Assumptions and Origins of Competency-Based Assessment: New challenges for teachers

A paper presented at the conference of the Australian Association for Research in Education, and the New Zealand Association for Research in Education, Melbourne, November 1999

J. A. Pitman, E. J. Bell, I. K. Fyfe

Queensland
Board of Senior Secondary School Studies

Contents

Aim of this paper

The Queensland Board of Senior Secondary Studies (QBSSSS, or, the Board) is aware that assessment is a key challenge for teachers of subjects with vocational education and training (VET) components. This was one of the findings of the evaluations of the trial of 31 new subjects from nine study area specifications (SASs)[1]. The assessment issues identified by that study are complex and are being dealt with through Board workshops, in which teachers ask questions and look at exemplars.

This paper is designed to work as a companion paper to another more 'nuts and bolts' paper for teachers: *Practical Suggestions for Integrating Criteria-and-Standards-Based Assessment with Competency-Based Assessment*. The present paper is more conceptual and reflective, and more unapologetically 'academic'. It aims to provide a discussion paper on competency-based assessment by exploring the following questions:

What is competency-based assessment and how is it different from criteria-and-standards-based assessment?

What are the assumptions of competency-based assessment and criteria-and-standards-based assessment?

What are the origins of competency-based assessment?

What are the fundamental challenges of using competency-based assessment in Queensland senior secondary schooling?

What are some useful working principles of assessment for teachers combining competency-based assessment and criteria-and-standards-based assessment in SASs and Board subjects with embedded vocational education and training?

What are some useful strategies for supporting sound assessment practices in these subjects?

What other research and discussion papers about competency-based assessment are available?

This paper aims to provide a discussion that will be useful to a conceptual understanding of competency-based assessment, and the integration of competency-based assessment and criteria-and-standards-based assessment. Teachers, school administrators, employing authorities, policy decision makers, Board officers, and researchers wanting to reflect on issues to do with VET in senior schools, particularly as it relates to assessment, should find this paper useful.

---

1. Study area specifications are curriculum documents offering broad frameworks that allow schools to deliver subjects that meet local and specific needs while allowing some standardisation. Many SASs have substantial accredited VET components that are reported on the Queensland Senior Certificate. SASs were introduced in 1997 and, by 1999, over 20 000 senior students were taking at least one SAS.

What is competency-based assessment (CBA) and how is it different from criteria-and-standards-based assessment (CSBA)?

Competencies[2] have been defined by Green (1998, p. 24) as 'can do' statements that may be

> used both to guide the course of instruction and to report outcomes. To give an example: the competency 'can type more than 60 words per minute' could be used as an objective of a wordprocessing course, as the criterion for success on a test of typing speed, and a statement appearing on certificates awarded to successful trainees … Thus, it is argued, large-scale, time-consuming qualifications such as degrees and diplomas are replaced with a seamless progression of cumulative achievements.

Of course, many competencies are not as simple as the example just given. If they were, teachers in Queensland would probably have fewer questions about CBA. In reality, competency standards have at times been described as being on the one hand too narrow, and on the other too broad. For example, Chappell (1996, p. 65) has argued:

> there is solid justification for claims that, on the one hand, some standards are overly narrow and instrumental—being solely preoccupied with performance outcomes— while on the other, some are too general—lacking any reference to context, and thereby being too remote from any actual performance or outcomes.

Stevenson (1996, p. 26) has described competency in the context of vocational education and post-compulsory education as

> the capacity to perform defined and predictable tasks according to some pre-specified standard. Particular interests are represented in defining the standards, e.g. 'competent at the level expected by industry, as specified by industry standards'.

Hayton and Wagner (1998) make an important distinction between competency-based assessment and performance assessment. They see CBA as 'the assessment of evidence to determine a person's current abilities against a given set of competency standards'. 'Competency-based assessment, then, is a system in which a number of assessment techniques can be used, of which performance assessment is just one technique' (p. 71). Performance assessment is a technique that 'is likely to be used in a competency-based system because both the system and the technique have a focus on criterion activities or outcomes' (p. 71). Performance assessment has as its 'key characteristic' the 'requirement that students be assessed on performance of a practical activity which is the criterion activity (e.g. performance of a job task at the workplace), or which is a simulation of the criterion activity' (p. 70).

Perhaps not surprisingly, the Board's evaluations of the trial of study area specifications found that teachers using CBA are sometimes uncertain about the definitions of competency. There has, of course, been considerable debate about the definition of competency in Australia (Harris et al. 1995, p. 25), and in this transition phase for Queensland schools implementing VET, it is clear that teachers have also raised important questions about what it means to say a student is competent.

---

2. *Competency* and *competence*
   These two words are generally synonymous (see dictionaries) but, because *competency* is used in VET to describe two things: (a) a specification that describes a particular ability to do something ('a competency'), and (b) a person's ability to do that same something ('a person's competency'), we have also generally adopted *competency* to mean both things. As we do not alter quotations, however, you will see *competence* a few times, but, in this report, you should not infer any difference between the two words.

Exploring what it means to say a student is competent involves looking at what the judgment is based on; that is, the basic assumptions of the assessment being made. When we look at the basic assumptions of CBA, we find another question, which may be helpful to those coming to CBA from CSBA for the first time: 'Are CBA and CSBA really as different as chalk and cheese?'

Interestingly, some of the claims made for CBA do not seem so different from the reasons we in Queensland senior schooling might give for using CSBA, the type of assessment on which our school-based system rests: that competencies make the learning outcomes explicit, offer specific criteria for judging learning (rather than measuring achievement against other learners using marks with unknown meanings), and provide a language in which to give learners feedback (Brindley 1989; North 1993). The two systems share an intention to make the outcomes of education explicit, and the basis of assessment judgments transparent.

In fact, it seems that CBA is often contrasted with the kind of assessment regime that began to die on the vine in Queensland in the early 1970s when the Radford report advocated the abolition of the senior and junior examinations and ushered in the beginnings of a new system of moderated school-based assessment. The rationale for the developing system of CSBA, articulated largely in the papers put out by the Board's Assessment Unit, involved a similar view of the limitations of 'marks-driven' norm-referenced assessments that can be found in writings about CBA.[3]

However, there are at least two important respects in which CBA and CSBA differ: procedures for reporting, and quality assurance.

Reporting

In CBA the details of competencies are reported, rather than some overall result (although it should be noted that the names of competencies do not always make such reporting meaningful). In contrast, results in Board subjects are reported on students' Senior Certificates in terms of broad levels of achievements; members of the community have certain expectations about what it means to have a certain level of achievement.

Quality assurance

In Australian versions of CBA at the moment there is no systematic moderation of standards in the sense that student work is moderated. The emphasis of quality assurance in the current VET system in this country is upon establishing the sufficiency of the human and material resources. To a considerable extent in CBA, quality assurance is seen as the outcome of a standards-setting process that emphasises the importance of detailed national standards. In contrast, for Board subjects in Queensland, there are around 330 district review panels across the State, which examine samples of student work from every school subject-group and provide detailed advice to schools about how well they are applying standards. Although the Board does develop exit criteria, which are published together with other requirements in its syllabuses, these do not have the detail that characterises CBA. It should be emphasised that teachers do develop detailed criteria, based on the syllabus, for particular assessment

---

3.   Of course, the distinction between norm-referenced and criteria-and-standards-based assessment is not as clear cut as some would make out. Systems tend not to be purely one or the other, but somewhere along a continuum that has norm-referenced assessment at one end and criterion-referenced assessment at the other.

situations, and these applications of the broad criteria and standards are independently moderated. In Queensland school-based assessment, comparability of standards is achieved through independent panels of teachers who act in a highly developed and structured set of moderation procedures. In essence, these procedures work to achieve shared understandings of the meaning of the standards.

It is not surprising, then, that teachers coming to CBA from CSBA have raised questions about how they know that their judgments of what is competent are the same as the judgments about the same competency made in other schools, TAFE, and other VET providers. The question is a fair one but, of course, the reason it is not so easy to answer has to do with two different systems of quality assurance—one placing more emphasis on detailed criteria and establishing the sufficiency of human and material resources (VET), and the other placing more emphasis on independent moderation of the application of broad criteria (CSBA).

There are, of course, many other respects in which CBA and CSBA are the same or different. For example, both systems tend to de-emphasise 'traditional' testing regimes. CBA emphasises, but is not restricted to, performance of a practical activity, or simulation of this activity in ways that require students to apply their knowledge. CSBA, as we know it in Queensland, emphasises teachers' use of a range of assessment situations, including practical activities.

The substantive content of the knowledge and skills being assessed under the two systems is not the same, and some would say that competency-based education involves knowledge and skills with more direct relevance to the workplace, and to the needs of industry, than other forms of formal education. Bowden and Masters (1993, p. 15) note:

> Advocates of competency-based approaches point out that education and training curricula tend to be designed to meet assumed rather than actual workplace needs. A major intention of CBET [Competency-based education and training] is to make the outcomes of formal education and training more appropriate to future workplace needs. Related to this intention is a widely held belief that societies such as Australia have traditionally placed too much value on theoretical/'educational' learning to the detriment of vocationally relevant competencies.

An appreciation of the similarities between the two systems of assessment is useful to understanding how they might 'fit' together. The very real differences can be related to the quite different histories and different historical needs that each system was designed to serve. They also involve quite different assumptions about the purpose of education (in CBA, the emphasis is on equipping students to meet the demands of the workplace and developing outcomes that match current industry needs in workplaces, whereas school education has traditionally involved a much broader notion of education).

At the same time, we should be very cautious about applying simplistic dichotomies about the implicit values and outcomes of these two systems of assessment based on crude distinctions between 'general' and 'vocational' education. Board subjects incorporating CSBA are wide ranging and have for years incorporated elements of what might be described as both general and vocational education. Nor is accredited VET exclusively 'practical': as our evaluations of the implementation of VET, as part of new Board registered

subjects (study area specifications, or SASs), suggest, some teachers and their students feel there is 'too much theory' in certain VET content. These facts suggest the value of avoiding polarised definitions and conceptions of the two assessment systems and the curriculum with which they are associated.

What are the assumptions of CBA and CSBA?

In 1982, Glen Rowley published a key article on measurement that has been read since by those interested in CBA. The article, 'Historical Antecedents of the Standards-Setting Debate: An inside account of the minimal-beardedness controversy' (Rowley 1982), raises important questions about how an apparently simple and observable dimension (in Rowley's article 'minimal beardedness'—whether a person has a beard or not) can be measured.

According to Rowley, itemising the dimension in a way that does not permit people to make a holistic judgment does not necessarily lead to reliable assessments (p. 90). Of course, writing out the detail of what is being measured is something that is common to a lot of approaches to assessment, both CBA and CSBA. What Crowley was arguing is that simply doing this is not enough to make judgments reliable.

The QBSSSS study of the implementation of the new SASs suggests that Queensland teachers are also pointing to all the fine detail that makes up a competency, and voicing their concerns about how to decide exactly where is the 'cut-off' point for competent/not competent. The questions Queensland teachers have raised are not always simply or easily answered because, as Rowley argues, knowing what is the 'cut-off' point for the dimension being present or not present is not a simple matter:

> The members of the bearded group were very hairy indeed, while the unbearded group was positively shiny … As we had expected, the distributions of scores from the two groups were quite distinct. The cutting score surely had to be in the middle somewhere, but where? … various statistical devices … all had the property that the results were dependent on how bearded the bearded group was, and we wondered whether this should be so. In a week's time, when the bearded group had become a little more bearded, the cutting point would have moved, and we wondered about the appropriateness of this data dependence. (p. 90)

It would seem that in Queensland, as in other States, school communities are raising important questions about CBA (such as 'how do we know what is competent/not competent?') that the assessment research literature suggest are fairly tricky to answer. Trying to identify what lies on the border between bearded and unbearded proved impossible for Rowley: 'the judges soon found they were unable to identify such individuals with any confidence … '(p. 91).

Rowley's article is one of the more entertaining and at the same time thought-provoking articles in the research literature. As he concludes, perhaps prophetically for some Queensland teachers today who feel uncertain about competency standards: 'the standards-setting problem is a serious one for those who have responsibility for competency testing programs' (p. 94). The dichotomy on which VET is based—competent/not competent—is, for Rowley, an artificial measurement category that forgets that achievement, like many human characteristics, is a matter of degree. Other commentators have also referred to the notion of 'mastery' that underpins CBA standards ('can do' versus 'cannot do').

Criteria-and-standards-based assessment involves a model of *degrees* of mastery of multifaceted domains of learning. This means, of course, that some teachers approaching CBA in the context of the Queensland system may find that they feel uncertain not only because the CBA system involves different kinds of quality assurance, but also because it involves different assumptions about achievement itself.

Like the teachers it serves, QBSSSS is often more concerned with the pragmatic aspects of making new things work rather than with abstract reflection or academic discussion. Yet to make CBA work well in our schools, perhaps we need to reflect on why some teachers are uncertain, and what kind of certainty they seek with CBA. It seems that the introduction of CBA has raised questions about what exactly is a competency standard. As Peddie (1997) has argued:

> there is no abstract, external, objective 'competency standard' somewhere out there, just waiting to be incorporated into a unit. Similarly, there is no abstract, external and objective 'competency' which will be acquired by the learner as one might acquire a hamburger from the corner takeaway. (p. 21)

It is understandable that some Queensland teachers, looking from their perspective of school-based assessment, in which extensive moderation procedures aim to develop shared understandings among different communities of teachers, find themselves uncertain in the face of CBA. The Queensland model of school-based assessment has, after all, involved quite a different approach to standards setting: understandings of the meaning of words (standards and descriptors of criteria) in communities of teachers have been built up over many years through formal structures and moderation processes. Competency-based assessment has different historical roots, and it is fair to say that senior secondary schooling is going through a period of transition as it accommodates the CBA approach to setting standards.

When Queensland teachers point to competencies that they are uncertain about, they are often talking about competencies that seem to have more than one interpretation. Nobody would argue that it is easy to write simple criteria for making assessment judgments about human achievements. Few of those who were involved in writing the criteria for competencies would want to argue that every criterion that has been written for a competency is a model of clarity with only one interpretation. One perspective can be taken from Chappell (1996) who argues that, if a competency is to be measurable, outcomes must be written

> in ways that make them measurable. The problem with this position is that, though it is reasonably easy to produce these sorts of descriptions when the focus is limited to the relatively straightforward task skills needed in the workplace, attempts to produce descriptions of more complex work practices generally fail. (p. 63)

As noted above, one difference between CBA and CSBA lies in the processes that support the validity and reliability of assessment judgments. Quality assurance for CBA places the emphasis on developing detailed national criteria that are based on industry needs. CBA quality assurance also emphasises auditing human and material resources in ways that lead to continuous internal quality improvement. In Queensland school-based assessment, teachers develop detailed criteria using syllabuses that provide subject requirements, including broad exit criteria and standards. As noted previously, teachers' interpretations and applications of the syllabus criteria are moderated by more than 300 independent panels of teachers across the State who look at samples of

student work from every school subject-group in the State. In Queensland school-based assessment, therefore, there is a highly structured set of procedures for providing schools with reassurance that they are 'doing the right thing' by their students.

This difference is unlikely to be altered by the new Training Packages. The *Updated Guidelines for Training Package Developers: Australia's National Training Framework* (Australian National Training Authority 1998) suggests that assessment guidelines and 'agreed national principles' are to be the key supports for assessment and that 'registration of training organisations is the key quality assurance mechanism within the VET sector' (p. 3). Media representations of competency-based training and assessment sometimes do seem to cheerfully reinforce the belief that the existence of a competency is the same as having well-known, agreed-upon, and consistently applied national competency standards (Lord 1999).

However, some VET researchers are now arguing that development of quality VET competency standards must involve what continues to be a fundamental principle of Queensland school-based assessment:

> [A]cceptable performance is, more often than not, a contested abstraction hotly debated by those involved in practice. Thus any attempt to develop descriptions of practice must involve *practitioners* and this involvement must be both active and collective. Areas of agreement can only be achieved through the process of participative debate. (Chappell 1996, p. 66)

That is, if we want to have competency standards that are reliable and comparable, the way forward is to support the efforts of practitioners in schools—those making the assessment judgments—to reach an understanding about the meaning of the competencies. While we may not have a fully fledged system of moderation for SAS subjects, there is much that all those involved (teachers, heads of department, the Board, systems officers, school administration) can do to support teachers' efforts to develop this understanding of standards through, for example, industry contact.

What are the origins of CBA?

It is sometimes said that the education system is always changing and that these changes can cause anxiety for those affected by change. However, it seems equally true that reflecting on the past can tell us much about where we are now, and why, and that simply knowing this can help make us feel less buffeted by the winds of change. This section offers a short history of CBA. There is so much written in this field that this apparently simple task is a little like cutting a path through a vast and tangled thicket, in which even the deceptively simple term *vocational education* cannot be agreed upon by historians (Spaull 1992).

The discussion here will trace the origins of CBA as it is known and used in Queensland senior schools; that is, the CBA in some Board subjects and in SASs. It is appreciated that some would argue that the differences in the values of different systems of education are what is worth exploring, rather than historical details, because we need to 'make values explicit'. Values are, however, relative things, and one person's construction of the inherent values of any education system or curriculum offering may not ring true for another. This paper offers an admittedly descriptive and sketchy history of the origins of competency-based training and assessment as it is known in the Queensland

senior curriculum, because in the context of Queensland senior schooling, there has been very little discussion of these basic historical developments. Readers who would like to read a discussion of how to analyse the values in vocational education could go to the work of John Stevenson (1995a; 1995b).

It has been argued that the theoretical roots of CBA lie in 'behaviourist' models of human psychology from the 1950s that had Skinner as their main proponent. This is based on the view (put forward by McGaw (1993) and others) that CBA is about making inferences about competency on the basis of performance. It has also been argued that the American defence forces in the 1950s (influenced by Frederick Taylor (1947), one of the founders of industrial psychology, who elevated job analysis to a science) first developed and trialled CBA as we know it today. Chappell (1996) has argued that:

> The model of competence used most extensively in education was developed by the American defence forces in the 1950s. Competency-based training (CBT), as it came to be called, is based on the view that standardised training outcomes can be achieved by all learners if a thorough analysis of the behaviours demonstrated by any competent performer is undertaken and then transposed into a set of standardised learning sequences. (p. 62)

'Mastery learning', as it came to be called, enjoyed an important place in defence personnel training in World War II, and took root in the USA in the succeeding decades, particularly the 1970s.[4] In the USA it spread from teacher education to other professional development programs, such as dentistry and nursing, before its decline in the 1980s. In the UK, competency-based education and training was promoted considerably later and in a less ad hoc manner in the 1980s, as part of government reform of vocational qualifications using formally recognised industry-led bodies to develop competency standards. As Bowden and Masters (1993) point out, a competency movement occurred not only in the UK and America, but also in other European countries, particularly Germany.

Some commentators have argued that CBA developed in ways that were influenced by more than one narrow approach to learning. For example, Harris et al. (1995, p. 36), like Bowden and Masters (1993), argued that, in the USA:

> In the 1970s there were five related developments that fed into the design of CBE/T [competency-based education/training]. These were (1) mastery learning (Bloom 1974), (2) criterion-referenced testing (Popham 1978), (3) minimum competency testing (Jaegar 1980), (4) competence in education (Burke et al. 1975) and (5) programmed learning (Skinner 1952). These movements shared three things in common: modules, design of assessment around a list of observable behaviours and the concept of 'mastery'. (Harris et al. 1995, p. 36)

It is important to emphasise that, apart from there sometimes being no agreed-upon definition of competency (Griffin 1995), CBA has been conceptualised in other than behaviourist terms. Some have argued (Hager and Gonczi 1993, p. 36) that critics of the competency movement have sometimes mistakenly assumed that it is 'concerned with assessing whether individuals can perform specific, narrowly defined tasks'. They argue for a much broader notion of competency which they say is present in definitions of competency given in the

---

4. Bowden and Masters (1993) point out that in 1971 'the first bibliography on competency-based education [in the USA] listed 22 items. Within five years, the number had grown to over 6000.' (p. 22)

1990s by such bodies as the National Training Board and the National Office of Overseas Skills Recognition: 'Competence is essentially a relation between abilities or capabilities of people and the satisfactory completion of appropriate task(s)' (p. 37):

> While performance of tasks is directly observable, abilities or capabilities that underlie the performance are necessarily inferred. This means that assessment of competence will inevitably be based on inference from a sample of performance. In requiring that the sample meet criteria that will make the assessment valid, assessment of competence is in the same boat as other kinds of assessment. (p. 38)

Stevenson (1996, p. 35) has also argued that early versions of CBA were more 'overtly behaviouristic, in that it equated knowing with doing', but that, in later manifestations of CBT, 'knowledge is regarded as a separate phenomenon which underlies performance and which can receive legitimate attention'.

The development of CBA in Australia can be described in terms of a few key moments in the 'operationalisation' of VET: the 1986 report *Standards-Based Training: A discussion paper*, by Nicholas Clark and Associates; the 1989 official statement *Improving Australia's Training System*, by the then Federal Minister of Employment, Education and Training; a report, *Industry Training in Australia: The need for change* by the Employment and Skill Formation Council (1989); and the two conferences (April 1989 and November 1990) where ministers of VET agreed that CBT should be part of the national training reform agenda.

The ostensible political rationale for the introduction of competency-based training and assessment was the need to raise the skill levels and work standards in Australia. Chappell (1996, pp. 59–61) has argued that competency-standards development was

> central to the Federal Government's Industrial Reform Agenda … many saw competency standards as the vehicle through which employment and training reforms could be achieved and they were regarded as a central feature of negotiations between employers and unions … competency standards were seen by many as multi-purpose instruments that would influence all aspects of vocational education and training and also facilitate workplace reform.

Some commentators agree with Chappell (1996) that the priority given to the economic and industrial reform agenda in Australia in the early 1990s, 'including the development of competency standards, was not reflected in any priority being given to the development of new competency-based education and training models'. When seen in educational terms, CBA was often set against the perceived failings of standards setting and assessment practices in TAFEs and universities.[5] For example, Ashenden wrote in his 1990 commissioned report for the National Board of Employment, Education, and Training (NBEET):

> In Australia assessment has usually been available only at the end of a course of study or training and has frequently been so imprecise that guarantees of standards have in fact depended as much or more on the fact that the course has been completed as on the results of assessment. (p. 9).

---

5. In fact, long before ministers agreed to the national training agenda, at least one State had implemented CBA in an effort to rectify perceived failures of the TAFE assessment system. For example, in 1986 the Western Australian government decided to introduce a CBA system which required revamping of assessment in the trades.

> There is voluminous research literature to show that assessment remains one of the least developed—indeed most amateurish—of the practices of education and training institutions. (p. 43)

Interestingly, Ashenden did call for a 'paradigm shift' in CBA quality assurance 'requiring or developing systematic evidence on outputs and outcomes … the use of standards moderation procedures' (p. 68). He was aware of precedence in senior secondary schooling which he saw as offering the model of this moderation (p. 69). He expressed a vision of quality certificates that he understood must be buttressed by a more credible standards-setting system: 'The power and usefulness of certificates are partly determined by their reliability, credibility, and understandability … Australia lacks a system of recognition of certificates, and so most Australian certificates have limited exchange value' (p. 23). His own consultations certainly raised a broad range of concerns about the quality of existing competency standards-setting in Australia a decade ago, including the observation that

> there are already well documented difficulties in assessing technical skills—the tendency to produce 'assessment schedules' which are little more than long lists of trivial tasks and skills, for example. It is more difficult still to define the standards and to observe performance in the so-called 'higher competencies'. (p. 43)

During this decade of change there has been sustained criticism of traditional measurement models of assessment by proponents of assessment approaches associated with the vocational education and training sector: their dissatisfaction has largely been directed against standardised norm-referenced testing (Hayton & Wagner 1998).

Most commentators agree that the concept of competency that appeared in the early 1990s in Australia did distance itself from the more narrow, behaviourist, instrumental competency-based training model. It is true that in 1992 the National Training Board did propose a broad view of CBA:

> the concept of competency focuses on what is expected of an employee in the workplace rather than on the learning process, and embodies the ability to transfer and apply skills and knowledge to situations and environments … This is a broad concept of competency in that all aspects of work performance, and not only narrow task skills, are included'. (National Training Board 1992, p. 29)

To support this claim for an early, broader Australian view of competency-based training and assessment, commentators often point to the definitions of the generic 'key competencies' proposed in the Finn and Mayer reports.

Industry, in the form of industry training advisory bodies (ITABs), took a prominent role in setting the assessment agenda in a context of tension between them and public vocational education training providers. A government-funded investigation of methods of assessment of the time commented that the ITABs 'face the task of creating, from scratch, an assessment system often in conjunction with new training provisions or with new awards or enterprise agreements' (Toop, Gibb & Worsnop 1994, p. 40). Case studies of the work involved in developing competency standards in the different industries documented by Toop, Gibb & Worsnop (1994) and others support the view that this work was directed largely by industry representatives[6] and shared certain features, including:

---

6. By January 1995, 47 competency standards bodies were operating.

- a focus on the lower ASF levels 1–3 (this focus arose from the implementation of skill-based awards and enterprise agreements)
- an emphasis on the importance of allowing industry to regulate training and assessment
- a push for workplace assessment
- an emphasis on training assessors
- an emphasis on supporting documentation and detailed record keeping
- the assumption that making the detail of standards explicit (prescribing standards) is a central part of having quality standards.

The use of a 'functional analysis' approach was recommended for bodies developing competency standards in Australia. This approach was derived from the UK where it was developed to deal with a situation in which the concept of competency had led to excessively long and impracticable lists. In Australia, the results of this 'functional analysis' were

> a number of Units of Competence each divided into a set of Elements of Competence with their associated Performance Criteria to be used in judging whether an individual is 'competent' in relation to that particular element. (Bowden and Masters 1993, p. 25)

In short, much has happened since competency-based training was formally endorsed by the Ministerial Council in 1990 and 1991 in the form of two reports—*A Strategic Framework for the Implementation of a CBT System* (Commonwealth/State Training Advisory Committee 1990) and the *Operational Plan* for the implementation of competency-based training (VEETAC 1990). These changes have, of course, involved some controversy. Some commentators (e.g. Ahearn 1993) have argued that the education community has been largely alienated from these changes and insufficiently consulted so that competency-based education in Australia developed largely without dialogue with, and advice from, educators themselves. (This was for reasons that are highly contested: some say the educators were excluded, others say they excluded themselves.)

The present use of criteria for measuring competencies reported on the Queensland Senior Certificate is based on the industry-endorsed approach to the development of workplace competencies described in the foregoing discussion. The competency-based standards originally incorporated into Board syllabuses and SASs are those derived from Competency Standards Bodies[7], groups from industry officially recognised by the National Training Board which, by 1995, had developed competency standards to cover much of the workforce and the bulk of occupations (Harris 1996, p. 11).

Clearly, it is not possible to capture all the nuances of the history of CBA in this short paper. Some of the larger events and movements can be signposted but, of course, any period of great change in education will be a period full of complexities and varied perspectives. At the end of almost a decade of reform it is clear that there is considerable diversity in the practices for implementing VET across Australia and that some of the various 'strains' of CBA being implemented across this country show important differences, both in terms of the detail of practices and the underlying principles (Thomson, Mathers & Quirk 1996).

---

7. Of course, these subjects have now been revised to reflect the new National Training Packages.

What are the fundamental challenges of implementing CBA in Queensland senior secondary schooling?

QBSSSS was not the first organisation to produce evaluations of the implementation of VET, nor are these evaluations likely to be the last. However, it is fair to say that when the existing body of research into the implementation of VET is considered, there are few studies focusing upon the challenges faced by schools as providers of VET.

These challenges are not likely to go away, although they may be lessened over time for, as has been noted, the new policy direction of Training Packages carries with it the same kinds of assumptions and approaches to CBA that have been detailed in this paper.

We know from the Queensland study of the implementation of SASs that teachers are more dissatisfied with assessment practices than with any other area. Few who have really listened to what teachers are saying would want to argue there is a single explanation for this. The 1999 Board SAS evaluations study identified a number of key challenges:

Reconciling different approaches to assessment

Some teachers who are coming from CSBA to CBA for the first time (or are new to both) feel initially rather overwhelmed with a sense of these differences. Queensland teachers who feel this are not alone. For example, Chappell (1996, pp. 68–69) has argued:

> For many teachers, competency standards are now a central and problematic feature of practice. They are being asked to develop and deliver competency-based programs that are informed by competency standards of highly variable quality. Standards that fail to incorporate crucial attributes of practice lend themselves to a technico-instrumental CBT curriculum that concerns itself with narrowly defined and atomised task outcomes. Many teachers are therefore faced with the dilemma of implementing a curriculum that not only flies in the face of their understanding of learning theory, but also fails to consider the crucial importance of the learning process in the development of those generalisable abilities that are regarded, by many, as the primary aim of education.

Gaining teacher confidence with the definition of competency

Green (1998) argues that 'the validity of competency-based systems requires a shared understanding among assessors and users of the terms used to report results'[8] (p. 26). If, as some commentators are arguing, there is uncertainty whether a shared understanding exists among TAFE teachers and/or employers, it might not be a simple matter to create one for teachers using existing VET quality assurance procedures. Certainly, the Board's recent evaluations of SASs (Bell, Williams and Paties 1999) suggest that some teachers feel that the concept of competency is not as clearly defined as some would like to believe.

---

8. Interestingly, Green's paper, which examines the introduction of competency-based assessment in a tertiary vocational college in Japan, concludes that the manageability of the system and difficulties agreeing on standards were the key implementation issues.

Developing simple and effective methods of assessment, including record-keeping systems

There are teachers who feel that the detail required by VET forces them into an endless cycle of assessment.[9] For some it has been difficult to design assessment instruments that measure the criteria for not one but a number of competencies. Some teachers feel that it is difficult and impracticable to decide a level of achievement as well as decide competencies; that is, to integrate competency-based and criteria-and-standards-based assessment.

Again, Queensland teachers are not alone. Ashenden in his 1990 review *The Recognition of Vocational Training and Learning* writes prophetically in a discussion of what should be the 'longer term' issues and guiding principles for the future:

> The fourth and last principle: *keep it simple.*
>
> One of the dangers inherent in this pattern of reform is that it will inadvertently reproduce one of the problems it sets out to solve. Every one of the processes of recognition—setting and approving standards, assessments, recording and all the rest—can be made complicated, subject to several and overlapping authorities, rule-bound, expensive, and frustrating. And there will always be vested interests with plausible reasons for making them so … If this happens the recognition system will collapse under its own weight. (p. 88)

Available data suggest that 'keeping it simple' is a key challenge for implementing CBA in post-compulsory schooling. For some teachers, making this exhortation an in-practice reality is the hardest part of making CBA work well for them and their students. There are, in fact, many teachers who are satisfied with the simplicity and effectiveness of their assessment methods in SASs and Board subjects with embedded VET. As new teachers and new schools take up these new subjects, working towards a situation where all teachers feel they have developed a workable method of assessment will be a continuing challenge for teachers, school administrators, employing authorities, systems officers, and not least of all the Board.

What are some useful working principles for teachers combining CBA with CSBA in SAS subjects and Board subjects with embedded VET?

The discussion in these closing sections is based on what our research suggests teachers have found helpful in meeting the challenges of implementing CBA as part of SASs or Board subjects with embedded VET.

First and foremost, it seems that having a sense of the *complementary nature* of CBA and CSBA is useful (as much as a clear sense of their differences). Students who have studied an SAS can receive a level of achievement on their Senior Certificates, as well as any competencies and certificates achieved. While the information about competencies offers the detail of what a student has achieved, the information about level of achievement provides broad information about how well a student has achieved over the whole course of study. CSBA and CBA are compatible in this sense. As we have seen, both involve professional, on-balance judgments about whether a student has met the criteria for achievement.

---

9. Perceived 'excessive' assessment was also an early feature of the implementation of criteria-and-standards-based assessment in Queensland in the 1970s.

Having a sense of the *flexibility that schools can apply* to developing approaches to assessment that allow assessment to be done simply and well, and in ways that are efficient, practicable and manageable for schools, seems also to be helpful. This paper offers some discussion of possible working principles and illustrative strategies for assessment in SASs. Yet what seems to be most important is being aware that schools can and should develop approaches to assessment, including record keeping, that work simply and well. For example, schools can make decisions about when and how to record student achievements in the student record book. Schools can also make their own arrangements for awarding levels of achievement. The Board paper *Practical Suggestions for Integrating Criteria-and-Standards-Based Assessment with Competency-Based Assessment* offers one approach to assessment that teachers can consider along with other approaches.

The SAS curriculum documents also have considerable 'built in' flexibility in terms of content. Teachers have scope to select the order in which competencies will be assessed when designing study plans that suit the needs of their students. This means that the design of the subject, the sequence of learning and assessment, can minimise, rather than maximise, the amount of assessment required. When designing the study plan, some teachers seem to aim to streamline assessment as much as possible. In fact, teachers *need not* assess:

- each competency separately
- each learning outcome/element of the competency separately
- each criterion for the learning outcome separately.

What is important is that teachers make sound professional judgments about student achievement, using simple and efficient assessment methods.

Finally, it seems that having a clear sense of *what teachers are responsible for* can be helpful. The Board, in consultation with schools, is responsible for:

- developing SASs
- registering schools as providers of accredited vocational education
- approving study plans
- certifying students' achievements in SASs.

Schools are responsible for:

- arrangements for implementing and delivering SASs
- continuously improving VET through internal reviews
- assessment decisions.

As has been discussed elsewhere in this paper, levels of achievement in SASs and competencies are not 'moderated' in the way that results in Board subjects are moderated. Some teachers coming from teaching in Board subjects have been concerned that they do not have the feedback on their judgments about standards that they receive under the moderated system. What can be said is that teachers of SASs and Board subjects with embedded VET are responsible for making assessment decisions that are accurate in the sense that they are consistent with the stated criteria (for competencies as well as levels of achievement). This means that students must have demonstrated these criteria in an assessment situation (not necessarily a pen-and-paper activity).

Summary of principles

The following summary of working principles for making decisions about the assessment of SASs is offered to support teachers' efforts to develop sound and manageable practices in their schools. It is not intended to be definitive or conclusive but rather to provide, from our research into these issues, some useful indicators of the principles that teachers may find helpful when approaching assessment.

- Assessment decisions must be accurate in the sense that they are consistent with the stated criteria: an accurate assessment decision may involve a judgment about how well a student has met a criterion in an assessment situation that measures many other criteria.

- Records of assessment such as student record books show the detail of what a student has achieved: a teacher who has met the necessary human resource requirements may 'sign off' on several or even many competencies on the basis of a student's performance in one assessment situation.

- Students should be provided with reasonable opportunities for reassessment of competencies as part of their continuous development: a reasonable opportunity is one that is practicable and manageable for the teacher and the student in the context of the school's resources.

- Records of assessment such as student profiles and checklists of competencies provide different kinds of information about student achievement in the SAS: a sound record-keeping system, including when and how recording occurs, is one that *works well for the school*—that is, is simple and efficient.

- An assessment decision that can be substantiated is a professional judgment based on the evidence of demonstrated student achievement: teachers often have the flexibility to decide what is the best evidence of this achievement; that is, a practical activity observed by the teacher, a pen-and-paper activity, or some other kind of activity.

- Deciding a level of achievement involves consideration of the fullest and latest information about student achievement: if a student has met the assessment criteria for competencies early in the course, the teacher may well decide a level of achievement on the basis of this early information— *there may be no need to reassess.*

- *Grouping competencies* or elements of competencies under the overall criteria for the award of that level of achievement can help organise information relevant to deciding a level of achievement: this grouping can occur at the earliest stage of designing the course.

- Special consideration can involve varying how information about assessment requirements is communicated to students, and how students communicate what they know and can do to the teacher—however, assessment decisions must be accurate in the sense that all students who are awarded a competency or level of achievement have met the relevant criteria.

Useful strategies for supporting sound assessment practices in SASs and Board subjects with embedded VET

Since these subjects were introduced, Queensland schools have had to learn quickly, and much assessment 'know how' has been built up. The following list of strategies illustrates how some schools involved in our research have met these challenges. Clearly, schools, not the Board, are best placed to decide which, if any, of these practices may be useful in their different contexts.

Schools may:

- support and encourage teachers to use the 'human resource requirements' (as found in SASs) as opportunities for exploring applications of assessment criteria in workplace situations

- involve industry personnel in student learning and teaching

- encourage peer discussion and review of study plans for SAS Board-registered subjects in ways that focus on the integration of competencies in assessment instruments; these assessment instruments should assess a range of knowledge and skills (competencies)

- establish and/or participate in regional meetings of teachers exchanging examples of assessment instruments that assess a range of knowledge and skills, and methods of recording assessment information

- circulate copies of Board curriculum evaluation reports for debate and discussion between teachers

- review and develop practices for recording assessment information in ways that provide an across-the-school approach to assessment

- participate in Board workshops, and discuss their assessment challenges with the workshop facilitator

- encourage teachers to contact the Board with their questions about implementation of the subject, particularly if it appears that assessment methods are more cumbersome than those in use in other kinds of subjects.

Other research and discussion papers about CBA

Teachers wanting resources for teaching their subject can consult the list in the curriculum document and/or contact the Office of the Board. However, some teachers reading this discussion paper may want more information about the nature of CBA itself.

A survey of existing literature on competency-based training indicates that critical analysis of this movement in Australia, and in Queensland, has come from many quarters, notably academics, vocational education practitioners and researchers. However, as Chappell (1996, p. 59) has noted, the body of literature on quality issues is scant: the role for competency standards in industrial negotiations has 'overshadowed and to some extent delayed a more rigorous investigation of their quality in terms of educational utility' (p. 62). Others have argued that research in VET has been highly instrumental and

> has simply become an arm of evaluating the level of penetration and performance of government-driven programs … one of the problems with VET research in Australia is the impression that it is inclined to be insular and self-referential, lacking exposure to criticism and the scrutiny of the wider research community (Kell 1999).

In their 1998 book on VET research Robinson and Thomson note that

> vocational education and training in Australia does not have anything like the history of research and evaluation work that underpins practices in our universities and schools (p. 2)

> This is not to say there has been no research; an estimated $10 million of Commonwealth money was spent over a four-year period in the late 1980s and early 1990s on pilot CBT projects which had research and evaluation components. However, the problem with the work done at the time was that it rarely questioned the underlying principles on which CBT was based (p. 4).

When we turn to the developing body of literature on quality assurance in VET in Australia, Hager (1998) notes an important limitation—an emphasis on case studies aimed at developing quality assurance rather than evaluative studies of well-established quality-assurance initiatives.

The approach to assessment that underpins the competency-based training movement is less often critically analysed in research papers. Interestingly, the often-commented-on 'historical tension between liberal and practical concepts of education and training' (Harris et al. 1995, p. 34) has meant that a sustained and constructive critique of VET assessment practices has not been made from an education assessment perspective (such as CSBA in Queensland) that, far from being diametrically opposed to CBA, can claim some kinship to CBA. This may be why there is not a great deal in the research literature that really resonates with our system in Queensland, although there is much that is thought provoking and helpful to a deeper understanding of our local challenges.

While, as Ryan (1998) has suggested, the issue of VET in schools is now a fashionable and much-debated one, the existing VET research that identifies the implementation challenges in senior schools has at times cast schoolteachers in a less than positive light, representing their difficulties in implementing VET as a kind of evidence of moribund academic curricula, school cultures, and so on. This is certainly not our experience in Queensland where the questions teachers have raised about assessment often seem to come from a well-developed understanding of assessment, as well as high expectations for assessment quality (for example, in the area of comparability).

The Bibliography offers further reading.

Conclusions

For the Board, working with schools to support the implementation of sound VET assessment practices has been first and foremost about *listening*, through our evaluations and contact with teachers, to what teachers are saying about assessment in SASs and Board subjects with embedded VET, so that we can understand *why* assessment is sometimes challenging. This paper has explored some of these whys and wherefores, and offered some thoughts in response to the broader 'big picture' questions teachers have asked about assessment in these new subjects.

Teachers' satisfaction that they have developed a simple and workable method of assessment is encouraging, and offers a basis for supporting those who are less than satisfied with assessment. It may be that a clear sense of the 'big picture' issues in CBA is the most helpful thing to have when confronted with the fine detail of the criteria for assessing a particular competency.

This paper has explored some of these 'big picture' issues, for those who are keen to reflect on the broader issues of fitting CBA into CSBA, and of achieving the industry-based outcomes within the wider context of school education. Some of the 'nuts and bolts' for achieving this integration are offered in the Board's companion paper *Practical Suggestions for Integrating Criteria-and-Standards-Based Assessment with Competency-Based Assessment.*

Bibliography

ACTU/TDC Mission to Western Europe 1987, *Australia Reconstructed: Report of the mission members to the ACTU and the TDC*, Australian Government Publishing Service, Canberra.

Ahearn, C. 1993, 'Changing vocational education ideologies 1983–1993: From Kangan to the construction of competency-based training system', in *Australian Curriculum Reform: Action and reaction*, ed. D. L. Smith, Australian Curriculum Studies Association, pp. 14–27.

Ashenden, D. 1990, *The Recognition of Vocational Training and Learning*, report commissioned by the Employment and Skills Formation Council, Australian Government Publishing Service, Canberra.

Ashenden, D. 1998, 'Powerhouse or gravy train? Credentialism and policy on education and the economy', *The Bulletin of the National Clearinghouse for Youth Studies*, vol. 7, no. 2, May 1998.

Australian National Training Authority (ANTA) 1996, *Benchmarking VET: The performance of the vocational education and training sector 1995*, ANTA, Brisbane.

Australian National Training Authority 1998, *Updated Guidelines for Training Package Developers: Australia's National Training Framework*, ANTA, Melbourne.

Australian Qualifications Framework (AQF) Advisory Board 1998, *Australian Qualifications Framework: Implementation handbook*, 2nd edn, AQF, Carlton, Victoria.

Beevers, B. 1993, 'Competency-based training in TAFE: Rhetoric and reality', in *Competencies: The competencies debate in Australian education and training*, ed. C. Collins, Australian College of Education, Deakin, Canberra.

Bell, E., Williams, J. & Paties, B. 1999, *Evaluations of Study Area Specifications*, Queensland Board of Senior Secondary School Studies, Brisbane.

Blachford, K. 1996, *Orientations to the Curriculum in TAFE*, Hawthorn Institute of Education, Melbourne.

Blank, W. E. 1982, *Handbook for Developing Competency-Based Training Programs*, Prentice-Hall, Englewood Cliffs, New Jersey.

Bowden, J. A. & Masters, G. N. 1993, *Implications for Higher Education of a Competency-Based Approach to Education and Training*, Australian Government Publishing Service, Canberra.

Brindley, G. 1989, *Assessing Achievement in the Learner-centred Curriculum*, NCELTR, Sydney.

Broadfoot, P. 1992, *Changing Priorities in Assessment: An international reform agenda*, keynote address at Qualifications for the 21st Century Conference, NZQA.

Chappell, C. S. 1996, 'Quality and competency standards', *Prospect*, vol. 11, no. 1, May, pp. 59–70.

Chappell, C. S. & Hager, P. 1994, 'Values and competency standards', *Journal of Further and Higher Education*, vol. 18, no. 3, pp. 12–23.

Commonwealth/State Training Advisory Committee 1990, *A Strategic Framework for the Implementation of Competency-Based Assessment*, Canberra.

Confederation of Australian Industry 1991, *CBT: Proposals for the Australian Vocational Education and Training System*, Confederation of Australian Industry, Melbourne.

Cornford, I. 1993, *Theories of Skill Development and Research into the Development of Expertise: Some implications for competency-based training*, paper presented to the After Competence: The Future of Post-Compulsory Education and Training Conference, Brisbane, 1–3 December.

Cornford, I. 1997, 'Competency-based training: An assessment of its strengths and weaknesses by NSW vocational teachers', *Australian and New Zealand Journal of Vocational Education Research*, vol. 5, no. 1, pp. 53–76.

Cullen, R. B. 1997, *Report 2: Benchmarking Australian Qualifications Profiles. Workskills and National Competitiveness: External benchmarks*, Performance Management Solutions, Hawthorn, Victoria. (Commissioned by the Australian National Training Authority)

Davis, D. J. 1981, 'Back to beginnings: Credentialism, productivity, and Adam Smith's division of labour', *Higher Education*, vol. 10.

Dawkins, J. 1989, *Towards a Skilled Australia*, Australian Government Publishing Service, Canberra.

Dawkins, J. S. 1989, *Improving Australia's Training System*, official statement by the Federal Minister for Employment, Education and Training, Australian Government Publishing Service, Canberra.

Debling, G. 1992, 'When the assessing has to stop', *Competence and Assessment Compendium 2*, Employment Department, Sheffield, UK.

Department of Labour Advisory Committee 1988, *Trade Training in Australia*, Australian Government Publishing Service, Canberra.

Docking, R. 1994, 'Competency-based curricula: The big picture', *Prospect*, vol. 9, no. 2, pp. 8–17.

Employment and Skills Formation Council 1989, *Industry Training in Australia: The need for change*, Australian Government Publishing Service, Canberra.

Employment and Skills Formation Council 1992, *Australian Vocational Certificate Training System*, National Board of Employment, Education and Training, Canberra.

Field, L. 1990, *Skilling Australia*, Longman Cheshire, Melbourne.

Fletcher, S. 1992, *Competence-Based Assessment Techniques*, Kogan Page, UK.

Fourali, C. 1992, 'Quality systems and the evaluation of competence-based assessment', *Competence and Assessment*, vol. 17, pp. 7–11, Employment Department, Sheffield, UK.

Foyster, J. 1997, 'The debate so far …', *Australian Training Review*, no. 23, p. 25.

Foyster, J. 1999, *Getting to Grips with Competency-Based Training and Assessment*, National Centre for Research and Development, Adelaide.

Gonczi, A., Hager, P. & Heywood, L. 1992, *A Guide to the Development of Competency Standards for the Professions*, Research Paper No. 7, Australian Government Publishing Service, Canberra.

Green, A. 1998, 'Introducing competency-based assessment in a curriculum innovation', *Prospect*, vol. 13, no. 1, pp. 24–39.

Griffin, P. 1995, 'Competency assessment: Avoiding the pitfalls of the past', *Australian and New Zealand Journal of Vocational Education Research*, vol. 3, no. 2, pp. 34–59.

Hager, P. & Gonczi, A. 1993, 'Attributes and Competence', *Australian and New Zealand Journal of Vocational Education Research*, vol. 1, no. 1, pp. 36–45.

Hager, P. 1998, 'Quality assurance in vocational education and training', in *Readings in Australian Vocational Education and Training Research*, National Centre for Vocational Education Research, Kensington Park, South Australia, pp. 340–362.

Harris, R. 1996, *Getting to Grips with Implementing CBT*, National Centre for Vocational Education Research, Kensington Park, South Australia.

Harris, R., Barnes, G., Haines, B. & Hobart, B. 1985, *Competency-Based Vocational Education: An evaluation*, National Centre for Research and Development, Adelaide.

Harris, R., Guthrie, H., Hobart, B. & Lundberg, D. 1995, *Competency-Based Training: Between a rock and a whirlpool*, Macmillan Education Australia, Melbourne.

Hawke, G. & McDonald, R. 1996, *When Rhetoric Meets Reality: Issues confronting the national framework for the recognition of training*, commissioned report, Research Centre for Vocational Education and Training, University of Technology, Sydney.

Hawke, G., & Cornford, I. 1998, 'Australian vocational education policy change: But will the revolution improve the quality of training?', *Australian and New Zealand Journal of Vocational Education Research*, vol. 6, no. 2.

Hayton, G. & Wagner, Z. 1998, 'Performance assessment in vocational education and training', *Australian and New Zealand Journal of Vocational Education Research*, vol 6, no. 1, pp. 69–85.

Kantor, H., & Tyack, D. B. 1982, *Work, Youth and Schooling: Historical perspectives on vocationalism in American education*, Stanford University Press, Stanford, California.

Keating, J. 1995, *Australian Training Reform: Implications for schools*, Curriculum Corporation, Carlton, Victoria.

Kell, P. 1999, 'VET research: A child of policy', *Campus Review*, March 3–9, p. 8, cols 2–3.

Kinsman, M. 1992, *Higher Education and the Competency Movement*, Centre for Continuing Education, ANU, Canberra.

Lord, C. 1999, 'Apprentice scheme gets a shake-up', *The Courier-Mail*, 24 April, Employment, p. 1.

Mansfield, B. 1989, 'Competence and standards', in *Competency-Based Education and Training*, ed. J. W. Burke, Falmer Press, London.

Masters, G. & McCurry, D. 1990, *Competency-Based Assessment in the Professions*, Research Paper No. 2, Australian Government Publishing Service, Canberra.

McDonald, R. 1993, 'Assessment of competence: Issues arising from practice', paper presented at the Testing Times Conference, Sydney, 1–3 November, NCVER/TAFE NSW, Sydney.

McGaw, B. 1993, *Assessment Issues*, paper presented at the Testing Times Conference, Sydney, 1–3 November, NCVER/TAFE NSW, Sydney.

Mitchell, L. & Cuthbert, T. 1989, *Insufficient Evidence: Final report of the competency testing project*, SCOTVEC, Glasgow.

Moy, J. & Hawke, G. 1997, *Training Packages and the Quality of Vocational Education and Training*, unpublished commissioned report, Research Centre for Vocational Education and Training, University of Technology, Sydney.

National Council for Vocational Qualifications 1992, *The Principle and Processes of Assessment: Assessing candidate performance*, Employment Department, Sheffield, UK.

National Training Board 1990, *National Competency Standards: Policy and guidelines*, 1st edn, National Training Board, Canberra.

National Training Board 1992, *National Competency Standards: Policy and guidelines*, 2nd edn, National Training Board, Canberra.

National Training Board 1993, 'Assessment firmly on the agenda', *Network*, no. 10, pp. 6–7.

New South Wales Vocational Education and Training Accreditation Board) 1994, *Accreditation of Competency-Based Education and Training for a Qualification: A review of the literature*, NSW VETAB, Sydney.

New Zealand Qualifications Authority 1992a, *Moderation of Assessment: An introduction for national standards bodies*, NZQA, Wellington, NZ.

New Zealand Qualifications Authority 1992b, *Designing a Moderation System*, NZQA, Wellington, NZ.

Nicholas Clark & Associates 1986, *Standards-Based Training: A discussion paper*, n.p.

North, B. 1993, *The Development of Descriptors on Scales of Language Proficiency*, The National Foreign Language Center, Washington DC.

Otter, S. 1996, 'Modularisation and qualifications reform in the UK: Some realities', *European Vocational Training Journal*, vol. 7, Jan–April, pp. 31–34.

Peddie, R. A. 1997, 'Some issues in using competency-based assessment in selection decisions', *Queensland Journal of Educational Research*, vol. 13, no. 3, pp. 16–45.

Queensland Board of Senior Secondary School Studies 2000, *Practical Suggestions for Integrating Criteria-and-Standards-Based Assessment with Competency-Based Assessment*, QBSSSS, Brisbane.

Robinson, C., & Thomson, P. 1998, *Readings in Australian Vocational Education and Training Research*, National Centre for Vocational Education Research, Kensington Park, South Australia.

Rowley, G. 1982, 'Historical antecedents of the standards-setting debate: An inside account of the minimal-beardedness controversy', *Journal of Educational Measurement*, vol. 19, no. 2, pp. 87–95.

Ryan, R. 1997, 'Does Australia need CBT?', *Australian Training Review*, June–August, pp. 21–25.

Ryan, R. 1998, 'Vocational Education in Schools', in *Readings in Australian Vocational Education and Training Research*, eds Robinson, C. & Thomson, P., National Centre for Vocational Education Research, Kensington Park, South Australia, pp. 245–266.

Spaull, A. 1992, 'A historical essay', in *Education and Work*, ed. M. Poole, Australian Council for Educational Research, Victoria, pp. 21–39.

Stevenson, J. 1995a, 'The political colonisation of the cognitive construction of competence', *Journal of Vocational Education and Training*, vol. 7, pp. 353–364.

Stevenson, J. 1995b, 'Using cognitive structures and cognitive dispositions to analyse values in vocational education', *Australian Journal of Education*, vol. 39, no. 2, pp. 126–145.

Stevenson, J. 1996, 'The metamorphosis of the construction of competence', *Studies in Continuing Education*, vol. 18, no. 1, pp. 24–42.

Sweet, R. 1995, *Linking Schools and Workplaces: Lessons from Australia and overseas*, Occasional Paper 1, paper presented to the Second World Convention of the International Confederation of Principals, Sydney, Australian Student Traineeship Foundation.

Taylor, F. W. 1947 (1911), *Scientific Management: Comprising shop management, the principles of scientific management, and testimony before the special house committee*, Harper and Row, New York.

Thomson, P., Mathers, R. & Quirk, R. 1996, *The Grade Debate*, National Centre for Vocational Education Research, Kensington Park, South Australia.

Toohey, S., Ryan, G., McLean, J. & Hughes, C. 1995, 'Assessing competency-based education and training: A literature review', *Australian and New*

Zealand Journal of Vocational Education Research, vol. 3, no. 2, pp. 86–117.

Toop, L., Gibb, J., & Worsnop, P. 1994, *Assessment System Design*, Australian Government Publishing Service, Canberra.

Tovey, M. D. 1997, *Training in Australia: Design, delivery, evaluation, management*, Prentice Hall, Sydney.

VEETAC 1993, *Framework for the Implementation of Competency-Based Vocational Education and Training System*, VEETAC, Canberra.

VEETAC: Working Party on the Implementation of Competency-Based Training 1990, *Operational Plan*, VEETAC, Canberra.

Wheeler, L. 1993, 'Reform of Australian vocational education and training: A competency-based system', in *Competencies: The competencies debate in Australian education and training*, ed. C. Collins, Australian College of Education, Canberra.

Whiteley, J. 1991, *CBT: Assessment models appropriate for competency-based training and their relationship to teaching and learning approaches*, Research and Development Division, Office of Vocational Education, Training and Employment Commission, Brisbane.

Wilson, B. 1987, *The Systematic Design of Training Courses*, vol. 1, Parthenon, Carnforth, UK.

Wolf, A. 1995, *Competence-Based Assessment*, Open University Press, Buckingham and Philadelphia.

Woodruffle, C. 1990, *Assessment Centres: Identifying and developing competence*, London Institute of Personnel Management, London.