as Nominal Group Technique, Brainstorming) to identify what they needed to do and the most appropriate means for doing it. They were very vocal, very positive, very confident,

and very motivated. This was possibly because they felt confident in their knowledge of how to gather and use data that filled the gap between what they currently knew and what they needed to know. They were constantly asking questions and then trying out different ways to achieve their objective. Feedback appeared to be very important to this group – both from outside of the team and from within it.

Comments: There was a concern at first that this group may have been acting the way they were because they knew they were being observed, however, it soon became clear that this is the way this group worked anyway. Curiosity, it appears, might be a trait that is inherent in some people but when trying to decide what one needs to know to do things differently or better it is something that needs to be learned and applied.

In another example two participants had been tasked with a project for which no-one was quite clear on what the objective was or how to achieve it. These participants sought out subject matter experts from outside of their department and through discussions with them learned both what the objective should be of their project and useful ideas on how to go about achieving it. A later review of the documentation generated by them revealed that what they had gained from the subject matter experts was not only sufficient to get them started, it also opened up their thinking to a wider range of options for consideration as part of their project.

While seeking out new information or skills from work colleagues and subject matter experts appeared to be an important element of their competence, a review of the documentation relevant to their training failed to identify where this has been detailed in the competency standards against which their training had been conducted. Without such skills the tasks carried out by individuals interviewed or observed during this study would have been that much more complex and difficult, therefore, the inclusion of the competence to seek out and gain better and more appropriate knowledge at any given time appears to be an essential, but currently overlooked, element of competent on the job performance.

Skills and knowledge noted as applied during observation study of Group 2

- Self-development (asking questions, trying ideas out on other people)
- Developing others (mentoring, coaching)
- Creating a positive work environment (making sure the work area is set up so that all of the team can contribute on the same level)
- Contributing to the planning processes (taking part in brainstorming sessions, searching for information that helps others with their planning activities)
- Challenging long-standing beliefs and paradigms (not quite arguing but close)
- Patience and stress management

APPENDIX E

GUIDE FOR CONDUCT OF FOCUS GROUPS

Purpose of Focus Groups:

To reveal a greater understanding of:

- The way in which skills and knowledge, gained as a result of a competency-based training program, are applied in complex and chaotic environments;
- what, if anything, respondents do to cover real or perceived gaps between what they've been trained to do and what they need to do on the job; and
- their personal, as well as collective, thoughts and feelings on these issues.

Discussion Guide:

1. Do you feel that the training you received adequately prepared you for the work you currently do?

Probe for descriptions of the work they do and the training they received to do it. Concentrate only on the competency-based training and not subsequent courses they've attended. How closely did the competency standards mirror the skills and knowledge that they have to apply in their workplace.

2. What other skills and knowledge have you had to learn, or to apply, to more effectively use those gained during the training?

Encourage group to discuss skills and knowledge that they've gained from other jobs, experience, other training etc. Consider lifeskills learned, for example, at school and their relevance to their current work. Seek comments on the skills and knowledge that they feel others are applying, and in particular how these affect their work.

3. What are the most important skills and knowledge you need for your job, and where did you learn them?

Consider also the skills and knowledge they needed simply to work in their workplace, for example knowledge of organisational systems, the organisation's approach to risk management, etc. Include induction and any other training.

4. How do you feel about the reward systems your organisation has in place to encourage exemplary performance on the job.

Probe for feedback on the quality of leadership in their workplace, their performance management system, obstacles (human and organisational/system) that may be in place that inhibits learning how to be better at one's job, etc.

5. Please describe how teams operate in your workplace – for example do they form naturally and work closely together or are people allocated to teams and work as individuals?

Probe for concerns about the way in which individual performance impacts on that of others, willingness to accept the opinions of others and to share leadership of tasks, individual and team ability to change quickly to meet emerging trends and situations.

6. The following issue/s has arisen from the interviews for which the researcher would like your thoughts

Describe the issue/s and get participants thoughts and feelings. Where appropriate ask for clarification of meanings in the issue and potential outcomes. Explore what this means in the context of competency-based training at the edge of chaos.

Focus group wrap-up

Title of Group:

Date conducted:

Time commenced:

Time concluded:

Number of participants:

1. What were highlights of this group? Were assumptions confirmed? Were there any surprises?
2. What issues arose during the meeting for which the moderator was not prepared? What was done to overcome them?
3. Was discussion focussed on the issues throughout the meeting? If not, why did they wander and what could have been done to prevent it?
4. How well did the group work together?
5. Did the discussion guide adequately prepare the moderator for the group? If not, what was missing?
6. Did the objectives motivate the discussion?

7. What issues appeared to be most important to the group? Which appeared to be the least important?
8. Were the objectives of the focus group achieved? If not, why not?
9. Was the environment adequate to needs?
10. What was done well? What was not done so well? What can be done better next time?

APPENDIX F

LETTER OF AGREEMENT TO CONDUCT INTERVIEWS

F-1

29 Noala Street
ARANDA ACT 2614

5th April 2004

Dear xxxx,

You may be aware that the researcher am undertaking research as part of my PhD studies into the ways in which training can be best used to help people achieve goals and objectives in complex and chaotic environments, such as those typically experienced in the aged care sector. Part of this research includes talking with staff and management about the way in which these objectives are integrated into their day-to-day activities and how they learn the skills and knowledge needed to achieve them. The purpose of this letter is to seek your approval to approach some of your staff to ask if they would participate in this research.

As you know, the skills and knowledge to do one's job in a complex environment don't always come from formal training, primarily because the training fraternity doesn't generally understand how to approach this. My research is aimed at providing them with directions on how training can be best designed so that people working in such environments can get access to greater support when it comes to their learning needs. However, the researcher firstly have to clarify exactly what these needs are and from this get a better understanding of what people are doing to learn the skills and knowledge that are not addressed during formal training.

I have attached a copy of the formal request required of a research project such as this. The researcher appreciates how busy you are but if you would like to discuss this further the researcher can be contacted on 6253 0453 or 0413 310 818.

Yours sincerely,

Phillip Rutherford

APPENDIX G

PARTICIPANT LETTER

The University of
NEW ENGLAND

School of Professional Development and Leadership
Armidale NSW 2351 Australia
Telephone (02) 6773 2581 Facsimile (02) 6773 3363
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3363

Dear xxxxxxxx,

**INVESTIGATION INTO THE APPLICATION OF COMPETENCY-BASED
TRAINING AT THE EDGE OF CHAOS**

PARTICIPANT INFORMATION SHEET

Thank you for agreeing to participate in this study. The project is being conducted by Phillip Rutherford, a PhD student at the University of New England, and is supervised by Associate Professor Larry Smith, Head of the School of Professional Development and leadership at the university.

The aim of this research is to learn the ways in which skills and knowledge are gained and used in the workplace even when formal training has not taken place. To do this we would like to ask a range of questions about the skills and knowledge you have acquired over the years and where/how you learned them. This will take the form of an interview that should take no more than 40-45 minutes to complete. If there are any issues that need clarification or points that are unclear to the interviewer we might ask to meet with you again to clear them up.

The purpose of the interviews is to elicit your views regarding effective learning on the job and any suggestions that you might have for improving the process or the support provided by trainers and educators in the future. Your participation in this project is entirely voluntary and you are free to withdraw without explanation at any time.

Information collected from interviews will be analysed and presented as an interim report to the university as part of the requirements for PhD studies. Care will be taken in preparing the report to ensure confidentiality and that no person interviewed or the organisation for which they work can be identified from the text, either directly or by implication. Interview notes will only be seen by Associate Professor Smith and will be stored in a locked cabinet at the University of New England for a period of five years at which time they will be destroyed.

Following presentation of the interim report, it is planned to develop a short questionnaire based on the key issues and suggestions identified in the document for

follow-up and/or clarification with staff. The questionnaire will seek feedback on the issues and suggestions identified in the report. A final report will then be prepared for presentation as part of the researcher's PhD thesis.

You are asked to read and sign the attached agreement form prior to our arranging a time to conduct the interview. This form is designed to protect your rights as a participant in this project. Should you have any questions in regard to this research, or its conduct, these should be directed to Phil Rutherford on 0413 310 818 (email at phil_rutherford@ozemail.com.au) or Associate Professor Larry Smith on (02) 67732806 (email larry.smith@pobox.une.edu.au).

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No HE03/088, Valid to 17/2/2005). If at any time you have concerns regarding the manner in which this research is being conducted or over the purpose to which information gained during this study will be put, you are encouraged to contact the Research Ethics Officer at the following address:

*Research Services
University of New England
Armidale, NSW 2351.
Telephone: (02) 6773 3449 Facsimile (02) 6773 3543
Email: Ethics@metz.une.edu.au*

Thank you again for agreeing to participate in this research.

Yours sincerely,

Phillip D Rutherford

Note: In this letter it states that care will be taken to ensure that participants' organisation will not be identified. Because of the difficulty in describing the context from which the data were drawn, permission was later sought from participants for their organisation to be identified.

APPENDIX H

HREC APPROVAL

Dear Phil,

It was sent to you at this address: 'phil_rutherford@metz.une.edu.au'. Don't ask me where she got it from. I do apologise for this delay.

Regards,
Fiona

Thank you for your response to the HREC conditions of approval. A constructivist approach to competency-based training in the workplace

You have met the conditions of approval in full. Your approval number is: HE03/088, valid until 17/02/2004.

The Human Research Ethics Committee may grant approval for up to a maximum of three years. For approval periods greater than 12 months, researchers are required to submit an application for renewal at each twelve-month period. All researchers are required to submit a Final Report at the completion of their project. The Renewal/Final Report Form is available at the following web address: http://rs-nt-10.une.edu.au/Home/V_2_1_eeforms.html

The NHMRC National Statement on Ethical Conduct in Research Involving Humans requires that researchers must report immediately to the Human Research Ethics Committee anything that might affect ethical acceptance of the protocol. This includes adverse reactions of participants, proposed changes in the protocol, and any other unforeseen events that might affect the continued ethical acceptability of the project.

Good luck with your research.
Belinda

Belinda Ackling
Acting Research Ethics Officer
University of New England
Armidale NSW 2351
Ph: 02 6773 3449
Fax: 02 6773 3543
E-mail: ethics@pobox.une.edu.au

APPENDIX I

INTRODUCTORY LETTER AND INFORMATION SHEET

The University of
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School of Professional Development and Leadership
Armidale NSW 2351 Australia
Telephone (02) 6773 2581 Facsimile (02) 6773 3363
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6773 3363

Dear xxxxxxxx,

INVESTIGATION INTO THE APPLICATION OF COMPETENCY-BASED TRAINING AT THE EDGE OF CHAOS

INTRODUCTORY LETTER

This letter is to request your permission to approach staff in your organisation to participate in a project which has been designed to collect and document feedback regarding the training and developmental needs of staff working in complex and dynamic work environments.

The project is being supervised by Associate Professor Larry Smith, Head of the School of Professional Development and Leadership at the University of New England, and conducted by Phillip Rutherford a PhD student at the university.

Your organisation has been identified as having undertaken competency-based training programs aimed at providing staff with skills and knowledge vital to their workplace. Our aim is to work with these people to identify ways in which their learning and knowledge has been enhanced using these processes and the skills and knowledge they have developed to employ such knowledge on the job. Any questions in regard these issues should be directed to Phil Rutherford on 0413 310 818 and Email at phil_rutherford@ozemail.com.au or Associate Professor Larry Smith on (02) 67732806 or Email larry.smith@pobox.une.edu.au.

With your permission, the researcher would like to invite a number of staff in your organisation to participate in interview and focus groups aimed at gathering feedback from them on how the processes of learning in a modern work environment work. It is anticipated that each interview will take around 45 minutes to complete. The purpose of the interviews is to elicit the views of your staff regarding effective learning on the job and any suggestions that they might have for improving the process or the support provided by trainers and educators in the future. The participation of your organisation and your staff in this project is entirely voluntary and you and they are free to withdraw from the project without explanation at any time.

Information collected from the interviews will be analysed and presented as an interim report to the university as part of the requirements for PhD studies. Care will be taken in preparing the report to ensure confidentiality and that no person interviewed or the organisation for which they work can be identified from the text, either directly or by implication. Interview notes will only be seen by Associate Professor Smith, and they will be stored in a locked cabinet at the University of New England for a period of five years and then destroyed.

Following presentation of the interim report, it is planned to develop a short questionnaire based on the key issues and suggestions identified in the document for follow-up and/or clarification with staff. The questionnaire will seek feedback on the issues and suggestions identified in the report. A final report will then be prepared for presentation as part of the researcher's PhD thesis

Should you agree to this request you are asked to read and sign the attached agreement form prior to me approaching staff of your organisation to seek their participation in an interview. This form is designed to protect your rights, and theirs, as a participant in the project.

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No HE03/088, Valid to 17/2/2005)

Should you have any concerns over the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

*Research Services
University of New England
Armidale, NSW 2351.
Telephone: (02) 6773 3449 Facsimile (02) 6773 3543
Email: Ethics@metz.une.edu.au*

Yours sincerely,

Phillip D Rutherford

APPENDIX J

PARTICIPANT CONSENT FORM

Project Title: ‘Seeding the Gap’: An Investigation into Competency-Based Training at the Edge of Chaos

Study Approval Number: HE03/088 valid to 17/2/2005

Name:

Function in study:

Contact telephone number:

I confirm that the researcher have agreed to the participation of my organisation and its staff in this study.

I confirm that the researcher understand the purposes of the study being undertaken, and the role that the researcher am to play in it.

I acknowledge that the researcher has been advised that our participation is wholly voluntary and that we may withdraw from the study at any time. The researcher also acknowledges that any information provided by or about us will be not be used for any purpose other than this study and in a final report on the research outcomes.

I understand that the outcomes of this study may be used in a later publication authored by the researchers in which the findings of the research may be detailed but will not contain any information that may identify me, my organisation or any participants in this research.

I understand that I can seek further information about the project or its progress by contacting Associate Professor Larry Smith on (02) 67732806.

Signed:

Date:

APPENDIX K

THEMES USED DURING DATA ANALYSIS

The following themes are those that were developed prior to the first round of interviews, were modified during the interviews and initial data analysis, and were eventually used as the basis for sorting and analysing the data.

FIRST DRAFT OF THEMES – DEVELOPED PRIOR TO INTERVIEWS

Theme 1

- **Label** – Positive role change to individual.
- **Definition** – The person describes changes to job or role as a positive experience.
- **Implications** – Intrinsic motivation to adapt to change and learn; positive environment for learning; organisation encourages risk taking in learning and competence.
- **Indicators** – Coded when a person responds in terms similar to following: ‘My job is important’, ‘Spending more time learning about breadth of, and possibilities within, job.’ ‘I am gaining substantial knowledge and/or satisfaction from my job.’

Theme 2

- **Label** – Skills and knowledge learned without formal training.
- **Definition** – The person describes skills and knowledge that she/he has learned through a variety of means *but not* formal training.
- **Implications** – ability/motivation to adapt to new situations and adopt new ideas and skills; skills and knowledge taught weren’t sufficient for needs; an understanding of the role knowledge plays in the application of new/more appropriate ways of doing things; risk taking supported.
- **Indicators** – Coded when a person responds: ‘Weren’t taught that.’ ‘Don’t know where the researcher learned it.’ ‘Had to learn how to apply it on the job.’
- **Exclusion** – The statement should refer to skills and knowledge that are applied to their core task or activities. They may have been learned formally in different contexts so the actual competency is not necessarily in the skills or knowledge themselves but in the skills and knowledge to transfer and apply them to new context/s.

Theme 3

- **Label** – Setting the scene for learning at ‘the edge of chaos’.
- **Definition** – Learning is described that emerges from the person’s need to ‘make sense’ of a situation to develop a response to it.
- **Implications** – Internal motivation, initiated by external factors, to learn at ‘edge of chaos’; environment supports and promotes motivation to learn; risk taking supported;
- **Indicators** – Coded when the participant mentions strategies used to intuitively make decisions or solve problems without full cognisance of all of the facts, asking others for advice and guidance on what steps to take next, trying to make sense out of what is going on.

Theme 4

- **Label** – Learning as a responsibility of others
- **Definition** – The person describes her/his own responsibility for learning as secondary to that of others (e.g., trainers, manager, clients etc.).
- **Implications** – lack of intrinsic motivation to learn or change; strong pedagogical focus; no responsibility/competence at self-learning or improvement; risk taking not supported;
- **Indicators** – Coded when the person says: ‘I haven’t learned anything new/attended training in years.’ ‘My job has not expanded or gotten any more challenging in ages.’ ‘I have no control over the outcomes my job is supposed to achieve.’ ‘I look forward to returning to more challenging work.’
- **Exclusions** – Coding is not appropriate where person is limited in what she/he can do to self-organise learning.

Theme 5

- **Label** – Negative role change to individual.
- **Definition** – The person describes their job as difficult, not desirable, or less attractive than other jobs/tasks she/he has done.
- **Implications** – Lack of satisfaction in current situation; views other jobs as more attractive; measures job (external environmental factors) against other factors; views environmental factors as reason for not progressing in competence or learning opportunities; lack of motivation to learn; inefficient change management processes in job/environment; risk taking not supported;
- **Indicators** – Coded when a person responds: ‘I am getting less satisfaction now.’ ‘My interest has waned in this job.’ ‘I am unable to stay ahead of things.’ ‘Other jobs/tasks are more exciting or interesting than this one.’
- **Exclusion** – This statement should be unqualified (i.e., no ‘probably’ or ‘maybe’).

Theme 6

- **Label** – Reactions to adversity or unfamiliar situations. Problems.
- **Definition** – The person identifies obstacles encountered that she/he was unable to overcome and, therefore, walked away from, saw him/her having to use existing skills and knowledge in new or novel situations, (i.e., limited time to learn new skills or knowledge, lack of access to training or learning opportunities, pressure from within or external to the organisation that precluded time or opportunities, etc.), or saw him/her handing responsibility over to others.
- **Implications** – Insufficient skills and knowledge to hand difficult situations; motivation to learn absent (extrinsic or intrinsic); lack of freedom to learn; inefficient change management processes; risk taking not supported;
- **Indicators** – Mentioning any of the above.

Theme 7

- **Label** – Reactions to unfamiliar situations: As a cause of introspection or growth.
- **Definition** – The person identifies situations that saw him/her having to adapt existing skills and knowledge, or adopt new skills and knowledge, to overcome old issues or to address new ones.
- **Implications** – Sufficient competence gained through self study and intrinsic motivation to learn; curiosity promoted; efficient change management processes; risk taking supported;
- **Indicators** – Coded when the person responds: ‘I figured it out.’ ‘I tried out some ideas.’ ‘I tried different ways until the researcher found one that worked.’ Any statement that indicates growth, introspection, or an increased commitment to improve oneself or one’s achievements.
-

Theme 8. (Alternative Conceptualization developed during initial data analysis)

- **Label** – Reactions to adversity enhance growth
- **Definition** – Theme 7 minus Theme 6; see above for definitions, flags/examples, and exclusions
- **Implications** – Growth occurs despite negative environmental or motivational factors; negative situations motivate growth as a challenge; intrinsic motivation to learn is enhanced through challenge; learning occurs despite lack of organisational support

Theme 9

- **Label** – Sensitivity to impact of self-learning on others
- **Definition** – The person is sensitive to impact of self-learning on the way interrelationships are formed and others go about their work.

- **Implications** – Concern for how learning and application of new skills and knowledge impacts others and their work; intuitive acknowledgement of benefits of maintaining interrelationships; willingness to accept opinions of others and to change own style to align with them; team player; however, potential lack of confidence in own competence and validity of own knowledge; individuality and individual risk taking may not be supported;
- **Indicators** – Mentions interpersonal relationships or the impact her/his work has on others. The number of times person mentions others.

Theme 10

- **Label** – Sensitivity to needs of the job.
- **Definition** – The person thinks about the needs of the job, the workplace, the organisation, or the environment/society within which the organisation exists.
- **Implications** – View is of longer-term objectives; willingness to change to meet longer-term objectives at the expense of current objectives; team player, however, individuality and individual risk taking may not be supported;
- **Indicators** – The number of times the individual mentions the job, the workplace, the organisation, or the environment/society in a positive way.
- **Exclusion** – Do not code when a mention of the above is done to situate them 9.

Theme 11 (Alternative Conceptualisation developed during data analysis)

- **Label** – Sensitivity to others versus workplace or job role.
- **Definition** – Convert Theme 9 into a ‘presence or absence’ code – was it present or not in the interview? Deduct number of times Theme 9 was mentioned from Theme 10.
- **Implications** – More attention paid to needs of the organisation than to the needs of interrelationships; preference to work closer to ‘equilibrium’ than chaos;
- **Indicators** – See Themes 9 and 10 for codes and definitions.

Theme 12

- **Label** – Internal locus of control.
- **Definition** – The person takes decisive, specific and focussed action to identify and pursue learning needs.
- **Implications** – Intrinsic motivation to learn; may be little organisational or environmental support to learning; preference for andragogy;

- **Indicators** – The person uses the pronoun ‘I’ when declaring ownership of decisions and actions towards self-learning. The person describes self-initiating learning needs analyses, learning opportunities, and confirming the appropriateness of the learning either through self-evaluation or encouraging others to provide feedback.
- **Exclusion** – Do not encode if the action is initiated by others.

THIRD AND FINAL VERSION OF THEMES

Theme 1

- **Label** – The degree to which competency standards describe the function being performed.
- **Definition** – The person describes the degree to which the standards against which her/his training was conducted described the functional requirements of the job in both stable and controlled environments and those characterised as complex and chaotic.
- **Implications** – Relevance of training to the function; impact of complex and chaotic environments on the skills and knowledge individuals and teams apply; individual’s need to adapt or adopt other skills and knowledge to do her/his job; intrinsic motivation to adapt to change and learn; positive environment for learning; organisation encourages risk taking in learning and competence.
- **Indicators** – Coded when a person responds in terms similar to following: ‘The standards/training did/didn’t describe my job.’ ‘There was a need to learn additional skills/knowledge.’ ‘I couldn’t apply to the job/task the skills and knowledge covered during the training.’ ‘I spent more time learning about breadth of, and possibilities within, my job.’ ‘Different objectives required different skills and knowledge.’ ‘I am gaining substantial knowledge and/or satisfaction from my job.’ ‘I don’t have the skills and knowledge to do my job.’ ‘I had to learn some/many things since the training.’ ‘I am unable to stay ahead of things.’ ‘Other jobs/tasks are more exciting or interesting than this one.’

Theme 2

- **Label** – Competency-based training appropriate to complex work environments
- **Definition** – The person describes the training as either appropriate or not appropriate to her/his learning needs at the edge of chaos.
- **Implications** – Lack of satisfaction in what was learned/how it was learned; views other training processes as more attractive; measures training and trainer against others; views lack of skills and knowledge as reasons for not being able to do work/ progressing in competence or learning opportunities; lack of motivation to learn.
- **Indicators** – Coded when a person responds: ‘I don’t have the skills and knowledge to do my job.’ ‘I had to learn some/many things since the training.’ ‘I am unable to stay ahead of things.’ ‘Other jobs/tasks are more exciting or interesting than this one.’
- **Exclusion** – This statement should be unqualified (i.e., no ‘probably’ or ‘maybe’).

Theme 3

- **Label** – Learning at the edge of chaos.
- **Definition** – The person identifies skills and knowledge that she/he has learned to competently perform her/his function
- **Implications** – Intrinsic motivation to learn skills and knowledge to handle difficult situations; motivated to learn; freedom to learn; sufficient competence gained through self study and extrinsic/intrinsic motivation to learn; curiosity promoted; efficient change management processes; risk taking supported;
- **Indicators** – Coded when person presents skills and knowledge learned/adapted since the training course. Growth occurs despite negative environmental or motivational factors; negative situations motivate growth as a challenge; intrinsic motivation to learn is enhanced through challenge; learning occurs despite lack of organisational support

Theme 4

- **Label** – The applicability of the complexity theories to the environment or workplace in which respondents work.
- **Definition** – The person is sensitive to degrees to which the systems, procedures and processes found within her/his workplace impact on each other and on the skills and knowledge she/he must apply to ‘make sense’ of the environment and, through this, better achieve the goals and objectives for which she/he has responsibility. Such responsibility might be direct (i.e., they have been delegated to him/her to achieve) or indirect (i.e., the work she/he does has an indirect impact on the goals and objectives others have been delegated to achieve). The person thinks about the needs of the job, the workplace, the

organisation, or the environment/society within which the organisation exists.

- **Implications** – The degree to which existing skills and knowledge need to be adapted or contextualised to meet new or unfamiliar work challenges; the type of learning that is best suited to the situation at the time (e.g., the urgency in which new ways of doing things must be learned and applied); concern for how learning and application of new skills and knowledge impacts others and their work; intuitive acknowledgement of benefits of maintaining interrelationships; willingness to accept opinions of others and to change own style to align with them; team player; degree of confidence held in own competence and validity of own knowledge; degree to which individuality and individual risk taking may be supported; individual view is of longer-term objectives and/or of objectives that may not have been apparent at the beginning of the task; willingness to change to meet longer-term objectives at the expense of current objectives.
- **Indicators** – Mentions the degree of uncertainty that exists in the workplace (e.g., uncertain goals and objectives, reliability or suitability of existing working relationships, ability of current processes and skills to meet all challenges as and when they arise) and the need to learn skills and knowledge not covered during training; interpersonal relationships or the impact her/his work has on others; the number of times person mentions the inability of self or others to achieve objectives. The number of times the individual mentions the job, the workplace, the organisation, or the environment/society in a positive way.
- **Differentiation** – Personality issues, stress,

APPENDIX L

SUMMARY OF RESPONSES

This summary of responses is in two parts:

- a. Responses to questions 14, 16, 19 and 20 of the questionnaire in which participants were asked to recall the skills and knowledge they applied on their quietest and most busiest days, and of these the ones that they felt were most important, and
- b. Responses categorized by groups.

A. RESPONSES TO QUESTIONS

Responses to question 14

The following is a list of the responses participants gave to the question: *What skills and knowledge do you apply on less chaotic days?*

Where two or more responses were exactly the same only one has been retained.

- Prioritisation and planning
- Change management
- Decision making
- Problem solving
- Reprioritising work
- Time management
- Interacting with clients
- Reprioritisation to meet client needs
- Empathy and showing understanding
- Communicating with others
- Following policies and procedures
- Interrelating with clients
- Communicating (chatting) with clients
- People management
- Client relationships
- Teamwork
- Resource allocation
- 'Fire fighting'
- Survival prioritisation
- Following up actions identified in risk management plan
- Reworking
- Recognising needs of stakeholders (eg environmental lobby, cultural heritage mob, land owners etc.)
- Liaison and negotiations
- Managing meetings.
- Maintaining balance of objectives
- Creating a sense of control and purpose Government policies and guidelines, working within them (as a Public Servant)
- Workload management
- Forming interrelationships
- Project management
- Issues management
- Following up work of others
- Planning
- Communicating (internal/external people)
- Building better understanding of 'big picture'.

- Managing and leading upwards
- Managing relationships
- Self-promotion
- Technical skills (to a lesser degree)
- Writing
- Researching
- Reasoning
- Business analysis
- Problem solving
- Networking
- People development
- People skills
- Understanding how to create a work environment
- Leadership
- Team building
- Delegation.
- Judgement
- Relationship management
- Discretion, tact
- Responsiveness.
- Leadership
- Team dynamics
- Managing more than one project at a time
- Managing upwards as well as managing their work, (as trainer)
- Setting environment where students can apply their skills and knowledge
- Doing high level strategic thinking for students
- Seriously identifying risks
- Liaising with others
- Interacting with clients and colleagues
- Building relationships with contractors and others
- Building and maintaining relationships (internal and external)
- Self-improvement
- Technical skills
- Conflict resolution
- Written and verbal communications
- Multi-tasking
- Organisational skills
- Organisational-specific competencies (especially processes and procedures)
- Customer care

Responses to question 16

The following are the responses given to question 16: *What skills and knowledge do you apply on the most hectic (chaotic) days?*

Where two or more responses were exactly the same only one has been retained.

- Survival prioritising
- Reprioritising
- Using experience to determine priorities of work
- Self control
- Delegation.
- Drawing on past experience
- Instinctively applying learning
- Using ‘sixth sense’
- Falling back on training
- Planning continuous monitoring of situations
- Applying and following procedures
- Leadership
- Decisiveness
- Keeping situation calm
- Reprioritising internally and externally set priorities Assessing priorities against all levels of objectives from immediate person’s to organisation’s.
- Prioritising
- Communications
- Time management
- Decision making.
- Time management
- Problem solving
- Teamwork
- Written and verbal communications (reporting to team leader)
- Critical decision making
- Change management
- People management (but doing it in a condensed timeframe) Managing risk insofar as deciding which priority/job must be attended to first,
- Doing more than one job at a time
- Establishing rules and responsibilities
- Self-motivation.
- Planning
- Short-term planning
- Resource allocation (especially people).
- People skills
- Understanding how to create a work environment
- Team building
- Self-motivation.
- Planning
- Short-term planning
- Resource allocation (especially people).
- People skills
- Understanding how to create a work environment
- Team building
- Delegation - but more rigidly than in less chaotic environment
- Sense of humour
- Maintaining productive environment
- Strategic thinking
- Client relationships
- Communicating with clients
- Customer service.
- Analysing
- Reacting to emerging needs
- Note taking
- Record keeping – capturing thoughts as they come along
- Being responsive to customer needs
- Maintaining control to do things
- Using experience and intuition to understand when clients are happy or not
- Monitoring and managing outcomes and requirements
- Project management
- Issues management

- Talking face to face/over the phone - establishing relationships
- Achieving results
- Dealing with the human factors
- Quick decision making
- Judgement when planning 'goes out the door'
- Determining what is important and what is not
- Understanding organisation's culture (environment)
- Internal policies, policies and procedures
- Risk management
- Technical skills
- Interpersonal skills
- Conflict resolution
- Written and verbal communications
- Multi-tasking
- Organisational-specific competencies, processes and procedures
- Team dynamics
- Customer care
- Workload management
- Time management
- Forming interrelationships
- Customer relations
- Keeping 'ahead of the game'
- Honesty
- Knowledge of (our) business
- Prioritisation - importance of and urgency in decision making
- Communicating with others
- Providing updates
- Following up work of others
- Following procedures
- Flexibility
- Risk taking
- Going the 'extra mile'
- Creativity in problem solving
- Advising rather than requesting accountability.
- Truthfulness
- Managing conflicting priorities
- Getting management to make decision on priority
- Telling clients the bad news (e.g., that their projects are slipping)
- Same as (above) just working harder
- Decision making and judgement using less information that brings with it a higher level of risk.
- Business acumen
- Contract management and administration
- Leadership and motivating others to perform

Responses to question 19

The following are the answers respondents gave to the question: *What skills and knowledge do you feel are most important on the less hectic days, even though you may not have them?*

Where two or more responses were exactly the same only one has been retained.

- Giving instructions (“Telling people to bugger off”)
- Seeking information and knowledge
- People and management skills
- Time management
- Delegation
- Keeping to routine
- Prioritising tasks
- Time management
- Workflow management
- Experience gained through life
- Common sense
- Interpersonal skills
- Leadership
- Keeping focus on the long-term objectives
- Applying a sense of purpose and urgency
- Leading people
- Self awareness, self development
- Prioritising and training others
- Preparation and planning prior to people joining (task or organisation)
- Listing tasks for them to do
- Knowing who to talk to
- General management – e.g., estimating, scheduling, resource management.
- Varying work to make it interesting
- Self-development
- Customer service
- Being visibly more proactive
- Situational awareness
- Time management and reprioritisation.
- Understanding what you’re trying to do, to achieve
- Having a clear plan.
- Feedback from people using interpersonal skills - working with/through people.
- Managing and Knowledge of relevant procedures, processes, legislation, policies, culture, structure of organisation
- Planning and catching up on unfinished work
- Reflection on what could have been done better
- Taking time to do things right
- Organisational skills.
- Customer relations
- Leading a team

Responses to question 20

The following are the answers respondents gave to the question: *What skills and knowledge do you feel are most important on the most hectic days, even though you may not have them?*

Where two or more responses were exactly the same only one has been retained.

- Keeping to routine, talking with people.
- Taking your time, reprioritisation.
- Keeping to routine
- Prioritising tasks.
- Prioritisation and decision making
- People management
- Leadership
- Teamwork
- Job/technical management
- Decision making based on risk management
- Applying best knowledge at the time.
- Strategic thinking and strategic management
- Leadership – especially keeping focus on the long-term objectives
- Applying a sense of purpose and urgency
- Leading people - all of this with focus on directing people and supervising them in their work rather than managing them.
- Prioritisation
- Judgement
- Risk management (especially when deciding when/if to cut corners).
- Communication skills.
- Written, verbal communications
- Sense of commitment
- Organisational skills
- Maintaining work momentum
- Risk taking
- Customer service
- Leading upwards
- Saying no
- Reprioritisation.
- Prioritisation – knowing and understanding the importance of a particular customer and deciding who to give the most attention to at any given time (i.e., organisational survival prioritisation)
- Understanding market dynamics.
- Basic skills because situation is in chaos
- Sorting technical from management skills - quiet if the technical skills are high because (strategic) management skills become more focussed. If technical skills are low then no sense trying to fix (strategic) management skills because this is probably not the real problem. Both technical and management competencies are needed.

B. RESPONSES CATEGORISED BY GROUPS

SKILLS AND KNOWLEDGE APPLIED ON QUIET DAYS – BY GROUP

Skills/knowledge applied		Group				
		1	2 (Inter-views)	2 (Focus group)	3	4
<i>Prioritisation and planning</i>	x	X		X	X	X
Change management		X		X		X
Decision making		X	X	X		X
Problem solving		X	X	X		X
Reprioritising		X	X	X		X
<i>Time management</i>	x	X		X	X	X
Interacting with clients		X	X		X	X
<i>Empathy</i>	x	X				
<i>Understanding (aged care only)</i>	x	X		X		
<i>Communicating with others.</i>	x	X	X	X		X
<i>Following policies and procedures.</i>	x	X			X	X
<i>People management.</i>	x		X	X		
<i>Client relationships.</i>	x	X	X	X		X
Teamwork		X	X	X	X	
<i>Resource allocation.</i>	x		X			X
Fire fighting		X	X			X
Survival prioritisation		X	X			
Managing and leading upwards			X	X	X	X
Building relationships with contractors and others		X	X	X		X
Managing relationships		X	X	X		X
Self-promotion			X			
<i>Technical skills (to a lesser degree)</i>	x	X	X	X	X	
<i>Government policies and guidelines, staying within them</i>	x		X			X
Being responsive		X	X	X		X
Applying discretion and tact		X	X			
Judgement		X	X	X		
<i>Delegation</i>	x	X	X	X		
<i>Team building</i>	x		X			
<i>Leadership</i>	x		X	X	X	
Understanding how to create a work environment			X	X	X	
People skills		X	X	X	X	
Networking			X			X
Business analysis			X	X		X
Researching			X			
Reasoning		X	X	X		
Conflict resolution		X		X	X	X
<i>Written and verbal communications</i>	x	X	X	X	X	X
<i>People development</i>	x	X	X	X		

All (skills and knowledge) contextualised within the framework of individual disciplines				X	X	X
Organisational skills (i.e., being organised).		X			X	
<i>Team dynamics</i>	x	X		X	X	
<i>Customer care</i>	x	X		X	X	X
Workload management		X		X	X	
<i>Forming relationships</i>	x	X		X	X	X
Issues management				X	X	X
Knowledge of (one's) business				X	X	X
Importance of and urgency in decision making		X			X	
<i>Providing updates and following up work of others</i>	x			X	X	
Building a better understanding of the 'big picture'					X	X
Doing high level strategic thinking for others				X	X	X
<i>Seriously identifying the risks and following up on actions identified in risk management plan</i>	x			X	X	X
Reworking				X	X	
<i>Recognising needs of stakeholders</i>	x			X	X	X
Liaison and negotiations				X	X	
<i>Meetings</i>	x			X	X	
Creating a sense of control and purpose		X		X	X	

(Total 57 – only 23 covered on course)

X Not reported as applied on busy or hectic days.

Empathy x Skills or knowledge also found in competency standards against which training program was written

SKILLS AND KNOWLEDGE APPLIED ON BUSY DAYS – BY GROUP

Skills/knowledge applied	Group					
		1	2 (Inter-views)	2 (Focus group)	3	4
Survival prioritising		X	X	X	X	X
Reprioritising		X	X	X	X	X
Using experience to determine priorities of work		X		X		
Self control		X				
Drawing on past experience		X	X			
Instinctively applying learning		X				
Using 'sixth sense'		X				
Falling back on training		X				
Planning continuous monitoring of situations.		X				
Delegation		X	X	X	X	
<i>Applying and following procedures</i>	x	X			X	
<i>Leadership</i>	x	X	X	X	X	
Decisiveness		X				
Keeping situation calm		X				
Assessing priorities against all levels of objectives from immediate person's to organisation's		X	X			
<i>Communications</i>	x	X	X	X	X	X
<i>Time management.</i>	x	X	X	X	X	X
Problem solving.		X		X		X
Teamwork		X		X		
<i>Reporting (to team leader)</i>	x	X			X	
Decision making/critical decision making			X	X	X	X
<i>Change management</i>	x		X			
People management (but doing it in a condensed timeframe)			X	X		
<i>Managing risk insofar as deciding which priority/job must be attended to first</i>	x		X	X		X
Doing more than one job at a time			X			
Self-motivation			X			
<i>Planning/short-term planning</i>	x		X			
<i>Resource allocation (especially people)</i>	x		X			X
<i>People development</i>	x		X	X		
People skills			X	X		
Understanding how to create a work environment			X	X		
Team building			X	X		
Maintaining a sense of humour			X			

Maintaining productive environment			X			
Strategic thinking (for self)			X	X		X
Client relationships and being responsive to customer needs			X	X	X	X
Analysing data and situations			X	X		
Reacting to emerging needs			X			
<i>Note taking and record keeping - capturing thoughts as they come along</i>	x		X			
Maintaining control to do things			X			
Using experience and intuition to understand when clients are happy or not			X	X		
<i>Monitoring and managing outcomes and requirements</i>	x		X			
<i>Establishing rules and responsibilities</i>	x		X			
Talking face to face or over the phone - establishing relationships			X			
<i>Achieving results.</i>	x		X			
Dealing with the human factors			X			
Judgement when planning 'goes out the door'			X	X		
Determining what is important and what is not			X			
<i>Understanding and working within an organisation's culture (environment)</i>	x		X			
<i>Internal policies, processes and procedures</i>	x		X			X
<i>Risk management</i>	x		X			
Technical skills			X	X		
Interpersonal skills			X			
Conflict resolution			X	X		X
Multi-tasking			X			
All contextualised within the framework of one's discipline			X			
Organisational skills			X			
Interrelationships			X		X	
Team dynamics.				X	X	
Workload management.				X	X	
Issues management.				X	X	
Knowledge of (one's) business.					X	
Following up work of others.				X	X	
Flexibility.					X	
Risk taking.					X	
Going the 'extra mile'.					X	
Being creative in problem solving.					X	

Advising rather than requesting accountability.					X	
Keeping 'ahead of the game'.					X	
Honesty.					X	
Truthfulness.					X	
Managing conflicting priorities					X	
Getting management to make decisions on priorities.				X	X	X
Telling clients the bad news (e.g., that their projects are slipping).		X			X	
Business acumen					X	X
<i>Contract management and administration.</i>	X				X	

(Total 76 – only 18 covered on course)

<i>Empathy</i>	x	Skills or knowledge also found in competency standards against which training program was written
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