SUPPORT DOCUMENT

Mix or match? New Apprentices' learning styles and trainers' preferences for training in workplaces

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This document was produced by the authors based on their research for the report, *Mix or match? New Apprentices' learning styles and trainers' preferences for training in workplaces*, and is an added resource for further information. The report is available on NCVER's website:
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Introduction

The Australian vocational education and training (VET) sector is committed in its *National Strategy for VET 2004-2010* to quality in teaching and learning and placing employers and individuals at the centre of training (ANTA 2003, p.12). This broad policy direction commits those involved in facilitating learning (both in institutional and workplace settings) to develop sound approaches to teaching and learning which are capably of embracing the diversity of learners in the VET sector as well as being responsive to the needs of employers. The notion of a 'learner centred' approach to VET pedagogy (CURVE/University of Ballarat 2003) has received recent prominence. One way of making this policy direction operational is attending to different learning styles[1] of students and being open-minded about employing different approaches to assist people to learn. By understanding learning preferences and taking this into account when designing teaching/training strategies and learning environments, it is suggested that improved learning outcomes will follow. This review provides an overview of the literature on learning styles/preferences and examines some of the issues relating to the research in this field. It also addresses the issue of using learning preferences as a basis for pedagogic decision-making with particular reference to literature on the application of models of learning styles in workplace settings.

Conceptualising learning styles

Learning style theory has evolved from the earlier research of psychologists who were interested in the relationship between personality and perception and mental processes including learning (for example see Cronbach & Snow 1977, Guildford 1956, Hudson 1966, Witkin, Ottman, Raskin & Karp1971). Theory development has also been concerned with identifying individual capacity for learning and how individual characteristics might explain different learning outcomes across groups of learners. In most instances, the learning that is referred to is usually 'intended learning' - that is, learning which is understood as both product and process:

> The process is adaptive, future focussed and holistic, affecting an individual's cognitive, affective, social, and moral volitional skills. The product is observable as a relatively permanent change in behaviour, or potential behaviour (Curry 1983, p. 3).

As this literature as evolved over time one of the significant features (and criticisms) of this field has been its lack pf conceptual clarity, in relation to both the meaning of key concepts and the

[1] For the purposes of this review, we follow the convention of Curry (1983) and other researchers where the term 'learning styles' is used for convenience as a term to describe the broad area of interest examining individual differences to learning, rather than a specific individual characteristic.

relationships between concepts. This lack of clarity has lead to significant differences in predictions by theorists about the nature and scope of behaviour that can be predicted from learning styles (Curry 1983, p.1).

Indeed, McLoughlin (1999) considers that one of the reasons why learning style theory is not universally accepted as useful as it might be is because it is seen as ill-defined and lacking in consistency:

> There has been a lack of confidence in learning styles research because inventories and definitions of learning styles vary and also because researchers in different traditions and contexts have addressed learning styles in unique ways (McLoughlin 1999, p.10)

Sadler-Smith (1996) argued that two aspects of individual difference can impact on learning – learning style and cognitive style. These are fundamentally different concepts, each potentially requiring different responses from teachers and trainers in their work to design and support learning.

Sadler Smith (1996a, p. 186) also asserts that each of these concepts differs in the ways in which they might be observed and quantified. Learning preferences, for example are most easily addressed since they rest on learners expressing a preference for a particular teaching method. Other constructs (learning styles, for example) may be measured directly by questionnaires while others can only be inferred through the use of psychometric tests. This line of reasoning builds on Curry's (1983) 'onion ring' model of individual differences developed from an analysis of 21 models of learning styles. This model has as its key organising constructs the ease with which each individual difference can be observed and its 'stability' (that is, the degree to which the difference might be influenced by interventions) (Curry 1983, p. 7). At the 'core' of the onion is an individual's cognitive personality style. This individual characteristic is viewed as relatively stable and is concerned with the ways in which an individual takes on and uses information. This characteristic in viewed as relatively independent of environment. The Myer Briggs Type Indicator (MBTI) is an example of a model which addresses this individual difference as part of the broader examination of personality. The middle segments of the onion model represent an individual's information processing style – that is, the cognitive approach taken by an individual when assimilating information. This characteristic is perceived to be relatively stable but able to be modified. Kolb's work on learning styles addresses this individual characteristic. The outer most segment of the onion represents an individual's instructional preferences, that is, the choices an individual might make in relation to the type of learning environment they prefer to learn in. This construct is viewed as being the least stable and the most amenable to change.

Vermunt (cited in Coffield, Moseley, Hall 7& Ecclestone 2004, p. 18) has offered an alternative way of integrating these various individual differences, dividing models of learning styles into those which examine different learning processes which are seen as relatively stable (mental learning models and learning orientations) and those which are more contextually determined (for example, processing strategies). Coffield *et al.* (2004) in their recent examination of the usefulness of learning styles to promoting effective pedagogy in the further education (FE) sector in the United Kingdom developed another typology for classifying the various learning styles models which is essentially a continuum with the main organising construct being the degree to which the authors of various models of learning styles believe that learning styles are fixed generic characteristics (Coffield *et al.* 2004, p. 20). As one moves along the continuum, authors pay greater attention to the 'dynamic interplay between self and experience', with those placed at one extreme claiming that learning styles are largely immutable and can only be 'worked with', and at the other that learning styles are the product of a range of factors (for example, motivation/environmental factors such as curriculum design etc.) (Coffield *et al.* 2004, p. 20).

Models of learning styles

Attempts to develop different models of learning styles are usually accompanied by inventories or scales which attempt to quantify these preferences. These various approaches attempt to differentiate and categorise methods of processing information (Gregorc 1979, Honey & Mumford 1986, Kolb 1985), personal differences, motivational factors (Vermunt 1994) and general neuro-physiological tendencies (Riding, Glass & Douglas 1993). The following section briefly outlines some of the main models of relevance to adult and vocational education.

Myers – Briggs

The Myers-Briggs Type Indicator (Myers 1962) is a personality rather than a learning style model, and has a robust history of use in educational and training environments. In this model, there are the following four pairs of psychological preferences (Martin 1997, Lawrence 1989):

- Extroversion – Introversion: this preference indicates where people put their attention and get their energy, whether in the outer world of people and things or the inner world of ideas and images:
    - Extraverts (E) depend on outside stimulation and interaction to engage in learning. They learn by explaining to others, they prefer to work in groups, are alert to events outside themselves, and tend to take an active, trial and error approach.
    - Introverts (I) are concentrators and reflective thinkers, as they tend to look inward for resources and cues. They like dealing with ideas, pictures, memories and reactions that are inside their heads. They prefer to work alone, or with one or two with whom they feel comfortable.
- Sensing – Intuition: this preference indicates basic learning style differences, how people prefer to take in information:
    - Sensing (S) learners like details and facts, focusing on the immediate experience. They work systematically and observe closely, prefer to learn by moving step-by-step as they engage their senses, and like to see the practical use of things.
    - Intuitive (N) learners like to stimulate their imagination, looking for patterns and to searching for possibilities. They like to organise their own learning, and are more concerned with the overall picture than with the details.
- Thinking – Feeling: this preference indicates how people like to make decisions:
    - Thinking (T) learners like to use logical analysis. They like to find the basic truth or principle to be applied, to analyse the pros and cons and then be consistent and logical in deciding. They value justice and fairness, and their thinking tends to be impersonal.
    - Feeling (F) learners like to make decisions by weighing what people care about and others' viewpoints. They are concerned with values and what is best for those involved. They like to do whatever will establish or maintain harmony, and like to work in harmonious groups.
- Judging – Perception: this preference dimension indicates how people like to live their outward life, their orientation to the outer world:

- Judging (J) learners tend to be structured, purposeful and decisive. They prefer a planned or orderly work plan, like to have things settled and organised, and to bring matters to closure.
- Perceptive (P) learners tend to be spontaneous, inquisitive and perceptive, and are flexible and adaptable. They prefer to keep all avenues open for new information. They like to understand and adapt to situations rather than organise them.

Gregorc

Gregorc's (1979) model is based on perception and ordering - how information is perceived and the way it is processed. There are four styles in this model:

- Concrete Sequential learners who focus on facts and work systematically to a timeframe. They can produce practical outcomes from abstract ideas. They prefer to work alone and they want specific instructions.
- Abstract Sequential learners who like to make in-depth examination of information and repeat tasks over and over. They like to research and analyse ideas and reason logically. They learn by observation rather than action.
- Abstract Random learners who like to listen to others. They are good at understanding the feelings and emotions of others. They work well in groups.
- Concrete Random learners who use insight and instinct to solve problems. They are quick thinkers and can develop alternative solutions. They do not like rules and regulations or strict timeframes.

Kolb

Kolb's model (1985) proposes four styles:

- Concrete experience: learners who perceive information from concrete experiences. They prefer seeing, hearing, touching and relating to people. They like practical work, experimenting and audio-visual media.
- Reflective observation: learners who process information by thinking. They reflect on their own experiences. They view things from different perspectives and they think carefully before they make a judgement. They like using logs or journals.
- Abstract conceptualization: learners who use abstract conceptualisation. They are logical, plan systematically, and act on intellectual understanding. They develop theories to explain observations. They like researching, reading and lectures.
- Active experimentation: learners who like to do things in order to understand information. They take risks and influence people and events through action. They solve problems or come to decisions by working on theories. They like case studies and simulations.

Honey-Mumford

The Honey and Mumford (1986) model is an adaptation of Kolb's model that contains four categories:

- Activist:: dynamic people who like to learn through interaction with others and learn best through audio-visual stimuli like videos, films or interactive media.

- Theorists: theory developers who analyse and prefer structured learning material and are more concerned with logical explanations than practical examples.
- Pragmatists: common-sense seekers who are both thinkers and doers. They develop theories and then test them. They learn well on-the-job and like coaching and feedback.
- Reflectors: thinkers who like to have experiences and then reflect on them. They prefer to go at their own pace and not have rigid instructions.

Gardner

Gardner (1993) proposes seven learning styles which he calls "intelligences" – these are:

- Visual/spatial learners
- Verbal/linguistic learners
- Logical/mathematical learners
- Bodily/kinaesthetic learners
- Musical/rhythmical learners
- Interpersonal learners
- Intrapersonal learners.

Vermunt

Vermunt's Inventory of Learning Styles (1994) suggests that learning styles can be categorised in a hierarchical order. He integrates four components of learning: processing strategies, regulation strategies, mental models of learning and learning orientations. From these, he identifies four learning styles:

- Undirected: failure to regulate learning or a systematic approach to learning
- Application directed: learning to solve an immediate problem
- Reproduction directed: learning to achieve a specific goal – for example, pass an exam or complete a qualification
- Meaning directed: learning for its own sake – intrinsic value.

McCarthy

McCarthy's 4MAT system (1990) brings together learning styles and preferences for using the two hemispheres of the brain. The model identifies four learning styles:

- Imaginative learners who have a preference for listening and interacting
- Analytic learners who have a preference for the 'what' of learning, preferring actions such as observing and theorising
- Common-sense learners who prefer application in their learning through actions such as experimenting
- Dynamic learners who prefer creating and taking risks.

Issues relating to the notion of learning styles

The field of learning styles is not without contestation. Apart from debates about conceptual clarity associated with learning styles and the quality (or otherwise) of models and their claims, there is also ongoing debate about the notion of learning styles providing an adequate explanation of individual differences in learning. No one theory or model is seen as providing a complete picture. There is an overarching concern that they each fails to take into consideration important factors such as the influence of the learning environment or subject area and individual theories could be seen as culture-bound or culture-specific. The following section highlights some of these concerns and issues.

Influence of socio-cultural factors

The literature reminds us that there are many other factors that are important in learning apart from learning styles. Clarke and Caffarella (2000) have emphasised the importance of broadening our perspective when considering factors affecting adult learning. They contend that individual theories clarify only certain aspects but cannot give the whole picture. They note '[t]heories [serve] as a … lens through which we view the life course; that lens illuminates certain elements and tells a particular story about adult life (Clark & Caffarella 2000, p.3).

Baumgartner (2001) proposes that there are 'four lenses through which adult development will be seen … behavioural / mechanistic, cognitive / psychological, contextual / sociocultural, and integrative' (Baumgartner 2001, p.1). She concludes that*:*

> each of the four lenses on adult development makes different assumptions. Recognizing these different outlooks on adult development broadens our perspective on adult development and its relation to practice. This awareness can lead to appropriate instruction for our students (Baumgartner 2001, p.7).

The literature indicates that the influence of socio-cultural factors leads to conflicting conclusions. A number of research findings support the notion that ethnic origin has an influence on learning style. Boyle, Duffy, Dunleavy (2003) found there were significant differences between Dutch and British students which they attributed to cultural differences. These, they suggest,

> may arise from the variety of both student-centred and teacher-centred teaching methods that students in the current [UK] study are exposed to, or may be attributable to the explicit emphasis that the Dutch educational system places on self-regulated learning (Boyle et al. 2003, p.286).

Earlier studies found that ethnic Asian and Hispanic groups to be significantly more field-dependent when compared with Anglo-Saxon English-speaking students in the USA (Castaneda, Ramirez & Herold, 1972: Kagan & Zahn, 1975; Ramirez & Price-Williams, 1974), although these findings have been challenged in that culture rather than ethnicity could be the determining factor (Knott 1991, Ogbu 1987). Boulton-Lewis and Wilss (2001) explored the educational implications of learning style for Australian Indigenous university students. They concluded that these students

> exhibited mainly a wholist dimension (Riding, 1997) that was dependent upon the activity and situation. There were also Imager aspects of the cognitive style to their informal learning (Boulton-Lewis & Wilss 2001, p. 9).

However, they report that Indigenous students have diverse thinking styles and 'essentially it seems that learning for Indigenous students is similar to that of others' (Boulton-Lewis & Wilss 2001 p.12). More recent research has indicated that, while these ethnic and cultural groups do exhibit specific learning style tendencies, there is also considerable internal variation. Drago-Severson, Helsing,

Kegan, Broderick, Popp & Portnow (2001) undertook a study of adult learners from different ethnic backgrounds in which the learners

> demonstrated a range of ways of knowing similar to the range found in previous studies with samples of native English-speaking adults with similarly widespread socio-economic status (see, for example, Kegan 1994). (Drago-Severson et al. 2001, p. 1)

Champagne and Walter (2000) suggest that the notion of learning style and its accompanying models and instruments could be culture-bound to the extent that they are less than optimal when examining Asian adult learners. In their study of Asian approaches to learning, they therefore moved away from their original idea of using Kolb's learning style inventory to a focus more on 'conceptions of teacher roles, student roles and the teaching-learning transaction' (Champagne & Walter 2000, p. 2). Further, a 2001 study by Smith which examined differences in learning behaviours in students from different Chinese national groups (students from Malaysia, Singapore and Hong Kong) provided evidence of the importance of these types of studies to control for nationality as well as ethnicity and cultural heritage, noting that different approaches to learning may be a product of social and educational experiences (Smith 2001, p. 437). What is forcefully reinforced through these studies is the importance of within-group variability. Lack of attention to this fact can lead to stereotyping and labelling of certain groups of learners with concomitant negative outcomes for learners.

Other factors that might influence learning styles

Drago-Severson *et al.* (2001) also explored the influence of level of education and found that

> … differences in complexity of learners' ways of knowing were not highly associated with level of formal education. That is, some learners with limited formal education nonetheless demonstrated developmentally complex ways of knowing (Drago-Severson et al. 2001, p.1).

This could be an important point when considering VET students, many of whom are likely to have less formal education than those going on to higher education. It cannot be assumed that VET learners will approach learning with a restricted repertoire of learning strategies on the basis of their limited formal education. Drago-Severson *et al.* concluded that this pointed to

> the need for educators to use a diversity of approaches in meeting and supporting learners with a diversity of learning needs and ways of knowing. Adult learners inevitably differ in ways that are less immediately apparent than that of more familiar pluralisms of race, gender, or age (Drago-Severson et al. 2001, p.2).

Other contextual factors also play a part in determining learning styles. It is likely, for example, that particular teaching and assessment methods affect learning styles. As Boyle *et al.* (2003) state:

> it has been suggested (Knight, 1995) that exams encourage students to 'mug up' and use a reproduction-oriented style of learning, while coursework assessments encourage students to develop a deeper understanding of course material. Consequently a meaning-directed learning style may be a better predictor of coursework marks than exam marks (Boyle et al. 2003, p.270).

Gardner and Korth (1998) investigated influence of learning styles and other contextual factors on learners' abilities to work effectively in workplace teams. They used Kolb's learning style inventory (LSI) to measure learning styles but also proposed that effective learning is a complex process affected by a number of other factors such as motivation, attitude, learning preferences, valuing others' learning styles and educational activities. They suggest that educators need to help learners to learn how to expand their learning style repertoire and to be aware of the influence of other factors on their learning. While there is no doubt that learners do have preferred learning styles, it would be

unwise to underestimate the versatility of learners, or the importance of providing learners with the opportunities to exercise a variety of learning styles.

Concerns about reliability, validity and stability

Some learning style inventories have been criticised for lack of reliability and validity (Allinson & Hayes, 1990). One critical factor seems to be that external factors, such as the learning environment, can have an influence on learning style. Boyle *et al.* (2003), when examining the validity of Vermunt's Inventory of Learning Styles, found that

> … *c*oncerns about the reliability of some of the Inventory of Learning Styles subscales indicate that further consideration should be given to clarifying and probably simplifying the constructs underlying the ILS model, focusing on the subscales which make the most useful distinctions (Boyle et al. 2003, p.287).

Their research, which compared British with Dutch learners, revealed that different learning environments had an effect on the links between components of the inventory. They suggest that 'how these may change in different educational environments ... demands further investigation' (Boyle *et al.* 2003, p.287). Since workplace environments are significantly different from classroom-based environments, the validity and reliability of learning style instruments used in the workplace cannot be assumed.

Other researchers have raised concern over the stability of Kolb's learning dimensions across time and hence their predictive validity if used to inform choices or learning environments. In comparing Felder and Silverman's Index of Learning Styles (ILS) and Honey and Mumford's Learning Styles Questionnaire (LSQ), Van Zwanenberg, Wilkinson and Anderson (2000) found that the ILS lacked internal reliability, containing a mixture of cognitive style and learning style scales, and the LSQ failed to show any strong performance as a predictive instrument. Neither instrument was judged a reliable measure.

Meta-analyses or systematic reviews of various models of learning styles have also been conducted, critiquing them in terms of their validity and reliability (Curry 1983; Coffield *et al.* 2004). Coffield and his colleagues (2004) examined over 70 models, identifying 13 as 'major' in terms of their theoretical importance to the field, the prevalence of their use and their influence (Coffield *et al.* 2004, p. 1). Of these 13 models (see table below), only three (marked with an asterisk) were able to meet criteria relating to internal consistency and test-retest reliability, construct and predictive validity, while a further three (marked with a #) met two of these criteria. While one might argue against selections of various models based on criteria such as theoretical importance or influence, Coffield *et al.* (2004) make the correct observation that many of the models of learning styles do not meet the basic criteria as measures of learning styles and hence should not be used as a basis for classifying learners or for pedagogic interventions which may neither be warranted nor helpful for student learning. They further argue that practitioners need to appraise current research evidence relating to learning styles with a critical mind, since much of the literature does not make realistic claims for their efficacy based on robust empirical studies:

> In the current state of research-based knowledge about learning styles…there is a need to be highly selective…A significant proportion of the literature on the practical uses of learning styles is not…circumspect…A thriving commercial industry has also been built… and much of it consists of inflated claims and sweeping conclusions which go beyond the current knowledge base and the specific recommendations of particular theorists (Coffield *et al.* 2004, p.36).

Models of learning styles evaluated by Coffield, Moseley, Hall and Ecclestone (2004)

Allinson and Hayes Cognitive Styles Index (CSI)*
Apter's Motivational Style Profile (MSP)*
Dunn and Dunn's model and learning styles instrument
Entwistle's Approaches and Study Skills Inventory for Students (ASSIST)#
Gregorc's Style Delineator (GSD)
Herrmann's Brain Dominance Instrument (HBDI)#
Honey and Mumford's Learning Styles Questionnaire (LSQ)
Jackson's Learning Styles Profiler (LSP)^
Kolb's Learning Style Inventory (LSI)
Myer-Briggs Type Indicator (MBTI)#
Riding's Cognitive Styles Analysis (CSA)
Sternberg's Thinking Styles Inventory (TSI)
Vermunt's Inventory of Learning Styles (ILS)*

Source: Coffield *et al*. 2004, pp.22-34 & 56-57
^This model has not been subject to independent evaluations

Felder (1996) concludes that the various models all have their strengths and weaknesses, but together can be used to improve teaching outcomes. Felder developed a learning style model and associated teaching strategies that are particularly applicable to technical and engineering learners. He researched the applications of four learning style models (Felder-Silverman, Kolb, and models based on the Myers-Briggs Type Indicator and the Herrmann Brain Dominance Instrument). His research concludes that the choice of a model is almost irrelevant. Teaching designed to address all dimensions on any of the models is likely to be effective and all of the models lead to more or less the same instructional approach.

Aligned with this thinking is the work of Sadler Smith (1996). This author proposes ways in which the experiential learning model and individual differences in cognitive styles can be accommodated in the instructional design process. This can be done by using a variety of adaptive approaches (where presentation of learning is specifically designed to take into account a learners preferred way of processing information or particular strengths and preferences in relation to learning styles) and non-adaptive approaches where cognitive difference is addressed using multiple teaching modes, within one learning package for example, or providing different packages of learning each build around a different teaching modes (Sadler-Smith 1996, p.188).

Although such criticism of learning styles models raises questions about their application, nevertheless these models have considerably advanced our understanding of how individuals approach learning and how internal and external factors affect learning strategies and outcomes. It is likely, therefore, that in exploration of workplace learning processes particularly, learning style instruments could have considerable potential as valuable tools, not only to indicate a learner's style so that learning experiences might be more appropriately designed, but also that learners can be made aware of the need to develop the learning attributes necessary for the learning environment they are in and to empower them to take control of their own learning.

Learning styles research in vocational education and training

Knaak (1983) outlined the early work in applying learning style theory to vocational education in the USA. He pointed out that there was little recognition of the importance of learning style theory among educational practitioners despite a long history of research in the area by psychologists. This lack of awareness was reported as being particularly the case in vocational education, though one of

the few researchers in the field at the time was Hill (1981) who worked on cognitive style mapping in vocational colleges in the United States. Knaak reported on a number of projects using learning styles in vocational education at the time of his writing, concluding that "the future of learning style research and application [in vocational education] is clearly promising" (Knaak 1983, p.27).

Misko (1994) provided a valuable summary of the learning style research that had taken place up to 1994. Much of the early research in learning styles was focussed on school children, although Misko found there had been some work with TAFE students in Australia. Research by Smith and Lindner (1986), in examining differences between TAFE students and university students, found significant differences between males and females. Heikkenen, Pettigrew & Zakrajesk (1985) also found similar results in an American study of university teacher trainees. Males were found to prefer working with numbers, logic, building and designing, while females favoured words, language, interacting with people and reading. Differences were also found between apprentices and university students. In particular, apprentices had a lower preference for organised coursework and explicit details on assignments and using listening as a learning mode. They had a higher preference for working with other apprentices and preferred learning by viewing illustrations, pictures or graphs. Misko questions the value of some of these findings as they "depend on the accuracy of student perceptions of their own preferences … and on how well the teachers know the students" (Misko 1994, p.32). She concludes that "[t]here is clearly a strong need to conduct more learning style research in the context of vocational education" (Misko 1994, p.39).

Since 1994 there has been more research on learning styles in vocational education although much of this is still inconclusive. The most valuable work has been undertaken by Smith and colleagues (as discussed later). Robinson and Thomson (1998, p.2) conclude that "there is not anything like the history of research and evaluation work [in VET] that underpins practices in our universities and schools". Meyer (2003) reinforces this view five years later, stating that "the research base for VET is recent, fragmented and highly dependent on case studies" (p.5).

Concerns about the application of learning styles in teaching and learning

While the quality of the evidence base for the validity and reliability of models of learning styles for the VET sector represents one strand of inquiry, another relates to outcomes of research relating to the application of learning styles by teachers and trainers in their work. A range of studies have taken up this issue.

Martin (2001) undertook a longitudinal study of small firms in the West Midlands of England, reviewing the learning styles of owner managers and key workers in each firm using the Honey and Mumford instrument together with qualitative interviewing. A relationship was found between the learning styles of the two groups, supported by a set of shared preferences and shared antipathies for the same types of learning experiences. Activists were more likely to select activists; reflectors were more likely to select reflectors. However, pragmatist or theorist owner managers were more likely to select a key worker with a different learning style. Suggestions were therefore made that owner managers' awareness of learning preferences be raised as a first step to developing better selection and learning processes within these firms. Martin concluded that a greater awareness of learning styles would improve selection and learning in small firms.

Also in the UK, Klein & Swabey (2001) studied the application of teaching strategies that took into account the learning styles of trainees in Health and Social Care and Business in a number of further education colleges in London. In these findings, the authors suggested that

> adopting a learning styles approach using the Dunn and Dunn model and instrument (PEPS) can help improve teaching and learning and can contribute to better achievement, as well as improving student enjoyment and confidence (Klein & Swabey 2001, p.1).

Earlier work in the UK also suggests that an approach which both identifies and addresses individual learning styles can improve achievement and motivation, as well as alter teacher perceptions (Klein & Swabey, 2001, p.1). Other research, particularly in the USA, shows that underachievers, drop-outs and at risk students tend to have less adaptable learning styles and are more frequently 'mismatched' to conventional teaching and environments (Klein & Swabey, 2001, p.1)

Garner (2000) warns that, although learning styles are important, they are not the only, and indeed may not be the most significant, variable for the quality of learning that takes place. Learning style is only one of a number of important factors in vocational education. Garner states:

> The underlying assumption of Kolb's (1984) learning styles is that an individual learner has a preferred approach to learning or an approach where they are more able. Although this does emphasise the strengths of an individual's approach to learning, it does undervalue or ignore the complementary abilities an individual may have (Garner 2000, p.1).

He raises the concern that Kolb's learning styles may give a false impression of an individual's learning abilities (Garner 2000, p.1). He suggests that, when a learner's other complementary abilities are taken into consideration, they may account for a greater part of their learning capacity than the dominant style alone (Garner 2000, p.1). This echoes the findings of Cronbach and Snow (1977) in their research on field-dependence and field-independence which showed that these cognitive preferences cannot be isolated from ability.

Further, there is the issue of matching teaching style with learning style. While in some cases this might be helpful, it may well not be practical and need not necessarily be in every learner's long-term interest. For example, Hansen (1997) discusses cognitive styles and how these might influence instructional design and teaching delivery in technology-based education.

> Matching students and instructors based on cognitive style, while of significant theoretical importance, may be of limited practical importance [and] may not be feasible, since few instructors have the time to develop and present the same material in different ways (Hansen 1997, p.16).

Certainly this would be true in the workplace environment where learning needs to fit in with business and production imperatives. Learners in the workplace are more likely to be successful if they have a variety of learning strategies to choose from. Hansen suggests that

> [p]roviding alternative learning strategies [to learners] has an additional long-term advantage … students will have learned how to adapt their learning to the immediate situation. Students will have learned how to learn (Hansen 1997, p.16).

While debate continues on the benefits or otherwise of matching teaching/training style and learning style (Misko 1994, pp.41-42), Hayes and Allinson (1997, p.3) have argued that 'exposing learners to learning activities that are mismatched with their preferred learning style will help them develop the learning competencies necessary to cope with situations involving a range of different learning requirements'. Opportunities for such exposure and mismatch are clearly considerable in the learning that takes place in workplaces, because the environments are far less structured and controllable than educational classrooms.

The implications of learning styles for trainers have been examined by Sadler-Smith (1996), who concludes that

> Any consideration of learners' styles should reciprocally acknowledge that individual HRD practitioners will themselves have their own personal styles which will impact on their own learning; and the training and learning methods which they adopt. Whether or not learners will benefit from a trainer of similar personal style to their own is not clear. Perfect match or

> perfect mis-match of trainer style and learner style across a group is, in any case, unlikely given the probable spread of styles with a group (Sadler-Smith 1996, pp.29-36).

The design of instructional materials is also a related issue. McLoughlin (1999) had observed that

> [m]uch empirical research signals that learning styles can hinder or enhance academic performance in several respects (Riding & Grimley 1999, Ross & Schultz 1999), although little research has been done on the relationship between instructional design of learning materials and learning styles (McLoughlin 1999, p.6).

Thus, there is clearly a need to look at how instruction is designed and delivered in terms of how learners with different learning styles will receive it and how "user friendly" it will be for them. McLoughlin believed that, rather than tailoring instruction to individual learners, more benefit could be gained by incorporating aspects of all learning styles into the design and delivery of the instruction. She believed there was mounting evidence to suggest that learners can benefit from exposure to a number of styles of instructional delivery and the opportunity to practise learning styles other than their preferred one actually helps students:

> Other research on learning styles and achievement have [*sic*] shown that teaching students how to learn and how to monitor and manage their own learning styles is crucial to academic success (Matthews 1991, Atkinson 1998, Biggs & Moore 1993) (McLoughlin 1999, p.6).

Kenyon and Hase (2001) believe that trainers need to encourage individuals to use whatever learning style they feel comfortable with and trainers should encourage learners to (re)-discover the learning techniques that they intuitively know:

> People know how to learn; they did it from birth until they went to school. It's a question of helping them remember how to do it. We need to help people have confidence in their perceptions and how to question their interpretation of reality, within a framework of competence (Kenyon & Hase 2000, p.6).

Thus, the opportunity to be exposed to and to exercise learning styles other than their preferred one can be beneficial to learners.

Despite this continued research activity, Misko's observation in 1994 about the need for more extensive research in the VET sector remains valid. The research continues to be fragmented and often contradictory. The knowledge and skill needed to navigate this field of work is considerable and, when combined with the unique and diverse features of the sector as a whole, creates the potential for a wide range of responses from teachers and trainers. This observation is further reinforced some ten years later by the work of Coffield *et al.* (2004), who argue strongly that the further education sector in the UK (like the VET sector in Australia) operates under quite different conditions from those in the self-accrediting organisations that comprise the higher education sector (where most of the research on learning styles has been conducted). The constraints of the UK further education system (embedded in compliance structures and assessment requirements, in combination with other factors such as time-poor teaching staff and large numbers of students) – not dissimilar to the VET system in Australia - mean that the chances for teachers and trainers to be responsive to learning styles might be severely limited (Coffield *et al.* 2004, p 14). The temptation in these circumstances to 'match' learning and teaching styles – sometimes on the basis of thin or highly contentious empirical evidence on various models of learning styles – is a high risk strategy. Additionally, although some research on learning styles is now happening in the VET sector, much of it is still focused on classroom-based instruction as distinct from workplace-based learning. As a learning environment, the workplace is significantly different from the educational classroom and this causes a different set of factors to bear on learner behaviours.

Learning in the workplace

In discussing the distinctions between the classroom and the workplace, Anderson (2000) draws on the work of Sefton (1995) in explaining that a major difference is the control the teacher has over the learning activities and indeed the content of the learning.

> Traditional classroom teachers , they say, generally construct the learning environments, frame the problems, develop the curriculum, learning strategies and resources, but in the workplace, teachers have virtually no control of the processes, procedures, etc. which drive production. ... Vocational teaching takes place within a changing world of work. (Anderson, 2000, p. 17)

Boud and Solomon (2001, p.327) claim that '[l]earning has escaped from the walls of the classroom and has taken on many uses, shapes and meanings'. They emphasise the importance of acknowledging that the workplace, as a learning environment, creates an altogether different scenario from that of more traditional learning settings and consequently it is necessary to analyse the differences and take these into account in our observations and research.

> The terms learning and learner are often used in research on workplace and organisational learning as if they were unproblematic … Our research illustrates that every time these words are used in workplaces, they have meanings beyond what researchers may expect (Boud & Solomon, 2001, p.331).

Chitty (2002) proposes that it is necessary to consider occupational culture, career, context and cognitive style when deconstructing learning in the workplace. For example, in many workplaces, formalised training programs are offered as part of career structures, whereas in others, although learning is going on, it is not formalised or perceived as learning. Boud and Solomon interviewed workplace learners and found that some individuals did not see learning as separate from work (Boud & Solomon, 2003, p.329).

Much has been made of flexible delivery which is aimed at facilitating work-based training and enabling workplace learners to take control of their own learning (Kenyon & Hase 2001, McLoughlin 1999). However, Smith (2001, p. 611) states that '[r]esearch focusing on learner preferences and styles also provides considerable evidence that vocational learners are not well equipped for flexible delivery'. Research has also investigated the feasibility of a range of strategies to promote learner development and workplace development within the context of flexible delivery of training in the workplace. Drawing on interviews in 12 enterprises in Victoria, Smith, Wakefield and Robertson (2002) found that organisations generally did not consider it feasible to specifically account for individual differences in learning styles and instructional preferences when developing employees more broadly or framing individual training plans (Smith *et al.* 2002, p. 48). Where acknowledgement of learning preferences was given, this was most likely to take the form of making a range of activities available in which learners could participate.

In Australia, Warner, Christie and Choy (1998) and Smith (2000, 2001) have undertaken important empirical research on the learning preferences of vocational learners. A key finding indicated that

> the majority of vocational learners in their sample were not favourably disposed towards self-directed learning. Neither were they well disposed towards forms of learning that did not include instructor provided structure and guidance (Smith 2001, p.611).

Smith (2000) has also found that apprentices favoured structured learning environments and learning through direct interaction with other learners and their instructors. They prefer hands-on experience, demonstrations and practice to lectures or 'chalk and talk'. In other research, Smith (2001) also found a preference among vocational learners for instructor-controlled, structured learning that allowed collaboration with peers and an aversion for verbal presentation of material.

In this respect, Billett's (2001) approaches to facilitating workplace learning are relevant. He highlighted four elements of collaborative and guided approaches to learning which are critically important. These include:

- having in place a logical sequence of workplace activities of increasing complexity and accountability
- making accessible to the learner the goal and product of the workplace activities
- enabling learners to be guided by more expert fellow workers, including mentors and coaches
- providing for learners to receive indirect guidance through activities like listening to and observing other workers

Also relevant to continuous workplace learning is the growing importance of working in teams and 'team learning' (Phair 2003, Dawe 2003). In particular, in particular the learning of problem-solving and decision-making skills, as well as communication skills such as dialogue, discussion and reflection, can be enhanced by the working in teams.

In exploring teaching strategies necessary to meet the new challenges of VET in Australia, Meyer (2003) suggests that

> ... [p]roject-based learning is a strategy that is clearly relevant and robust for the VET sector. It allows individual or group learning as well as being adaptable to different contexts (workplace /institutional based learning settings). It provides opportunities for learner-centred, work-centred and attribute-focused learning, potentially fostering independence, teamwork, communication, innovation etc. (p.5).

This theme of learner- and work-centred activity is also taken up by other authors. Browne and Lamb (2000) specifically consider the implications of workplace learning settings for research. When investigating learning in the workplace, they suggest:

> that the process in the workplace setting must be conceptualized as a learning process, not a teaching process; secondly, that the learning process must be embedded into the socio-cultural context in which the learning takes place; thirdly, that the kinds of activities that individuals engage in determine what they learn, and that the kind of guidance they access in that learning will determine the quality of the learning (Browne & Lamb 2000, p.546).

It is highly likely, then, that the impact of learning styles on workplace learning could be very different from their impact on classroom learning. Chappell (2003a) claims that the whole focus in the workplace changes from teaching to learning. Further, he contends that, in contemporary workplace learning, the focus shifts from developing skills to developing people:

> When workers are asked to do things differently in their work, they are also being called on to become different workers. ... This means that contemporary VET must change from a traditional focus on developing skills to an equal focus on developing people. This change of focus demands different pedagogical strategies in which learners take greater responsibility for determining what is to be learnt and are involved in all aspects of the learning process, including negotiating content, choice of learning strategy, assessment and evaluation (Chappell 2003a, p.4).

Thus the learner becomes a key player in determining learning strategy and this choice is likely to be determined, at least in part, by his/her preferred learning style. But as Chappell asserts, "work is often not organised in ways that make it learning conducive" (Chappell 2003a, p. 7). Consequently, learning strategies are likely to be constrained by what is possible rather than what would be ideal.

Thus choice of learning style will almost certainly be limited. Further, the type of learning most likely to be acceptable in the workplace is "work-conducive learning". Chappell (2003a) states that

> This kind of learning is often not guided by pre-specified content, is context bound, driven by specific and immediate work requirements and is learning that occurs at work facilitated by a number of people in the workplace (Chappell 2003a, p.7).

So although the workplace learner is likely to be more the subject of learning than the object of training, he/she is still constrained by what is considered valid knowledge and what is accepted as appropriate learning activities in the workplace environment. Chappell (2003b) elaborates this point in asserting that, when it comes to the content of workplace learning,

> ... [r]elevance no longer equates with the 'application' of knowledge to the workplace, rather the workplace itself is seen as a site of learning ... Workers in the new economy are now expected to contribute to new knowledge production within the workplace rather than merely applying existing knowledge to workplace activities (Chappell 2003b, p.7).

Chappell (2003a) also suggests that, although this shift in emphasis in VET from skills development to people development has resulted in some changes in the pattern of workplace training, vocational educators and workplace trainers have yet to change their practices sufficiently to accommodate these changes. While the workplace environment is not necessarily conducive to learning, the learning that does however take place in this environment is not typical of mainstream, classroom-based vocational education. In the workplace, learners are becoming more responsible for what and how they learn. Consequently, a workplace learner's learning style is likely to be contingent on factors related to the workplace as a learning environment as well as factors internal to the learner:

> Learning and being a learner can be understood as a strength for the organization and for the individual … however … being identified as a learner … a novice … or a person who has yet to be accepted as a fully functioning worker … can present a challenge … Being a learner is a risky business as it can position one apart from the group (Boud & Solomon, 2003, p.330).

Conclusion

Learning style theory has a relatively long history. There has been an evolution from the theories that imply individuals have a relatively stable preferred learning style, to more complex theories that acknowledge the influence of external factors such as socio-cultural background and learning environment or problem type. The reliability, validity and stability of learning style inventories has been challenged but, despite their limitations, considerable research has shown that they have proven valuable in progressing our knowledge of how individuals approach learning, and the relationship between some learning styles and preferred learning strategies.

In the practical application of learning style theory, there has similarly been a shift from an emphasis on matching teaching/training style to learning style in order to improve learning outcomes, towards providing understandings of learning styles as one of a number of individual and contextual factors that impact on the ways learners engage with learning. Learning style research specifically in VET started relatively late, but it is now established as a field in its own right and has revealed that, particularly in the case of workplace learning as distinct from classroom learning, a number of new dynamics are likely to be significant. Meyer (2003), in describing Billett's (2001) model of workplace learning, notes

> on the one hand the workplace with its norms, values, activities etc. affording certain learning opportunities, and on the other hand, an individual's personal knowledge including values, histories, ways of knowing that affect .....the extent to which the workplace supports or

> inhibits individuals engaging in learning through work and the extent to which individuals avail themselves of opportunities to participate (Meyer 2003, p.10).

In order to further our understanding of learning in the workplace, a valuable line of inquiry can be pursued which brings together the notion of learning preferences (as one of the identifiable individual characteristics) of workplace learners and the workplace trainers' actions that assist these learners to engage effectively in learning in the workplace. This line of inquiry forms the starting point for this current study.

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Appendix B: Interview protocols

Interview schedule: apprentices / trainees

[Introductions, tape recorder – needs only to be used for questions 1-4 and 8]

Positioning questions

1. How long have you been an apprentice/trainee?

2. Where have you been working during that time?

3. Who have you been working with?

4. Have you been going to TAFE, separate classes at the workplace, group-training company, or other off-job training provider?

5. This question focuses on how you prefer to do things.

For each of the following sets of two statements, please tell me which one describes you best *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each description and tick one description per line).*

___ I like action and variety	___ I like quiet and time to consider things
___ I like to do mental work by talking to people	___ I like to do mental work privately before talking
___ I act quickly, sometimes without much reflection	___ I may be slow to try something without understanding it first
___ I like to see how other people do something, and to see results	___ I like to understand the idea of something, and to work alone or with just a few people
___ I want to know what other people expect of you	___ I want to set your own standards
___ I like to use eyes and ears and other senses to find out what's happening	___ I like to use imagination to come up with new ways to do things, new possibilities
___ I dislike new problems unless there are standard ways to solve them	___ I like solving new problems, and dislike doing the same thing over again
___ I enjoy using skills already learned more than learning new ones	___ I like using new skills more than practising old ones
___ I pay most attention to experience as it is	___ I pay most attention to the meanings of facts and how they fit together

___ I are patient with details, but impatient when the details get complicated	___ I are impatient with details, but don't mind complicated situations
___ I like to decide things logically	___ I like to decide things with personal feelings and human values, even if they aren't logical
___ I want to be treated with justice and fair play	___ I like praise, and like to please people, even in unimportant things
___ I may neglect and hurt other people's feelings without knowing it	___ I are aware of other people's feelings
___ I give more attention to ideas or things than to human relationships	___ I can predict how others will feel
___ I don't need harmony	___ I get upset by arguments and conflicts – you value harmony
___ I like to have a plan, to have things settled and decided ahead	___ I like to stay flexible and avoid fixed plans
___ I try to make things come out the way they "ought to be"	___ I deal easily with unplanned and unexpected happenings
___ I like to finish one project before starting another	___ I like to start many projects but may have trouble finishing them all
___ I usually have my mind made up	___ I am usually looking for new information
___ I may decide things too quickly	___ I may decide things too slowly
___ I want to be right	___ I want to miss nothing
___ I live by standards and schedules that are not easily changed	___ I live by making changes to deal with problems as they come along

6. This question asks you to think about the type of work environment that you prefer. Please tell me, using the scale of 1 to 4 (where 1 is low and 4 is high), what your preference is for each statement *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each statement and tick interviewee's stated preference).*

I prefer a work environment that …	High 4	 3	 2	Low 1
allows me to work in privacy and uninterrupted				
allows space and time for reflection				
encourages and supports autonomy				
fosters my independence				
has a personal feel to it				
has efficient systems and people				
has people who are compatible				
has people who are sensitive				
includes competent people				
includes effective and productive people				
includes people who are adaptable				
includes people who are appreciative				
includes tough minded people				
is calm and quiet				
is challenging				
is change orientated				
is colourful				
is flexible				
is friendly				
is harmonious				
is not constrained				
is people orientated				

I prefer a work environment that …	High 4	3	2	Low 1
is physically appealing				
is structured				
allows for privacy				
is efficient				
is lively				
is action orientated				
is unstructured				
is orderly				
is supportive				
is task orientated				
offers variety and challenge				
provides me with opportunities to solve new problems				
provides opportunities for creativity				
rewards decisiveness				
rewards independence				
rewards risk taking				
values ideas				
provides stability and predictability				
and where …				
co workers are courteous				
I am encouraged to express myself				
I am unconstrained by rules				
I can focus on technical details				
I have security				

I prefer a work environment where …	High 4	3	2	Low 1
I have some flexibility in the way I do the job				
people and systems are goal orientated				
people are conscientious and working on well structured tasks				
people are conscientious, cooperative and focused on helping others				
people are cooperative and quietly enjoy their work				
people are decisive and focused on implementing long-term goals				
people are focused on action and what is happening now				
people are focused on changing things for the good of others				
people are hard working and focused on facts and results				
people are imaginative and focused on what might be possible				
people are independent thinkers and focused on solving complex problems				
people are pleasant and committed				
people are strongly focused on ideals/values that are about making a difference to people				
people work on models to solve complex problems				
the focus is on efficiency				
there are rewards for meeting goals				
there is a focus on providing service				
there is not a lot of bureaucracy				
there is some time for fun				
we work on projects				

7. This question asks you to think about the ways you prefer to learn while you are at work. Please indicate what your preference is for each statement and how often it is happening at your workplace *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each statement and tick interviewee's stated preferences).*

I prefer to learn when / where …	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
there are opportunities for me to have my competence formally tested (to count towards my qualification) at work								
the trainers are well trained								
there are opportunities for me to talk to my employer / trainer about what I would like to learn								
there is time allowed for me to practise the skills I am learning in the workplace								
I have the opportunity to attend workshops and classes								
there are opportunities for me to try out the skills and ideas I have learned from my off-site training (if applicable)								
trainers / employers correct my mistakes								
trainers / employers take time to talk to me about my job								
trainers / employers take time to listen to any concerns and difficulties I might be having in the workplace								
there are people who are selected especially to help me with my learning at work								
I am provided with opportunities to work on my own								

I prefer to learn when / where …	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
Trainers /employers help me to solve problems that occur in the workplace								
trainers /employers are interested about my future in the workforce								
I have opportunities to ask questions of other workers								
my employer / trainer plans work so that I am able to work at a level that best fits with my level of experience								
my employer / trainer organises work so that I can work at my own pace								
I am encouraged to take on more difficult and complex tasks over time								
I am given feedback and encouragement about my work performance								
I am challenged to come up with new or different ways of doing things in the workplace								
I have opportunities to talk with my employer /trainer about what I am learning in my off-the-job training (if applicable)								
I am given opportunities to share my ideas and learning with other people who work with me								

I prefer to learn when / where …	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
My employer / trainer acknowledges that I am at work to learn as well as work								
I am aware of exactly what is required of me when I am formally assessed at work								
I am able to be formally assessed when I feel I am ready								
I am provided with opportunities to learn about why things are the way they are, as well as how things work or are done in my workplace								
I have a good relationship with the people who are training me in the workplace								

8. Please complete the following:

(a) For me, learning in the workplace means ……

(b) I learn best in the workplace when …….

(c) I prefer my employer / workplace trainer to ……

9. Gender

_____ male _____ female

10. Age bracket

_____ under 20 years

_____ 20 – 25 years

_____ 26 – 35 years

_____ 36 – 45 years

_____ 46 – 55 years

_____ 56 – 65 years

_____ over 65 years

Thank you…conclude interview.

Interview schedule: workplace trainers / employers

[Introductions, tape recorder – needs only to be used for questions 1-5 and 9]

Positioning questions

1. How long have you been employed in this industry?

2. Where have you been working during that time?

3. How long have you been training apprentices/trainees?

4. How many apprentices / trainees have you worked with during that time?

5. How long has … *[name of apprentice/trainee interviewed]* … been with you?

6. This question focuses on how you prefer to do things.

For each of the following sets of two statements, please tell me which one describes you best *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each description and tick one description per line*).

___ I like action and variety	___ I like quiet and time to consider things
___ I like to do mental work by talking to people	___ I like to do mental work privately before talking
___ I act quickly, sometimes without much reflection	___ I may be slow to try something without understanding it first
___ I like to see how other people do something, and to see results	___ I like to understand the idea of something, and to work alone or with just a few people
___ I want to know what other people expect of you	___ I want to set your own standards
___ I like to use eyes and ears and other senses to find out what's happening	___ I like to use imagination to come up with new ways to do things, new possibilities
___ I dislike new problems unless there are standard ways to solve them	___ I like solving new problems, and dislike doing the same thing over again
___ I enjoy using skills already learned more than learning new ones	___ I like using new skills more than practising old ones
___ I pay most attention to experience as it is	___ I pay most attention to the meanings of facts and how they fit together
___ I are patient with details, but	___ I are impatient with details,

impatient when the details get complicated	but don't mind complicated situations
___ I like to decide things logically	___ I like to decide things with personal feelings and human values, even if they aren't logical
___ I want to be treated with justice and fair play	___ I like praise, and like to please people, even in unimportant things
___ I may neglect and hurt other people's feelings without knowing it	___ I are aware of other people's feelings
___ I give more attention to ideas or things than to human relationships	___ I can predict how others will feel
___ I don't need harmony	___ I get upset by arguments and conflicts – you value harmony
___ I like to have a plan, to have things settled and decided ahead	___ I like to stay flexible and avoid fixed plans
___ I try to make things come out the way they "ought to be"	___ I deal easily with unplanned and unexpected happenings
___ I like to finish one project before starting another	___ I like to start many projects but may have trouble finishing them all
___ I usually have my mind made up	___ I am usually looking for new information
___ I may decide things too quickly	___ I may decide things too slowly
___ I want to be right	___ I want to miss nothing
___ I live by standards and schedules that are not easily changed	___ I live by making changes to deal with problems as they come along

7. This question asks you to think about the <u>type of work environment</u> that you prefer. Please tell me, using the scale of 1 to 4 (where 1 is low and 4 is high), what your preference is for each statement *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each statement and tick interviewee's preference)*

I prefer a work environment that …	High 4	3	2	Low 1
allows me to work in privacy and uninterrupted				
allows space and time for reflection				
encourages and supports autonomy				
fosters my independence				
has a personal feel to it				
has efficient systems and people				
has people who are compatible				
has people who are sensitive				
includes competent people				
includes effective and productive people				
includes people who are adaptable				
includes people who are appreciative				
includes tough minded people				
is calm and quiet				
is challenging				
is change orientated				
is colourful				
is flexible				
is friendly				
is harmonious				
is not constrained				
is people orientated				
is physically appealing				
is structured				
allows for privacy				
is efficient				
is lively				
is action orientated				

I prefer a work environment that …	High 4	3	2	Low 1
is unstructured				
is orderly				
is supportive				
is task orientated				
offers variety and challenge				
provides me with opportunities to solve new problems				
provides opportunities for creativity				
rewards decisiveness				
rewards independence				
rewards risk taking				
values ideas				
provides stability and predictability				
and where …				
co workers are courteous				
I am encouraged to express myself				
I am unconstrained by rules				
I can focus on technical details				
I have security				
I have some flexibility in the way I do the job				
people and systems are goal orientated				
people are conscientious and working on well structured tasks				
people are conscientious, cooperative and focused on helping others				
people are cooperative and quietly enjoy their work				
people are decisive and focused on implementing long-term goals				
people are focused on action and what is happening now				
people are focused on changing things for the good of others				
people are hard working and focused on facts and results				

I prefer a work environment where …	High 4	3	2	Low 1
people are imaginative and focused on what might be possible				
people are independent thinkers and focused on solving complex problems				
people are pleasant and committed				
people are strongly focused on ideals/values that are about making a difference to people				
people work on models to solve complex problems				
the focus is on efficiency				
there are rewards for meeting goals				
there is a focus on providing service				
there is not a lot of bureaucracy				
there is some time for fun				
we work on projects				

8. This question is asking you to think about the ways you prefer to help others to learn in the workplace. Please indicate what your preference is for each statement and how often it is happening at your workplace *(interviewer to hand out a copy of this question for the interviewee to sight the statements; interviewer to read each statement and tick interviewee's stated preferences).*

I prefer to help others to learn where / when….	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
I can talk with the apprentice / trainee to work out what they know and do not know								
I can come to agreement with the apprentice / trainee about the sorts of activities, time and/or resources they need to learn the job								
I can work out learning goals with the apprentice / trainee								
I can tell the apprentice / trainee stories about work (for example, what has happened to you in the past, interesting things about the job etc.)								
I can go to events (such as training sessions, conferences) with the apprentice / trainee								
I am doing the same task with the apprentice / trainee								
I can organise tasks so that they match the apprentice / trainee's ability, skill, experience levels								
I can ask other workers in the workplace to help the apprentice / trainee to learn their job								

I prefer to help others to learn where / when….	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
I can organize time so that the apprentice / trainee can go an talk with, observe or interact with other workers								
I can organize tasks so that the apprentice / trainee can tackle tasks they can manage on their own								
I can talk with external training providers								
I can negotiate access to learning resources for the apprentice / trainee								
I can modify what's happening at work so that it fits more closely with what's happening in the formal training program that the apprentice / trainee is completing								
I can talk to the apprentice / trainee about the differences between what happens and work and what they might experience in a training program about their work								
I can gradually get the apprentice / trainee to increase the number and complexity of the tasks they do over time								

I prefer to help others to learn where / when….	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
I can talk to the apprentice / trainee while we are working about how the tasks fit with what they might be learning in an off-the-job training program								
I can make time to help the worker to learn								
I can organise the way tasks are done so that the apprentice / trainee is able to learn as they work								
I can make judgments about how fast or slow the pace of work needs to be so that the apprentice / trainee is able to keep up								
I can make judgments about how to balance the needs of the apprentice / trainee to learn and getting the job done								
I can monitor the work flow and quality of the apprentice / trainee's performance as the job/task proceeds								
I can discuss learning experiences with the apprentice / trainee as I am working with them								
I can correct mistakes in a way that will help the apprentice / trainee to learn								

I prefer to help others to learn where / when….	Your preference?				How often is this happening in your workplace?			
	High 4	3	2	Low 1	All / most of the time 4	Often 3	Sometimes 2	Hardly at all / it's not 1
I can organize meetings so that apprentice / trainee is able to share what they are doing with others								
I can make links between what the apprentice / trainee is currently doing and other (related) tasks or jobs								
I can give feedback to the apprentice / trainee on how they are going								
I can show the apprentice / trainee how to do tasks								

9. Please complete the following:

(a) For me, learning in the workplace means……..

(b) I believe that apprentices learn best where / when……

(c) When I am helping them to learn, I believe that the trainee / apprentice I work with prefers me to……

10. Gender

_____ male _____ female

11. Age bracket

_____ under 20 years

_____ 20 – 25 years

_____ 26 – 35 years

_____ 36 – 45 years

_____ 46 – 55 years

_____ 56 – 65 years

_____ over 65 years

Interviewer to record:

Industry _____ Size of enterprise_____

Thank you…conclude interview.

Appendix C: Further data

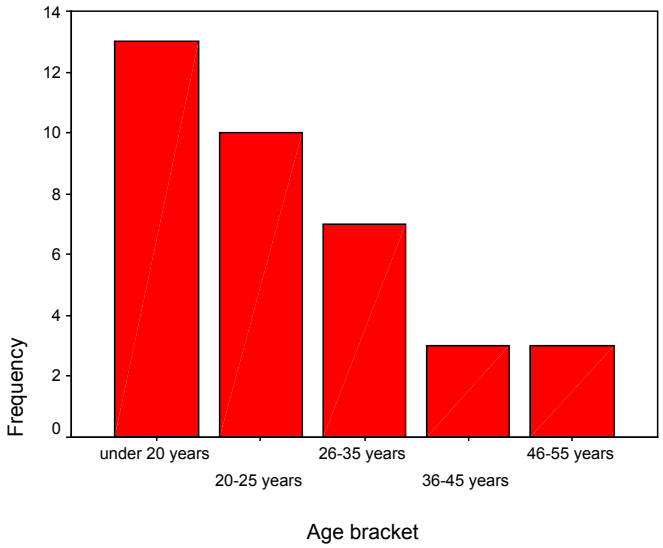


Figure 1: Age distribution of the apprentices

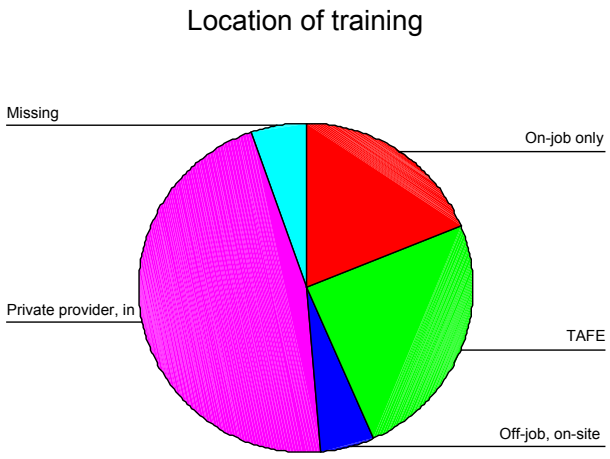


Figure 2: Location of the training of the apprentices

Figure 3: Age distribution of the trainers

Table 1: Percentages of intuitive-feeling (NF) in selected occupations entered in the CAPT database

Counsellors: vocational and educational (43.98%)	Teachers: adult education (21.93%)
Teachers: health (38.57)	ENGINEERS - all (19.98%)
Teachers: junior college (34.40%)	Engineers: mechanical (19.48%)
Teachers high school (34.21%)	Food service workers (16.96)
Teachers: university (32.73%)	Teachers: trade, industrial and technical (16.81%)
Nursing educators (32.13%)	Teachers: coaching (14.63%)
TEACHERS - all (30.96%)	Professional, technical & kindred workers, miscellaneous (14.63%)
NURSES - all (29.00%)	Public service aides and community health workers (10.50%)
Nurses: aides, orderlies, attendants (26.75%)	Sales agents, retail trade (10.45%)
SALES WORKERS - all (25.09%)	Service workers (10.06%)
HEALTH SERVICE WORKERS - all (24.56%)	Factory and site supervisors, miscellaneous (7.69%)
Sales clerks, retail trade (24.07%)	

Source: extracted from Myers & McCaulley, 1985, *pp. 257-259.*

Table 2: Personality types of apprentices matched with those of their trainers

Identity number	Apprentices' personality type	Trainers' personality type	Dimensions in common
1	INFP	INTJ	I N
2	ESFJ	ENFP	E F
3	ENFP	INFJ	N F
4	INTJ	INFJ	I N J
5	ENTJ	INFP	N
6	INFP	INFP	I N F P
7	INFJ	INFP	I N F
8	INTP	INTP	I N T P
9	ESTP	ENFP	E P
10	ENFJ	INFJ	N F J
11	ESFJ	ENFP	E F
12	ESFP	ENFP	E F P
13	ESFJ	ENFP	E F
14	ISFJ	INFP	I F
15	ISFJ	INFP	I F
16	ENFJ	ENFP	E N F
17	ENTP	ENFP	E N P
18	ESFP	ENTP	E P
19	ENFP	ENFP	E N F P
20	INTJ	ENFP	N
21	ENFJ	INFP	N F
22	INFP	ENFP	N F P
23	ESTJ	ENFP	E
24	ENTJ	I/ENTP	E N T
25	INFJ	ENTP	N
26	ISFJ	ENTP	
27	ENTP	INTP	N T P
28	ENTP	ENFP	E N P
29	INTP	ENFP	N P
30	ENTP	ENFP	E N P
31	ENTP	INFP	N P
32	ESTP	ESTJ	E S T
33	ESFP	ISFP	S F P
34	ESFP	ENFP	E F P
35	ENFJ	ISFP	F
36	ENFJ	ENFP	E N F

* Shaded types are repeats of the participant immediately above, having the same trainer or apprentice

Table 3: Apprentices' and trainers' scores and rankings on preferred work environments (in order for each group)

Apprentices				Trainers			
Item no.	Item	Score	Rank	Item no.	Item	Score	Rank
26	is efficient	125	1	6	has efficient systems and people	110	1
3	Encourages and supports autonomy	123	2	9	Includes competent people	110	1
49	people are conscientious, cooperative and focused on helping others	123	2	10	Includes effective and productive people	110	1
16	is change orientated	121	4	11	Includes people who are adaptable	109	4
62	there is a focus on providing service	121	4	19	is friendly	108	5
31	is supportive	120	6	39	values ideas	108	5
11	Includes people who are adaptable	119	7	31	is supportive	107	7
57	people are pleasant and committed	119	7	62	there is a focus on providing service	107	7
39	values ideas	118	9	49	people are conscientious, cooperative and focused on helping others	106	9
45	I have security	118	9	26	is efficient	104	10
41	co-workers are courteous	116	11	33	offers variety and challenge	104	10
8	Has people who are sensitive	115	12	57	people are pleasant and committed	104	10
54	people are hard working and focused on facts and results	115	12	41	co-workers are courteous	103	13
7	Has people who are compatible	114	14	3	Encourages and supports autonomy	102	14
46	I have some flexibility in the way I do the job	114	14	46	I have some flexibility in the way I do the job	102	14
53	people are focused on changing things for the good of others	114	14	22	is people orientated	101	16
4	Fosters my independence	112	17	34	provides me with opportunities to sole new problems	100	17
24	is structured	112	17	64	there is some time for fun	100	17
50	people are cooperative and quietly enjoy their work	112	17	7	Has people who are compatible	99	19
12	Includes people who are appreciative	111	20	20	is harmonious	99	19
22	is people orientated	111	20	4	Fosters my independence	98	19
58	people are strongly focussed on ideals/values that are about making a difference to people	111	20	15	is challenging	98	19

Apprentices				Trainers			
35	provides opportunities for creativity	110		18	is flexible	98	19
2	Allows space and time for reflection	109		35	provides opportunities for creativity	98	19
18	is flexible	109		42	I am encouraged to express myself	97	25
34	provides me with opportunities to sole new problems	109		50	people are cooperative and quietly enjoy their work	96	
40	provides stability and predictability	109		51	people are decisive and focused on implementing long term goals	96	
48	people are conscientious and working on well structured tasks	109		36	rewards decisiveness	95	
64	there is some time for fun	109		5	Has a personal feel to it	94	
1	Allows me to work in privacy and uninterrupted	108		53	people are focused on changing things for the good of others	94	
6	Has efficient systems and people	108		58	people strongly focussed on ideals/values that making a diff to people	94	
14	is calm and quiet	108		12	Includes people who are appreciative	92	
27	is lively	108		30	is orderly	92	
33	offers variety and challenge	108		37	rewards independence	92	
42	I am encouraged to express myself	108		55	people are imaginative and focused on what might be possible	92	
47	people and systems are goal orientated	108		47	people and systems are goal orientated	91	
52	people are focused on action and what is happening now	108		54	people are hard working and focused on facts and results	91	
60	the focus is on efficiency	108		28	is action orientated	90	
15	is challenging	107		61	there are rewards for meeting goals	90	
61	there are rewards for meeting goals	107		16	is change orientated	89	
28	is action orientated	106		21	is not constrained	89	
30	is orderly	106		27	is lively	89	
32	is task orientated	106		48	people are conscientious and working on well structured tasks	89	
9	Includes competent people	105		60	the focus is on efficiency	88	
10	Includes effective and productive people	105		65	we work on projects	88	
55	people are imaginative and focused on what might be possible	105		45	I have security	87	

Apprentices				Trainers			
56	people are independent thinkers and focused on solving complex problems	105		52	people are focused on action and what is happening now	87	
5	Has a personal feel to it	104		56	people are independent thinkers & focused on solving complex problems	87	
17	is colourful	104		63	there is not lot of bureaucracy	86	
36	rewards decisiveness	104		40	provides stability and predictability	83	
51	people are decisive and focused on implementing long term goals	104		24	is structured	82	
63	there is not lot of bureaucracy	104		44	I can focus on technical details	82	
19	is friendly	103		38	rewards risk taking	80	
37	rewards independence	103		8	Has people who are sensitive	79	
65	we work on projects	103		2	Allows space and time for reflection	76	
23	is physically appealing	101		23	is physically appealing	76	
20	is harmonious	97		25	allows for privacy	73	
21	is not constrained	97		32	is task orientated	73	
25	allows for privacy	97		13	Includes tough minded people	72	
44	I can focus on technical details	97		59	people work models to solve complex problems	72	
13	Includes tough minded people	88		17	is colourful	70	
59	people work models to solve complex problems	88		43	I an unconstrained by rules	70	
38	rewards risk taking	77		14	is calm and quiet	67	
43	I an unconstrained by rules	76		1	Allows me to work in privacy and uninterrupted	64	
29	is unstructured	52		29	is unstructured	51	

Table 4: Apprentices' workplace preferences by industry (ranked in each case)

Manufacturing			Community services			Retail		
Item no.	Item	score	Item no.	Item	score	Item no.	Item	score
26	is efficient	49	57	people are pleasant and committed	44	57	people are pleasant and committed	34
31	is supportive	48	11	includes people who are adaptable	44	49	people are conscientious, cooperative and focused on helping others	34
34	provides me with opportunities to sole new problems	48	26	is efficient	43	45	I have security	34
33	offers variety and challenge	47	12	includes people who are appreciative	42	11	includes people who are adaptable	34
3	encourages and supports autonomy	47	62	there is a focus on providing service	42	3	encourages and supports autonomy	34
49	people are conscientious, cooperative and focused on helping others	47	58	people strongly focused on ideals/values that making a diff to people	42	62	there is a focus on providing service	33
24	is structured	47	49	people are conscientious, cooperative and focused on helping others	42	39	values ideas	33
8	has people who are sensitive	46	41	co-workers are courteous	42	26	is efficient	33
64	there is some time for fun	46	31	is supportive	42	16	is change oriented	33
62	there is a focus on providing service	46	16	is change oriented	42	50	people are cooperative and quietly enjoy their work	32
16	is change oriented	46	3	encourages and supports autonomy	42	35	provides opportunities for creativity	32
18	is flexible	46	20	is harmonious	41	4	fosters my independence	32
54	people are hard working and focused on facts and results	46	53	people are focused on changing things for the good of others	40	60	the focus is on efficiency	31
46	I have some flexibility in the way I do the job	46	45	I have security	40	58	people strongly focused on ideals/values that making a diff to people	31
48	people are conscientious and working on well structured tasks	45	40	provides stability and predictability	40	54	people are hard working and focused on facts and results	31
39	values ideas	45	39	values ideas	40	53	people are focused on changing things for the good of others	31

Manufacturing			Community services			Retail		
2	allows space and time for reflection	45	7	has people who are compatible	40	42	I am encouraged to express myself	31
60	the focus is on efficiency	44	6	has efficient systems and people	39	27	is lively	31
14	is calm and quiet	44	52	people are focused on action and what is happening now	39	22	is people orientated	31
41	co-workers are courteous	44	22	is people orientated	39	14	is calm and quiet	31
45	I have security	44				12	includes people who are appreciative	31
44	I can focus on technical details	44				8	has people who are sensitive	31
						7	has people who are compatible	31

Table 5: Trainers' workplace preferences by industry (ranked in each case)

Manufacturing			Community services			Retail		
Item no.	Item	Score	Item no.	Item	Score	Item no.	Item	Score
26	is efficient	49	11	Includes people who are adaptable	44	3	Encourages and supports autonomy	34
31	is supportive	48	57	people are pleasant and committed	44	11	Includes people who are adaptable	34
34	provides me with opportunities to solve new problems	48	26	is efficient	43	45	I have security	34
3	Encourages and supports autonomy	47	3	Encourages and supports autonomy	42	49	people are conscientious, cooperative and focused on helping others	34
24	is structured	47	12	Includes people who are appreciative	42	57	people are pleasant and committed	34
33	offers variety and challenge	47	16	is change orientated	42	16	is change orientated	33
49	people are conscientious, cooperative and focused on helping others	47	31	is supportive	42	26	is efficient	33
8	Has people who are sensitive	46	41	co-workers are courteous	42	39	values ideas	33
16	is change orientated	46	49	people are conscientious, cooperative and focused on helping others	42	62	there is a focus on providing service	33
18	is flexible	46	58	people strongly focussed on ideals/values that making a diff to people	42	4	Fosters my independence	32
46	I have some flexibility in the way I do the job	46	62	there is a focus on providing service	42	35	provides opportunities for creativity	32
54	people are hard working and focused on facts and results	46	20	is harmonious	41	50	people are cooperative and quietly enjoy their work	32
62	there is a focus on providing service	46	7	Has people who are compatible	40	7	Has people who are compatible	31
64	there is some time for fun	46	39	values ideas	40	8	Has people who are sensitive	31
2	Allows space and time for reflection	45	40	provides stability and predictability	40	12	Includes people who are appreciative	31
39	values ideas	45	45	I have security	40	14	is calm and quiet	31
48	people are conscientious and working on well structured tasks	45	53	people are focused on changing things for the good of others	40	22	is people orientated	31
14	is calm and quiet	44	6	Has efficient systems and people	39	27	is lively	31

Manufacturing			Community services			Retail		
41	Co-workers are courteous	44	22	is people orientated	39	42	I am encouraged to express myself	31
44	I can focus on technical details	44	52	people are focused on action and what is happening now	39	53	people are focused on changing things for the good of others	31
45	I have security	44	8	Has people who are sensitive	38	54	people are hard working and focused on facts and results	31
60	the focus is on efficiency	44	9	Includes competent people	38	58	people strongly focussed on ideals/values that making a diff to people	31
1	Allows me to work in privacy and uninterrupted	43	21	is not constrained	38	60	the focus is on efficiency	31

Table 6: Apprentices' preferences for learning environment at work (ranked in order of strength of preference)

I prefer to learn when / where …	Apprentices' preferences (means)
The trainers are well trained	3.81
I have a good relationship with the people who are training me in the workplace	3.81
Trainers/employers correct my mistakes	3.75
My employer/trainer acknowledges that I am at work to learn as well as work	3.67
There is time allowed for me to practise the skills I am learning in the workplace	3.58
Trainers/employers take time to talk to me about my job	3.58
Trainers/employers take time to listen to any concerns and difficulties I might be having in the workplace	3.58
I am given feedback and encouragement about my workplace performance	3.58
I am encouraged to take on more difficult and complex tasks over time	3.54
There are opportunities for me to talk to my employer/trainer about what I would like to learn	3.53
There are opportunities for me to try out the skills and ideas I have learned from my off-site training (if applicable)	3.50
I have opportunities to ask questions of other workers	3.50
Trainers/employers help me to solve problems that occur in the workplace	3.47
Trainers/employers are interested about my future in the workforce	3.47
I am provided with opportunities to learn about why things are the way they are as well as how things work or are done in my workplace	3.44
I am given opportunities to share my ideas and learning with other people who work with me	3.39
I am exactly aware what is required of me when I am formally assessed at work	3.37
I am able to be formally assessed when I feel I am ready	3.34
My employer/trainer plans work so that I am able to work at a level that bests fits with my level of experience	3.31
I am provided with opportunities to work on my own	3.19
There is an opportunity for me to have my competence formally tested (count towards qualification) at work	3.14
There are people who are selected especially yo help me with my learning at work	3.14
I am challenged to come up with new or different ways of doing things in the workplace	3.14
I have opportunities to talk with my employer/trainer about what I am learning in my off-job training (if applicable)	3.06
My employer/trainer organises work so that I can work at my own pace	3.00
I have the opportunity to attend workshops and classes	2.97

Table 7: Apprentices' preferred learning environment (significant differences)

By industry:

- There are opportunities for me to talk to my employer/trainer about what I would like to learn. The community services apprentices (mean 3.92) reported a stronger preference for such opportunities than those in retail (mean 3.60) and manufacturing (mean 3.14). (X^2=11.88, df=4, significance=.018)

- I am provided with opportunities to learn about why things are the way they are as well as how things work or are done in my workplace. The community services apprentices (3.83) reported a stronger preference for such opportunities than those in manufacturing (mean 3.43) and retail (mean 3.00). (X^2=12.95, df=4, significance=.012)

- I am exactly aware what is required of me when I am formally assessed at work. The community services apprentices (mean 3.92) reported a far stronger preference for wanting to know what is required in formal assessment at work than those in either retail (mean 3.20) or manufacturing (mean 2.86). (X^2=17.65, df=6, significance=.007)

- I have opportunities to talk with my employer/trainer about what I am learning in my off-job training - how often is this happening in your workplace? The community services apprentices (2.83) reported that they had far more such opportunities than those in either manufacturing (mean 2.21) or retail (mean 1.60). (X^2=16.97, df=6, significance=.009)

- I am able to be formally assessed when I feel I am ready - how often is this happening in your workplace?. The community services apprentices (mean 2.92) reported that they were more available opportunities to be formally assessed when they are ready than those in retail (mean 2.40) and manufacturing (mean 2.07). (X^2=14.85, df=6, significance=.021)

By gender:

- I am exactly aware what is required of me when I am formally assessed at work. Females (mean 3.94) reported a much stronger preference for wanting to know what is required in formal assessment at work than did males (mean 2.94). (X^2=9.46, df=3, significance=.024)

- I am provided with opportunities to learn about why things are the way they are as well as how things work or are done in my workplace – how often is this happening in your workplace? Males (mean 3.00) reported that they were more such opportunities provided in their workplace than did females (mean 2.89). (X^2=11.26, df=3, significance=.010)

Table 8: Trainers' preferences for training environment at work (ranked in order of strength of preference)

I prefer to help others to learn where / when …	Trainers' preferences Means
I can correct mistakes in a way that will help the apprentice/trainee to learn	3.86
I can give feedback to the apprentice/trainee on how they are going	3.84
I can ask other workers in the workplace to help the apprentice/trainee to learn their job	3.78
I can make time to help the apprentice/trainee learn	3.78
I can organise tasks so that they match the apprentice/trainee's ability, skill experience levels	3.76
I can organise the way tasks are done so that the apprentice/trainee is able to learn as they work	3.76
I can talk with the apprentice/trainee to work out what they know and do not know	3.73
I can monitor the work flow and quality of the apprentice/trainee's performance as the job/task proceeds	3.70
I can make judgements about how to balance the needs of the apprentice/trainee to learn and getting the job done	3.70
I can organise tasks so that the apprentice/trainee can tackle tasks they can manage on their own	3.68
I can show the apprentice/trainee how to do tasks	3.62
I can gradually get the apprentice/trainee to increase the number and complexity of the tasks they do over time	3.60
I can organise time so that the apprentice/trainee can go and talk with, observe or interact with other workers	3.54
I can discuss learning experiences with the apprentice/trainee as I am working with them	3.51
I can make judgements about how fast or slow the pace of work needs to be so that the apprentice/trainee is able to keep up	3.49
I can come to agreement with the apprentice/trainee about the sorts of activities, time and / or resources they need to learn the job	3.46
I can work out learning goals with the apprentice/trainee	3.43
I can talk to the apprentice/trainee about the difference between what happens at work and what they might experience in a training program about their work	3.35
I can talk with external training providers	3.34
I can negotiate access to learning resources for the apprentice/trainee	3.32
I can talk to the apprentice/trainee while we are working about how the tasks fit what they might be learning in an off-job training program	3.27
I can tell the apprentice/trainee stories about work	3.24
I can make links between what the apprentice/trainee is doing and other (related) tasks or jobs	3.11
I can organise meetings so that apprentice/trainee is able to share what they are doing with others	3.08
I am doing the same task with the apprentice/trainee	3.03
I can modify what's happening at work so that it fits more closely with what is happening in the formal training program that the apprentice/trainee is completing	3.03
I can go to events with the apprentice/trainee	2.73

Table 9: Trainers' preferred training environment (significant differences)

By industry:

- I can go to events with the apprentice (means: community services 3.46, retail 2.56, manufacturing 2.20) (X^2=12.65, df=6, significance=.049)
- I can organise tasks so that they match the apprentice's ability, skill experience levels – how often is this happening in your workplace? (means: community services 3.69, manufacturing 3.53, retail 2.67) (X^2=17.75, df=4, significance=.001)
- I can talk to the apprentice about the difference between what happens at work and what they might experience in a training program about their work (means: community services 3.62, retail 3.44, manufacturing 3.07) (X^2=10.84, df=4, significance=.028) – **and** how often is this happening in your workplace? (means: community services 2.92, retail 2.44, manufacturing 2.13) (X^2=13.66, df=6, significance=.034
- I can negotiate access to learning resources for the apprentice (means: community services 3.54, retail 3.44, manufacturing 3.07) (X^2=17.11, df=6, significance=.009) – **and** how often is this happening in your workplace? (means: community services 2.92, retail 2.22, manufacturing 2.07) (X^2=13.68, df=6, significance=.033)
- I can make time to help the apprentice learn – how often is this happening in your workplace? (means: manufacturing 3.27, community services 3.08, retail 2.89) (X^2=13.58, df=6, significance=.035)
- I can make judgements about how fast or slow the pace of work needs to be so that the apprentice is able to keep up – how often is this happening in your workplace? (means: community services 3.39, retail 2.89, manufacturing 2.67) (X^2=18.63, df=6, significance=.005)
- I can gradually get the apprentice to increase the number and complexity of the tasks they do over time – how often is this happening in your workplace? (means: manufacturing 3.40, retail 2.89, community services 2.46) (X^2=14.58, df=6, significance=.024)

By gender:

- I can show the apprentice how to do tasks. Females (mean 3.78) reported a stronger preference for showing apprentices how to do tasks than did males (mean 3.47). (X^2=10.91, df=3, significance=.012)
- I can make judgements about how fast or slow the pace of work needs to be so that the apprentice is able to keep up. Females (mean 3.83) reported a stronger preference for making judgements about how fast or slow the pace of work needs to be than did males (mean 3.16). (X^2=8.11, df=2, significance=.017)
- I can negotiate access to learning resources for the apprentice. Females (mean 3.56) reported a far stronger preference for negotiating access to learning resources for apprentices than did males (3.11). (X^2=12.68, df=3, significance=.005)
- I can go to events with the apprentice. Females (mean 3.11) reported a stronger preference for going to events with apprentices than did males (mean 2.37). (X^2=7.83, df=3, significance=.050)

- I can talk to the apprentice about the difference between what happens at work and what they might experience in a training program about their work – females (mean 3.67) reported a stronger preference for talking to the apprentice about such differences than did males (3.05) (X^2=7.91, df=2, significance=.019) – **and** how often is this happening in your workplace? – females (mean 3.06) judged that there was far more such talking in their workplaces about differences than did males (1.95). (X^2=12.30, df=3, significance=.006)

- I can discuss learning experiences with the apprentice as I am working with them – how often is this happening in your workplace?. Males (mean 2.84) judged that there was more discussing of learning experiences with apprentices than did females (mean 2.78). (X^2=6.72, df=2, significance=.035)

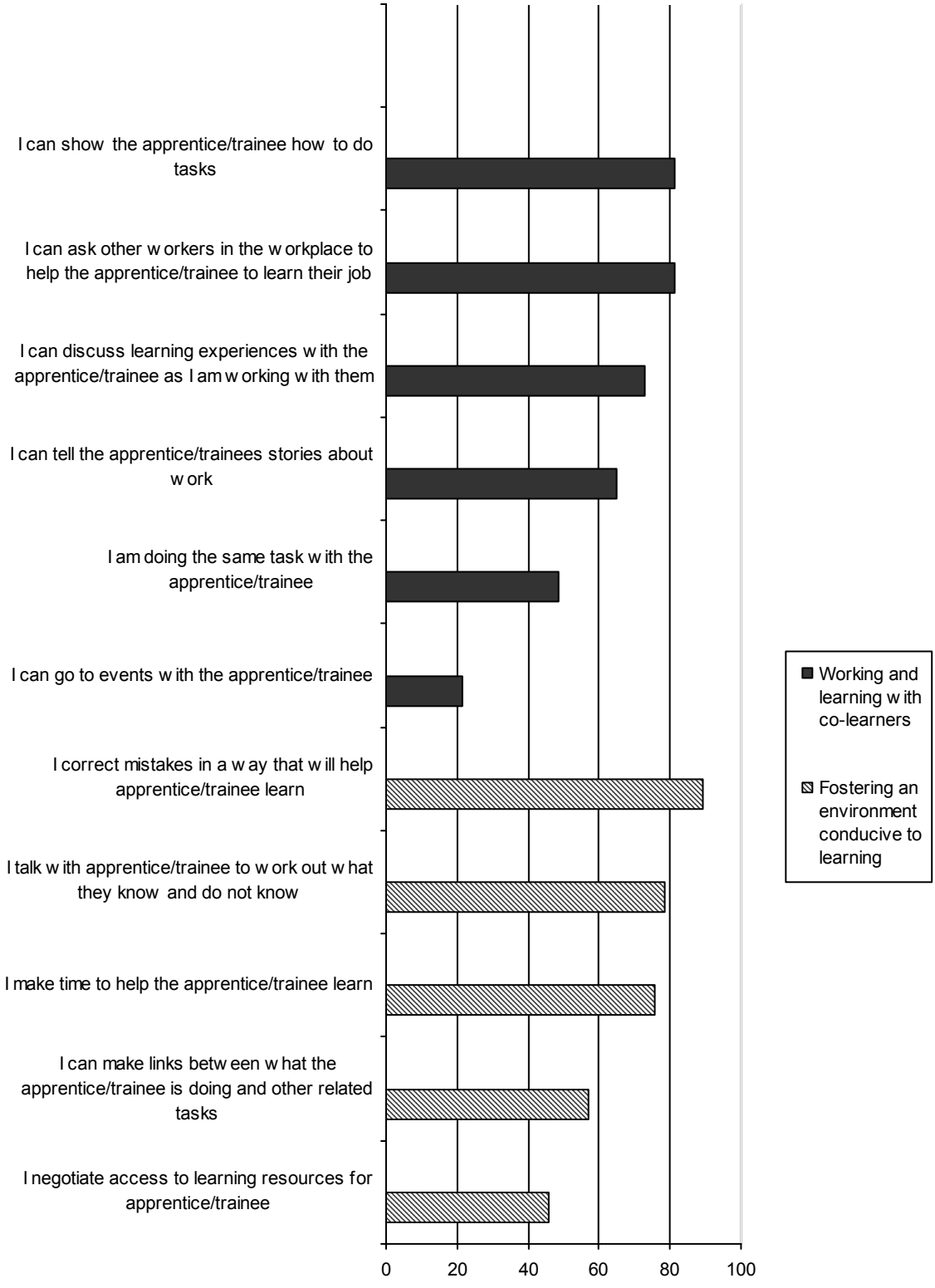
Table 10: Apprentices' judgements on how often their learning preferences were happening at their workplaces (ranked by frequency)

I prefer to learn when / where …	Apprentices' preferences (means)	How often is this happening in your workplace? (means)
I have a good relationship with the people who are training me in the workplace	3.81	3.53
The trainers are well trained	3.81	3.50
I have opportunities to ask questions of other workers	3.50	3.36
Trainers/employers correct my mistakes	3.75	3.31
My employer/trainer acknowledges that I am at work to learn as well as work	3.67	3.20
Trainers/employers take time to listen to any concerns and difficulties I might be having in the workplace	3.58	3.17
There is time allowed for me to practise the skills I am learning in the workplace	3.58	3.11
Trainers/employers help me to solve problems that occur in the workplace	3.47	3.11
Trainers/employers are interested about my future in the workforce	3.47	3.03
I am given feedback and encouragement about my workplace performance	3.58	3.00
I am given opportunities to share my ideas and learning with other people who work with me	3.39	2.92
There are opportunities for me to talk to my employer/trainer about what I would like to learn	3.53	2.91
I am exactly aware what is required of me when I am formally assessed at work	3.37	2.88
Trainers/employers take time to talk to me about my job	3.58	2.86
I am provided with opportunities to learn about why things are the way they are as well as how things work or are done in my workplace	3.44	2.86
My employer/trainer plans work so that I am able to work at a level that bests fits with my level of experience	3.31	2.83
I am provided with opportunities to work on my own	3.19	2.83
I am encouraged to take on more difficult and complex tasks over time	3.54	2.80
My employer/trainer organises work so that I can work at my own pace	3.00	2.75
There are opportunities for me to try out the skills and ideas I have learned from my off-site training (if applicable)	3.50	2.73
There are people who are selected especially to help me with my learning at work	3.14	2.67
I have the opportunity to attend workshops and classes	2.97	2.63
I have opportunities to talk with my employer/trainer about what I am learning in my off-job training (if applicable)	3.06	2.53
I am able to be formally assessed when I feel I am ready	3.34	2.51
There is an opportunity for me to have my competence formally tested (count towards qualification) at work	3.14	2.47
I am challenged to come up with new or different ways of doing things in the workplace	3.14	2.33

Table 11: Trainers' judgements on how often their training preferences were happening at their workplaces (ranked by frequency)

I prefer to help others to learn where / when …	Trainers' preferences Means	How often is this happening in your workplace? Means
I can correct mistakes in a way that will help the apprentice/trainee to learn	3.86	3.51
I can show the apprentice/trainee how to do tasks	3.62	3.43
I can organise tasks so that they match the apprentice/trainee's ability, skill experience levels	3.76	3.38
I can give feedback to the apprentice/trainee on how they are going	3.84	3.35
I can ask other workers in the workplace to help the apprentice/trainee to learn their job	3.78	3.35
I can organise the way tasks are done so that the apprentice/trainee is able to learn as they work	3.76	3.30
I can monitor the work flow and quality of the apprentice/trainee's performance as the job/task proceeds	3.70	3.30
I can organise tasks so that the apprentice/trainee can tackle tasks they can manage on their own	3.68	3.24
I can make judgements about how to balance the needs of the apprentice/trainee to learn and getting the job done	3.70	3.22
I can gradually get the apprentice/trainee to increase the number and complexity of the tasks they do over time	3.60	3.14
I can make time to help the apprentice/trainee learn	3.78	3.11
I can talk with the apprentice/trainee to work out what they know and do not know	3.73	3.11
I can discuss learning experiences with the apprentice/trainee as I am working with them	3.51	3.08
I can organise time so that the apprentice/trainee can go and talk with, observe or interact with other workers	3.54	3.00
I can make judgements about how fast or slow the pace of work needs to be so that the apprentice/trainee is able to keep up	3.49	2.97
I can come to agreement with the apprentice/trainee about the sorts of activities, time and / or resources they need to learn the job	3.46	2.97
I can tell the apprentice/trainee stories about work	3.24	2.84
I can make links between what the apprentice/trainee is doing and other (related) tasks or jobs	3.11	2.68
I am doing the same task with the apprentice/trainee	3.03	2.51
I can talk to the apprentice/trainee about the difference between what happens at work and what they might experience in a training program about their work	3.35	2.49
I can work out learning goals with the apprentice/trainee	3.43	2.46
I can talk to the apprentice/trainee while we are working about how the tasks fit what they might be learning in an off-job training program	3.27	2.46
I can negotiate access to learning resources for the apprentice/trainee	3.32	2.41
I can talk with external training providers	3.34	2.28
I can organise meetings so that apprentice/trainee is able to share what they are doing with others	3.08	2.24
I can modify what's happening at work so that it fits more closely with what is happening in the formal training program that the apprentice/trainee is completing	3.03	2.16
I can go to events with the apprentice/trainee	2.73	1.81

Figure 4: Trainer preferences for features of the training environment at work and frequency of them happening in their workplaces - clustered by function



Trainer preferences for features of the training environment at work and frequency of them happening in their workplaces - clustered by function (continued)

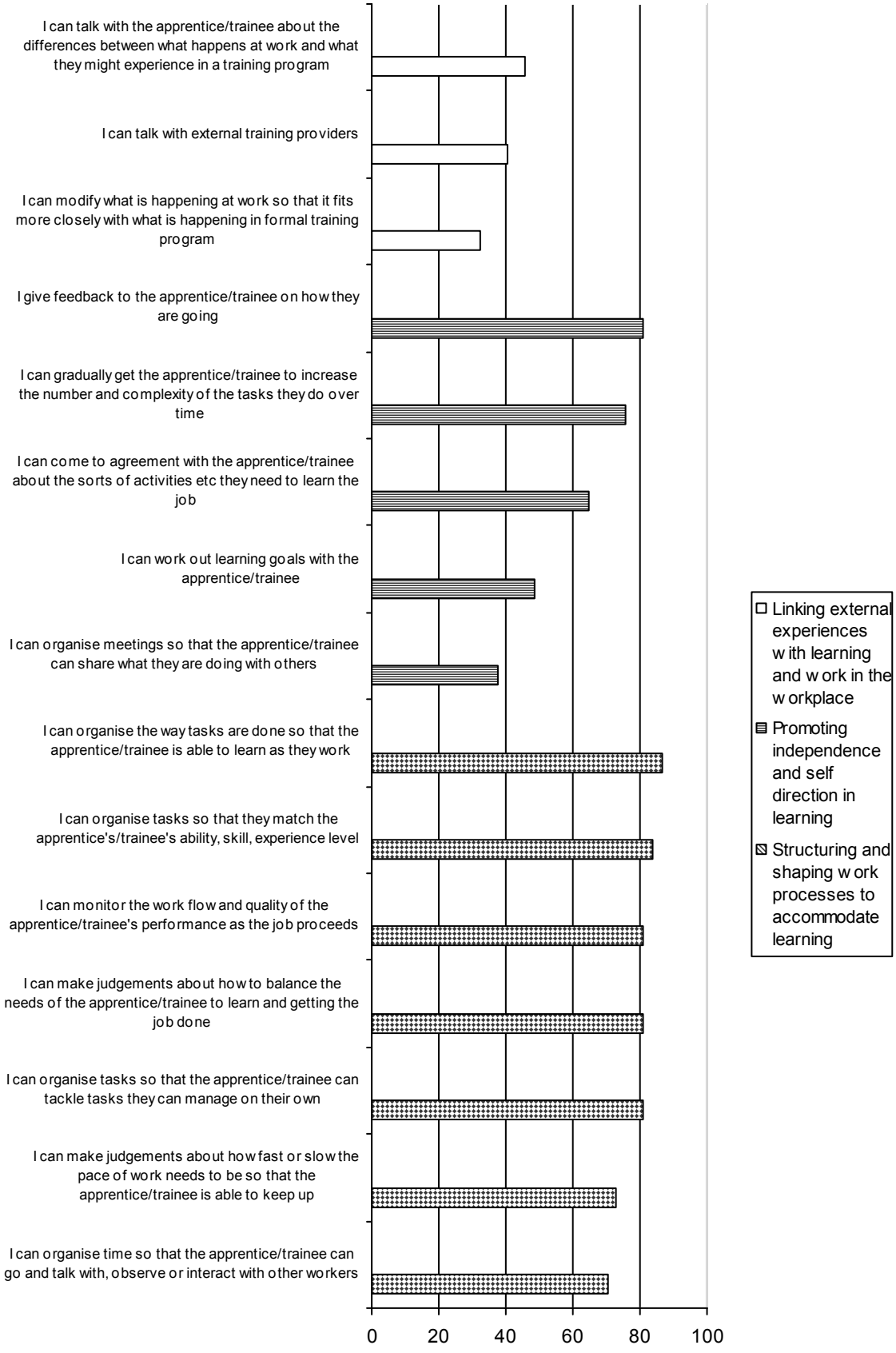
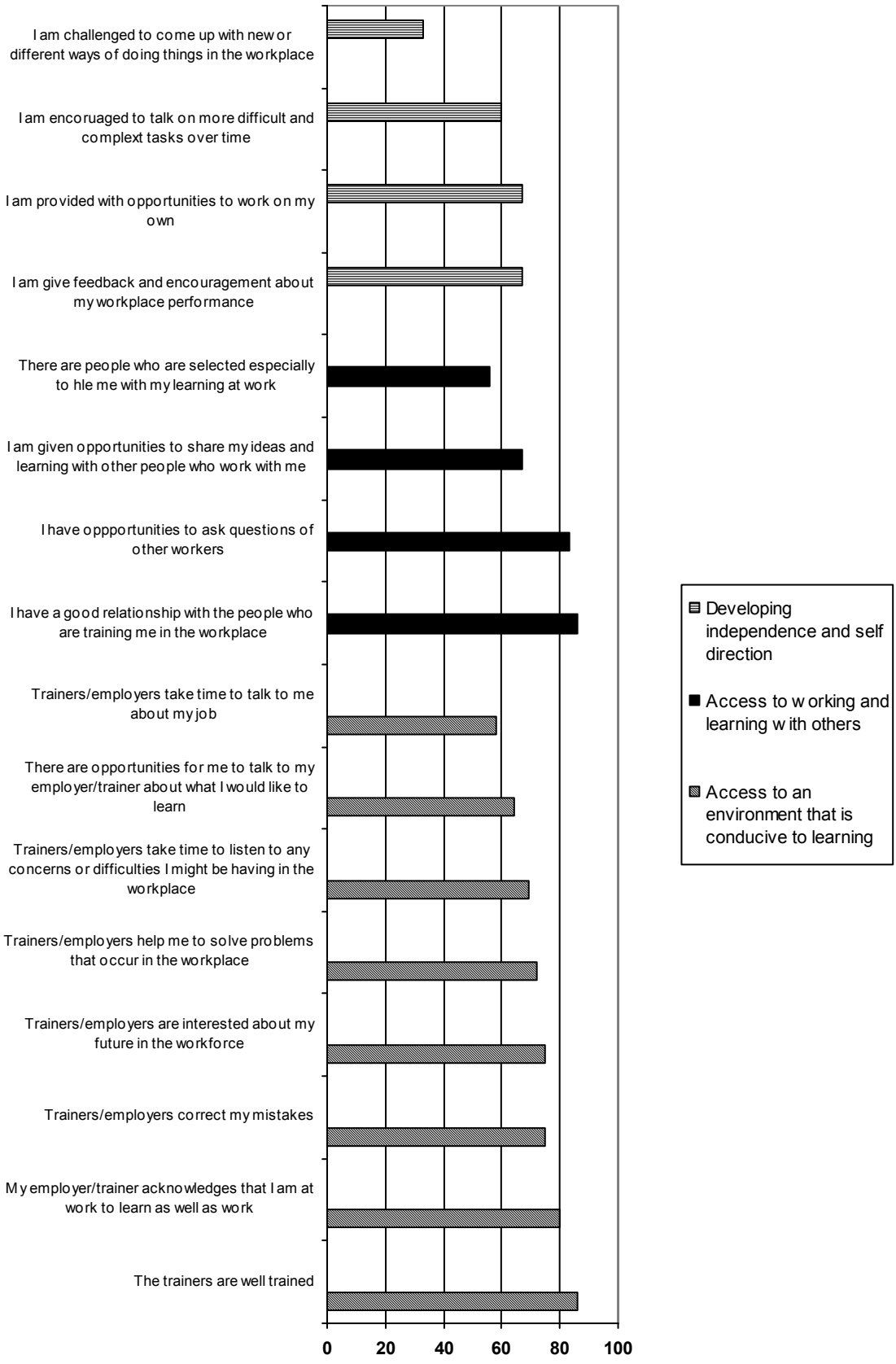

I can talk with the apprentice/trainee about the differences between what happens at work and what they might experience in a training program
I can talk with external training providers
I can modify what is happening at work so that it fits more closely with what is happening in formal training program
I give feedback to the apprentice/trainee on how they are going
I can gradually get the apprentice/trainee to increase the number and complexity of the tasks they do over time
I can come to agreement with the apprentice/trainee about the sorts of activities etc they need to learn the job
I can work out learning goals with the apprentice/trainee
I can organise meetings so that the apprentice/trainee can share what they are doing with others
I can organise the way tasks are done so that the apprentice/trainee is able to learn as they work
I can organise tasks so that they match the apprentice's/trainee's ability, skill, experience level
I can monitor the work flow and quality of the apprentice/trainee's performance as the job proceeds
I can make judgements about how to balance the needs of the apprentice/trainee to learn and getting the job done
I can organise tasks so that the apprentice/trainee can tackle tasks they can manage on their own
I can make judgements about how fast or slow the pace of work needs to be so that the apprentice/trainee is able to keep up
I can organise time so that the apprentice/trainee can go and talk with, observe or interact with other workers
0
20
40
60
80
100
Linking external experiences with learning and work in the workplace
Promoting independence and self direction in learning
Structuring and shaping work processes to accommodate learning

Figure 5: Apprentice preferences for features of the learning environment at work and frequency of them happening in their workplaces – clustered by function


I am challenged to come up with new or different ways of doing things in the workplace
I am encoruaged to talk on more difficult and complext tasks over time
I am provided with opportunities to work on my own
I am give feedback and encouragement about my workplace performance
There are people who are selected especially to hle me with my learning at work
I am given opportunities to share my ideas and learning with other people who work with me
I have oppportunities to ask questions of other workers
I have a good relationship with the people who are training me in the workplace
Trainers/employers take time to talk to me about my job
There are opportunities for me to talk to my employer/trainer about what I would like to learn
Trainers/employers take time to listen to any concerns or difficulties I might be having in the workplace
Trainers/employers help me to solve problems that occur in the workplace
Trainers/employers are interested about my future in the workforce
Trainers/employers correct my mistakes
My employer/trainer acknowledges that I am at work to learn as well as work
The trainers are well trained
0
20
40
60
80
100
Developing independence and self direction
Access to w orking and learning w ith others
Access to an environment that is conducive to learning

Apprentice preferences for features of the learning environment at work and frequency of them happening in their workplaces – clustered by function (continued)

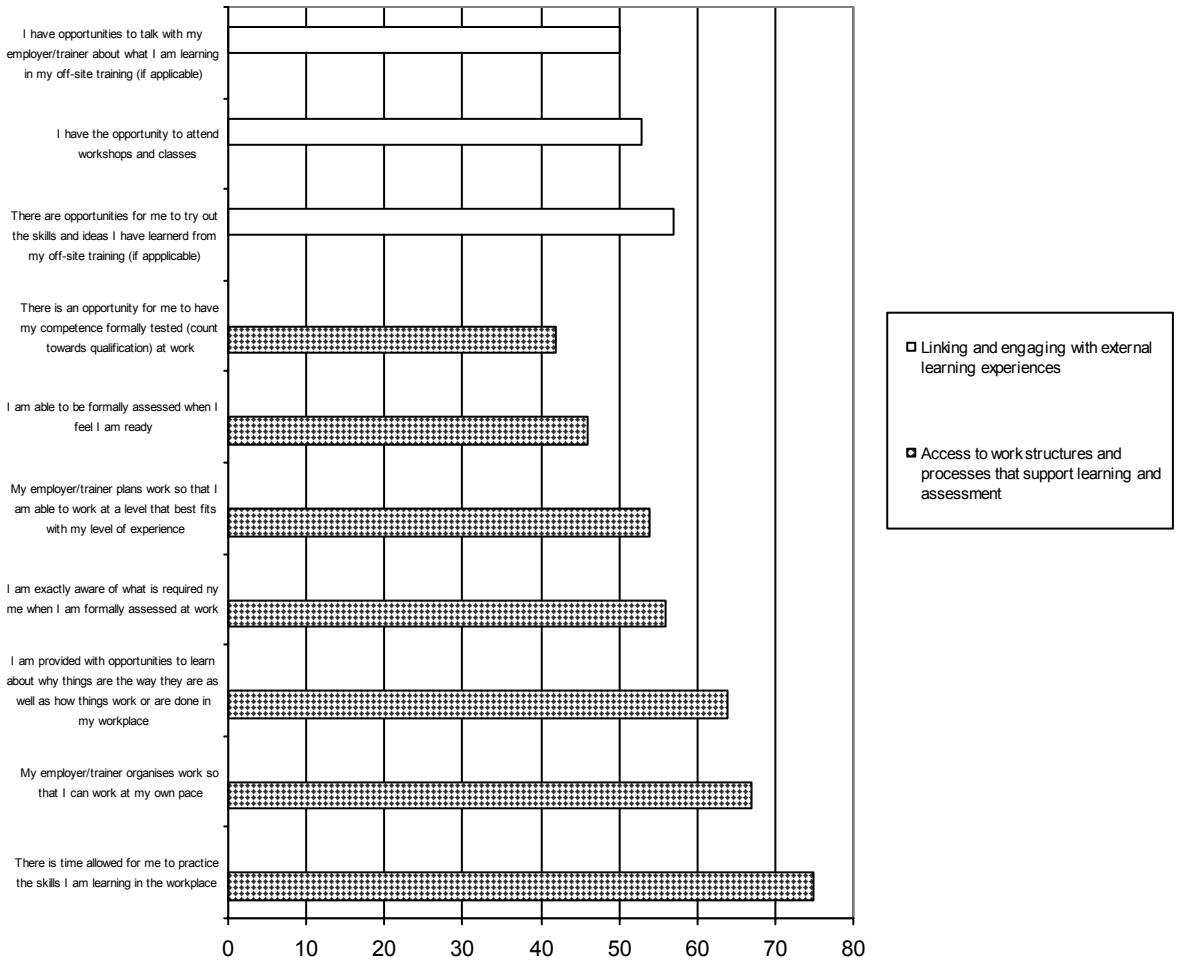

I have opportunities to talk with my employer/trainer about what I am learning in my off-site training (if applicable)
I have the opportunity to attend workshops and classes
There are opportunities for me to try out the skills and ideas I have learnerd from my off-site training (if appplicable)
There is an opportunity for me to have my competence formally tested (count towards qualification) at work
I am able to be formally assessed when I feel I am ready
My employer/trainer plans work so that I am able to work at a level that best fits with my level of experience
I am exactly aware of what is required ny me when I am formally assessed at work
I am provided with opportunities to learn about why things are the way they are as well as how things work or are done in my workplace
My employer/trainer organises work so that I can work at my own pace
There is time allowed for me to practice the skills I am learning in the workplace
0
10
20
30
40
50
60
70
80
Linking and engaging with external learning experiences
Access to work structures and processes that support learning and assessment

Table 12: Comparison of trainers' judgements on whether clusters were happening frequently in their workplaces – this study compared with data in 2000

	This study (2004)	2000 study *
Function	Percentages of trainers perceiving that clusters were happening in their workplaces 'all/most of the time' / 'often'	Percentages of trainers perceiving that clusters were happening in their workplaces 'very often' / 'often'
Structuring and shaping work processes to accommodate learning	79	65
Fostering an environment conducive to learning	69	59
Promoting independence and self-direction in learning	62	61
Working and learning with co-learners	62	60
Linking external learning experiences with work and learning within the workplace	42	25

- Harris, R, Simons, M and Bone, J (2000), *More than meets the eye? Rethinking the role of workplace trainer*, NCVER, Adelaide.