Training for diversity and change, whereby students of VET subjects in years 11-12 can be graded to facilitate admission to higher education.

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Abstract

To encourage students to remain at school for final two years, namely years 11 and 12, VET subjects have been included at these levels. Although these subjects can lead to recognised trade qualifications, the policy of competency-based assessment requires the students to be evaluated according to a dichotomous system as "competent", or "not yet competent". To determine whether subject matter experts from industry could develop graded criteria for evaluation of students for admission to higher education, the Graduate School of Education, University of Melbourne, conducted a national survey of schools teaching VET subjects. Item response analyses (Rasch) of the data produced by the survey have shown that, although experts were able to develop graded criteria when students were assessed almost entirely on their technical ability, there were problems with multi-dimensional assessments, especially where students required verbal skills as well as technical ability.

Introduction

This paper is based on research commenced in 2000 by members of the Assessment Research Centre, of the Faculty of Education (now the Graduate School of Education) at the University of Melbourne. The research, under the leadership of Professor Patrick Griffin, was undertaken to resolve a serious dilemma in the assessment of students who include VET subjects in their final years of schooling, namely years 11 and 12. VET (Vocational Education and Training) has been described as "an international term that describes the development and improvement of skills and knowledge for the specific purpose of improvement in an individual's capacity in productive work" (Smith and Keating 2003).

To encourage students to remain at school for the final two years, VET units (subjects) have been included at these levels. The policy of competency-based assessment requires these VET units to be evaluated according to a dichotomous system as "competent", or "not-yet competent", which does not give a student a grade that can be incorporated into the ATAR

(Australian Tertiary Admission Rank) score that is used for selection into university. Professor Griffin's group have undertaken research to identify ways to integrate the ranking of students, with competency-based assessments for students enrolled in VET units of National Training Packages (Griffin, Gillis and Calvitto 2007).

The present paper considers the extent to which subject-matter experts, drawn from industry, are able to extend the frameworks of training packages to include rubrics which grade the students while at the same time meeting the criteria of competency-based assessment

Literature review

Competency-based Training

Australia, Scotland and England, in line with most countries that are affiliated with the Organisation for Economic Co-operation and Development (OECD), have considered the global economy as entering a new phase in which manufacturing industries have been challenged by international trade, especially by emerging industrial nations (Gonczi 1997). The OECD countries have been trying to combat this competition by refining their education and training systems (Mulcahy 2000).

In the 1980s, the Australian Government believed that a lack of appropriate skills in the work force had damaged Australia's international training position (Stevenson 1993). To overcome this, the government restructured industrial awards to encourage broader skills (Stevenson 1993), which would be relevant, recognised, and rewarded. As part of this restructure, the Government introduced competency-based training to develop skills which would add value to the country's primary and manufactured goods, and services (Dawkins and Holding 1987; Dawkins 1988; Minister for Employment 1989). Subsequently, each state government in Australia committed itself to competency-based training, and signed an agreement, the National Framework for the Recognition of Training, which came into effect on 1 August, 1992 (Stevenson 1993).

The National Training Reform Agenda was the agreement between federal and state governments, supported by unions and employees, to improve and expand VET in Australia. Carmichael (1992) considered that the Reform Agenda would provide nationally consistent training outcomes and thereby would assist enterprises to compete more effectively than previously. Furthermore, with the standards recognised nationally, they would be portable across industries and states. The commitment of the state governments has been very important for the present project as it made competency-based training compulsory, not only for institutes of TAFE, but also for VET courses in secondary schools.

For the present paper, the important features of competency-based training are: All VET subjects/units have to be subject to competency-based Assessment. Candidates must demonstrate that they can achieve the standard required for each competency. Candidates are assessed as either 'competent' or 'not-yet competent' for each particular competency.

Training packages

In Australia and the United Kingdom, industry mainly determines the skills and the performance levels that will constitute standards. These standards of competence have been developed by industry and endorsed by government, so that these standards can also be used to qualify individuals as to their competence in the workplace rather than as to their performance in formal training. However, a particularly Australian approach is the introduction of national training packages whereby qualifications are only awarded by registered training organisations which provide training and assessment (Misko 2006). Debate about these training packages has been robust because the packages are the required form of the VET sector, and critics cannot just 'work around them' (Wheelahan 2004).

Early school leavers 'at risk'

The concept of being 'at risk' implies that there is a risk of early leavers not making a successful transition from school into adult life through work and study. Sweet (1995) argued for the integration of learning and experience under a protective umbrella, so that these experiences that would otherwise be fragmented might appear as a 'coherent whole'. He also argued that issues related to the current labour market can be addressed, in part by 'ensuring that all young people, regardless of their academic achievement, are effectively connected to the labour market before they leave the school'.

Method

National survey

The central component of the survey consisted of the Student Assessment Record Booklets to be completed by teachers in the secondary schools selected throughout Australia. The set selected for this paper was for the National Training Package BSB01 Business Services Training Package. As originally designed, each of the Units of Competence (i.e. subjects) consisted of Elements. Each of these Elements was made up of Performance Indicators. In accordance with the principles of competency-based-assessment each candidate had to demonstrate competence for each performance indicator. "Competence" has been taken to mean up to the standard that would reasonably be expected in the workplace. This is a very arbitrary standard at best, without any guidance for the assessor/teacher.

Subject-matter experts were selected by the relevant industries to add quality criteria to clarify the various performance indicators. These are illustrated in Fig 1.

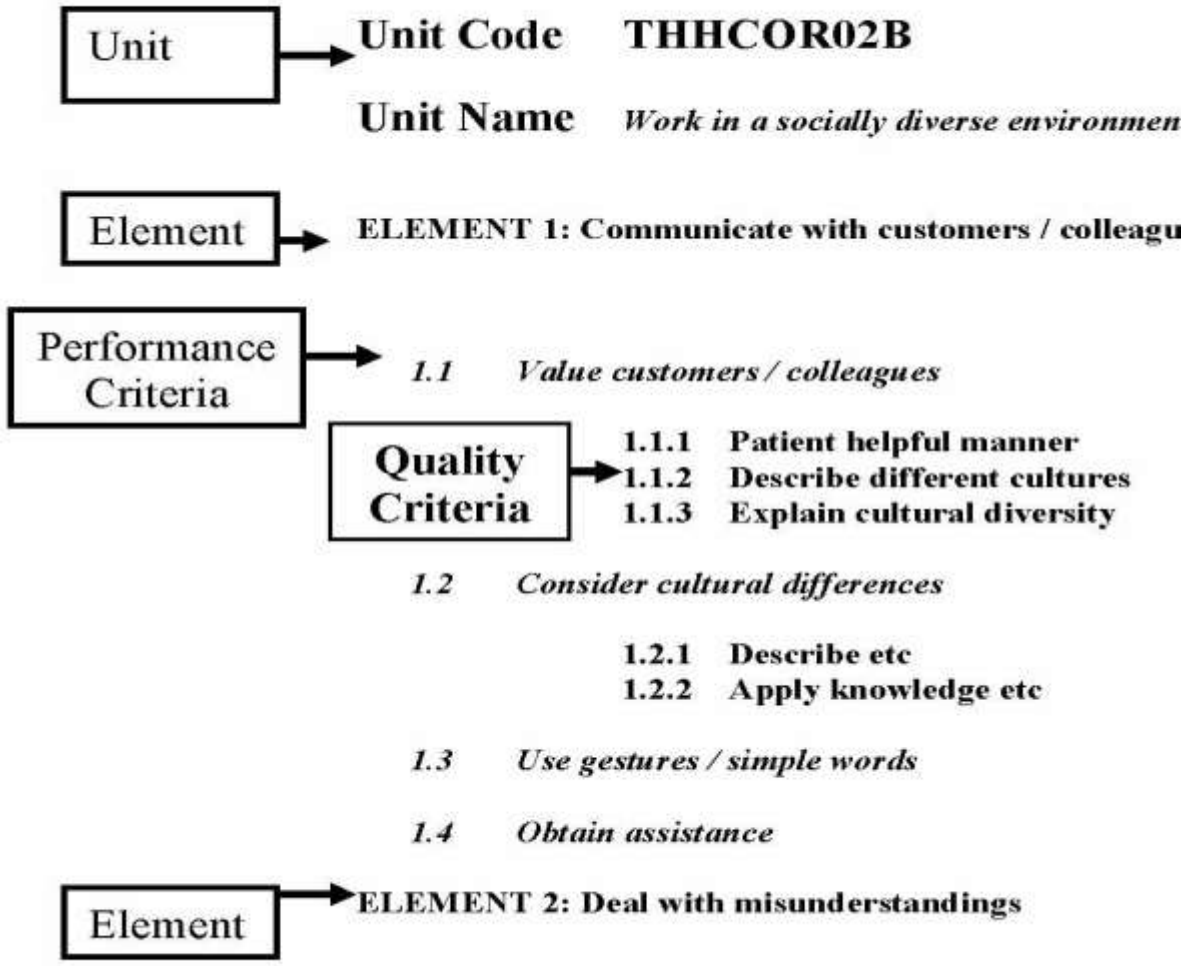

Fig 1 Components of a competency-based unit

Quality criteria were established to provide a sounder assessment by providing some indication of the level of achievement for each performance indicator. To establish levels of achievement the panel of experts wrote the details of each quality criterion onto an adhesive 'post-it' note. The notes were then attached to the grid so that each column of the grid contained each of the quality criteria for the respective performance indicator. It remained for the panel of experts to discuss the relative positions of the quality criteria. The harder the criterion, the higher it was placed in the column.

For the present paper the final form of the grid was accepted as being the "hypothesised construct" for that particular unit of competence, and compared with the empirical result obtained by item-response modelling.

The survey was conducted in two stages, namely a pilot study and the national survey. In the pilot study, the teachers were asked to rate each student against the quality criteria by placing a tick beside the highest level reached. See Fig 2. In the national survey the teachers were not

asked to rate the students against a hierarchy of quality criteria, but were asked *Can you confirm that the student can:*

Describe the functions of a range of business equipment.	Yes	No
Select the most appropriate business equipment	Yes	No
Clarify the selection of business equipment	Yes	No

This change had two advantages a) teachers, especially those with experience with VET subjects are comfortable with the dichotomous assessment of Yes/No implied in classifying students as competent/not-yet-competent, b) the dichotomous approach, rather than ranking the students, as with Partial Credit, makes it possible to evaluate the hypothesized continua.

The completed Student Assessment Record Booklets were returned to the University of Melbourne where the data were transcribed into a database before being analysed. "The result was a school-based assessment for 'VET in schools' subjects that could be differentially weighted, standardised and scaled to produce the universities admission index for each of the national education jurisdictions." (Griffin et al 2007).

In the abstract of their paper Griffin et al (2007) reported that "A change in the logic of competency assessment was proposed, in that the performance indicators were not rated using a dichotomy but with a series of quality ordered criteria to indicate how well students performed specified tasks in the workplace or its simulation." As noted above, although the quality ordered criteria were used in the pilot study they were not used in the national survey but had been replaced by a series of dichotomies, as shown in the Student Assessment Record Booklets.

In the present paper the data obtained from the dichotomous assessments were analysed by Item Response Modelling (Rasch). To allow the data from the national survey to be treated as Partial Credit, the dichotomous data had to be converted to quality ordered data before being analysed by Item Response Modelling. The two sets of outputs, dichotomous and partial credit respectively, were then compared.

Partial Credit derived from Dichotomous Data

	Dichotomous Data			Raw Score
	Crawl (Level 1)	Walk (Level 2)	Run (Level 3)	Partial Credit
Alan	0	0	0	0
Betty	1	0	0	1
Clare	1	1	0	2
Donald	1	1	1	3

Table 1 Conversion of dichotomous data into raw scores of partial credit

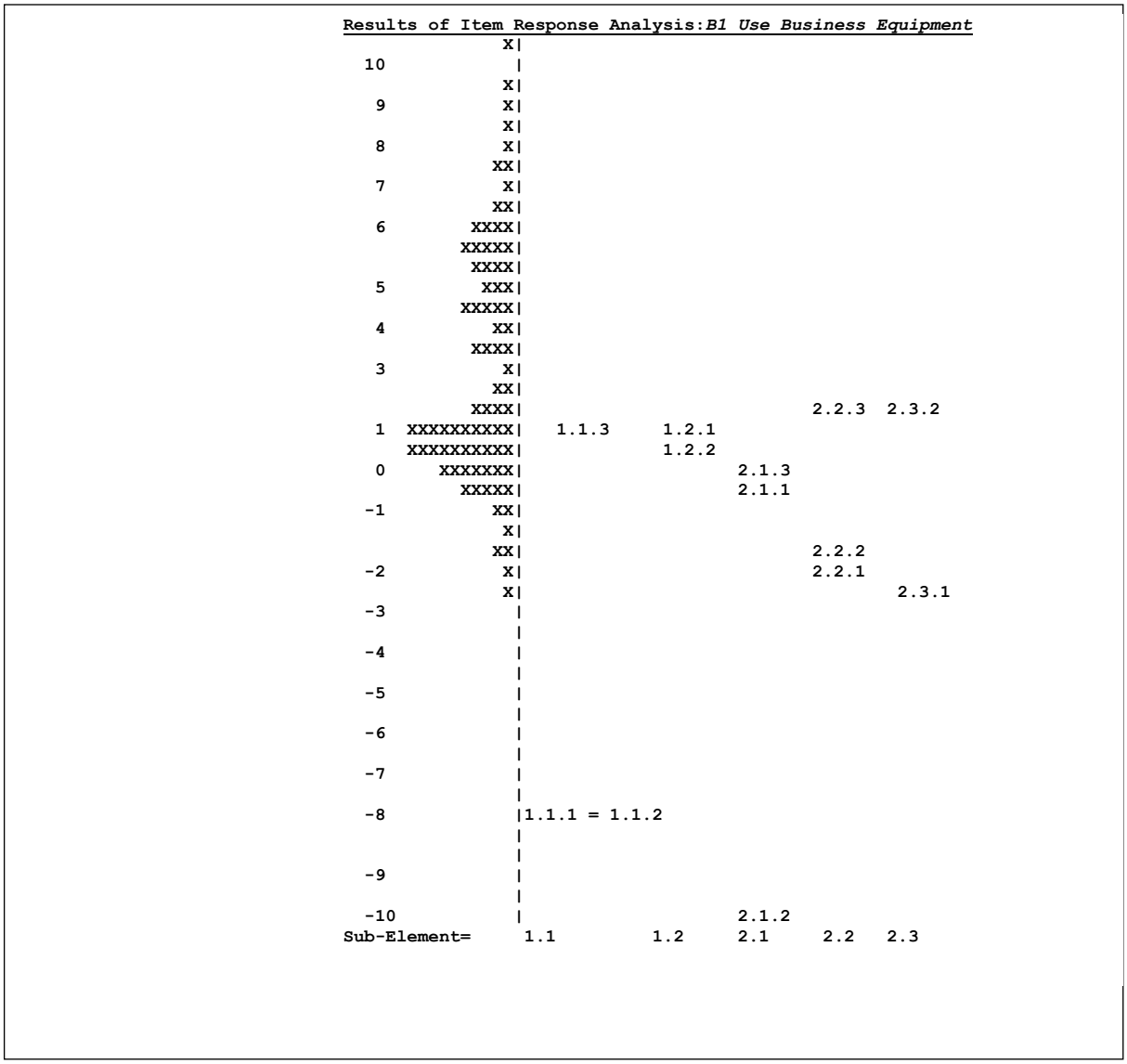

Fig 2 Analysis of data (partial credit)

For the partial credit data the quality criteria appeared in ascending orders of presumed difficulty (Fig 2) whereas in a few cases involving dichotomous data the quality criteria were not in ascending orders of assumed difficulty (Fig 3). These discrepancies occurred when the quality criteria involved more than one dimension, especially verbal and technical abilities.

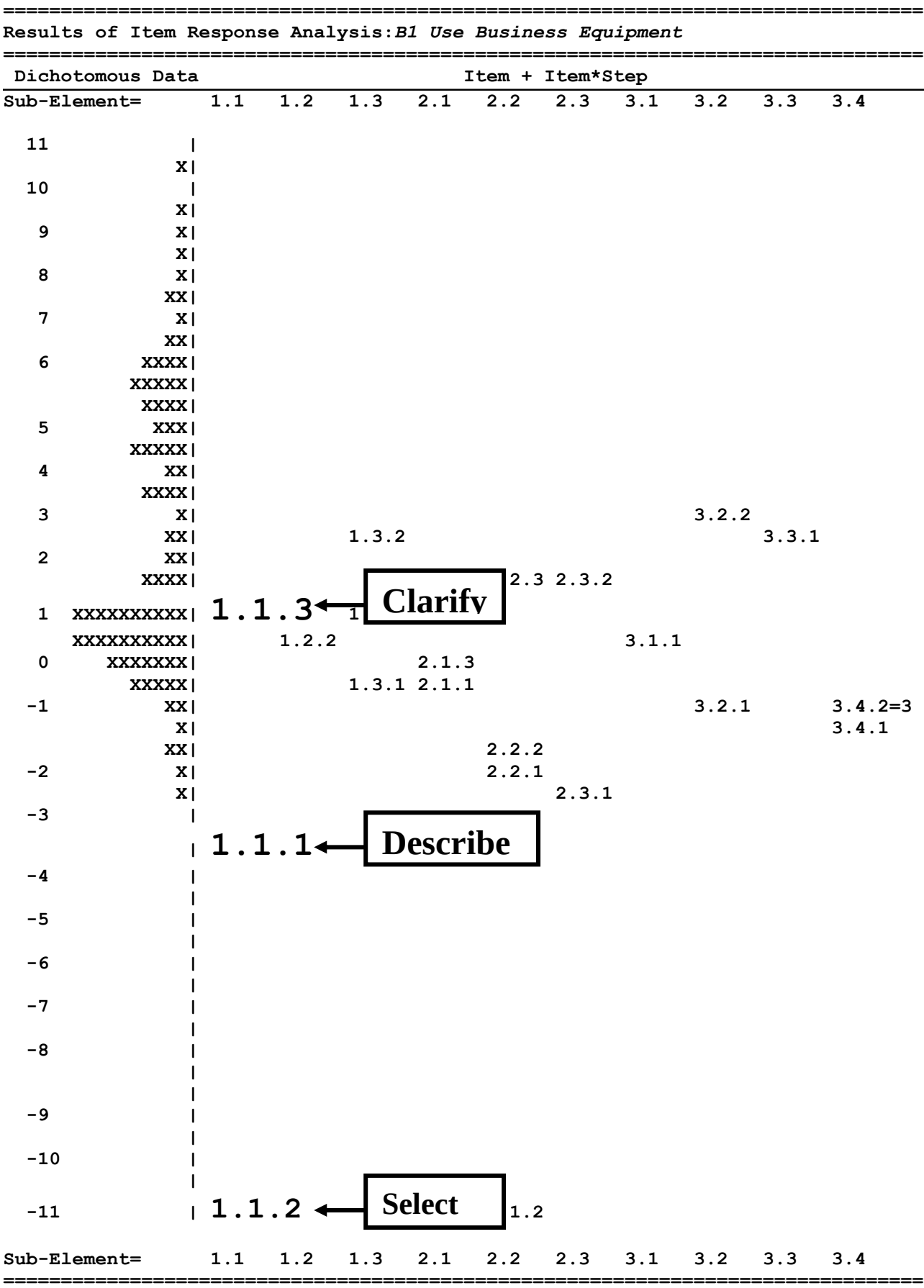

Fig 3 Analysis of data (dichotomous)

Findings and discussion

In general the two sets of outputs were consistent, and as such supported the use of subject-matter experts to design quality criteria for evaluating levels of achievement. There were, however, some exceptional cases where the two sets of outputs contained different results. An example is shown in Fig 3 where the subject-matter experts considered that the order of difficulty for three quality criteria for a performance criterion involving business equipment was a) describe equipment b) select equipment, and c) clarify selection. In practice the students found it more difficult to describe equipment than to select it. This is consistent with the observation that the students electing to study VET units have lower verbal skills than other students. It is also consistent with the idea that describing equipment involves more than one dimension, namely technical skills and verbal skills. This issue is discussed by Bond and Fox (2001).

Conclusions

It is possible for subject-matter experts, provided by industry to develop graded scores for VET units so that students of these units can be given not only a recognised technical qualification such as a Certificate 2, but also a graded score than can be considered for university selection. The production of these scores requires the addition of quality criteria to the units of the training packages. Although the subject-matter experts were able to do this in the vast majority of cases, they were less successful when the competencies involved more than one dimension. An example that was repeated more than once in this study involved the two combined skills of technical ability and verbal proficiency.

Acknowledgements

References

Bond, T.G. and Fox, C.M. (2001) Applying the Rasch Model: Fundamental measurement in the human sciences. Lawrence Erlbaum Associates, London.

Carmichael, L. (1992). Australian vocational certificate training system. Employment skills formation, National Board of Employment, Education and Training, Canberra.

Dawkins, J. S. (1988). A changing workforce, Australian Government Publishing Service, Canberra.

Dawkins, J. S. and Holding, C. (1987). Skills for Australia, Australian Government Publishing Service, Canberra.

Gonczi, A. (1997). 'Future directions for vocational education in Australian secondary schools.' Australian and New Zealand Journal of Vocational Education Research 5(1): 77-108.

Griffin, P., Gillis, S. A. and Calvitto, L. (2007). Standards-feferenced assessment for vocational education and training in schools. Australian Journal of Education 51 (1) 19-38

Misko, J, (2006) Vocational education and training in Australia, the United Kingdom and Germany. NCVER Research report 24 April 2006.

Minister for Employment, Education and Training (1989). Improving Australia's training system, Australian Government Publishing Service, Canberra.

Mulcahy, D. (2000). 'Brokering the boundaries of industry and education: Cultures of competency-based training.' Australian and New Zealand Journal of Vocational Education Research 8(2): 39-65.

National Training Board (1992) Policy and guidelines. National Training Board. Canberra

Smith, P. J. (2001). 'Learning preferences of TAFE and university students.' Australian and New Zealand Journal of Vocational Education Research 9(2): 87-109.

Smith, E and Keating, J. (2003) From training reform to training packages. Tuggerah Social Sciences Press

Stevenson, J. (1993). 'Competency-based training in Australia: An analysis of assumptions.' Australian and New Zealand Journal of Education Research 1(1): 87-104.

Stevenson, J. (2003a) 'Expertise for the workplace' Developing Vocational Expertise Stevenson, J. Crows Nest Allen and Unwin

Stevenson, J. (2003b) 'Vocational teaching and learning in context' Developing Vocational Expertise Stevenson, J. Crows Nest Allen and Unwin

Wheelahan, L, (2004) What are the alternatives to training packages. Australian VET Research Association Conference 1 January 2004.