Principles of competency-based assessment

It is often thought that competency-based assessment is something totally new in the world of education and training. This is due to the fact that competency-based assessment assesses a person's competence against prescribed competency standards, and such competency standards are of recent origin in Australia. However this line of thought overlooks the point that competency-based assessment is a species of performance assessment, which is a type of assessment that was well established in education and training long before competency standards came along. Thus, to the extent that teachers and trainers are familiar with performance assessment, competency-based assessment is a continuation of something that they have already been practising. Therefore the advent of competency standards offers the possibility of further contributions to trends that were already part of innovative education and training practice. However, there are different kinds of competency standards and not all are equally valuable from the perspective of sound education and training practice. Obviously, educationally valuable competency standards will be ones that can help learning to become more effective, by assisting with course development, teaching strategies, assessment strategies, etc. What kinds of competency standards have these features?

Kinds of competency standards

The major distinguishing feature of different kinds of competency standards is the different ways that they conceive of competence. This point is crucial because the current debate in Australia about the role and value of competency standards has highlighted the fact that there is a lot of confusion about precisely what competence is. In this section I will outline briefly the three major conceptions of the nature of competence that have been employed in the debate in Australia. It will be seen that each different conception leads to a different way of thinking about competency standards.

The first, and probably the most widely held, conception of competence is the task-based or behaviourist approach. This approach conceptualises competence in terms of the discrete behaviours associated with the completion of particular tasks. In effect tasks become the competencies, so that a mechanic who can replace a fuel
pump is said to possess the competency of fuel pump replacement. This approach is unconcerned with the various connections between tasks and ignores the possibility that the coming together of tasks might lead to their transformation, ie it is assumed that the whole is not greater than the sum of its parts.

Evidence of competence on this view comes from direct observation of performance of a long series of discrete tasks. Those who follow this approach tend to see the curriculum for education and training programs as being based on the series of behaviours/tasks specified in the occupation's competency standards. In Australia this approach has been adopted by some of the occupations that first developed competency standards. It is also the model of competence that is typically in the minds of the most vocal critics of competency standards.

The weaknesses of this approach to competence are easy to enumerate. It is excessively reductionist in that the occupation is viewed as an increasing number of smaller and smaller tasks; it ignores attributes that underlie competent performance; it ignores group processes and their effect on performance; it omits the role of judgement in intelligent performance. It is conservative and atheoretical. It also leads to invalid assessment processes. By viewing competence as the capacity to successfully perform a series of discrete observable tasks, assessment boils down to an observer simply ticking off a checklist of the discrete tasks. This approach to assessment of competence has been widely criticised on the grounds that reducing an occupation to a series of discrete observable tasks provides a trivial and superficial representation of the occupation. If this is so, then no matter how technically correct the assessment procedures are, they will not be measuring occupational competence. Thus they will be invalid.

The second conception of competence concentrates on the general personal attributes that are crucial to effective performance. The focus is on those general attributes that are taken to underlie competent performance of a wide range of specific tasks. Typical general attributes include knowledge, communication skills, planning, analysis, pattern recognition, etc. The assumption is that someone who has these general capacities will be able to apply them appropriately to a wide range of specific tasks. Thus the fundamental idea is that a general attribute, such as problem solving, can be applied (or transferred) to many or all situations. In this approach, competencies are equated with general attributes, ignoring the context in which they might be applied. Assessment is viewed in terms of a
strategy to assess each of these separate attributes. An example of this approach is Klemp (1988), who found that very successful performers in a range of jobs were distinguished by the following general attributes: diagnostic thinking, conceptualisation, systematic thinking, influence skills, sensitivity to others, ability to use informal processes, confidence, initiative and persistence.

There are a number of problems with this approach. First, there is no certainty that many generic competencies actually exist. The evidence from the novice/expert research and from the critical thinking literature suggests that expertise (high levels of competence) has some significant domain specific features. Second, these general attributes are of limited help to those involved in the practicalities of designing education and training programs. Third, this particular approach has been widely criticised on the grounds that assessing attributes in isolation from actual work practice bears little relation to future occupational performance. In fact, attributes such as problem solving, analysis, pattern recognition, etc. are highly context dependent, so that attempts to teach them out of context are largely misconceived. Hence, this generic approach to assessment of competence is of very dubious validity.

Neither of these conceptions of competence has been the one employed by, for example, the 20 or so professions in Australia that have set out to establish competency standards. Rather, they have employed an integrated conception of competence (Gonczi, Hager and Oliver, 1990; Heywood, Gonczi and Hager, 1992). According to this third approach, the 'integrated' conception, competence is conceptualised in terms of knowledge, abilities, skills and attitudes displayed in the context of a carefully chosen set of realistic occupational tasks which are of an appropriate level of generality. Such an integration of attributes with tasks of an appropriate level of generality accords with the root meaning of the concept of 'competence' (Hager and Gonczi 1993, pp36-8). It also accords with the view of competence propounded in key Australian policy documents (Hager and Gonczi 1993, pp38-40). This third approach to competence seeks to link general attributes to the context in which these attributes will be employed. It accepts that complex combinations of attributes (knowledge, attitudes, skills, etc.) underpin occupational performance. A feature of this integrated approach is that it avoids the problem of a myriad of tasks by selecting key tasks or elements that are central to the practice of the occupational. The main attributes that are required for the competent performance of these key tasks or elements are then identified. Experience has shown that when both of these are integrated to produce competency
standards, the results do capture the holistic richness of the practice of an occupation, including such things as professional judgement, in a way that neither of the other two approaches could. This approach also allows for there being more than one appropriate response in a given situation, as well for the framing of unique responses to changing contexts.

Several important implications flow from the integrated definition of competence:

(a) *Performance* is what is directly observable, whereas competence is not directly observable, rather it is inferred from performance. This is why competencies were defined as combinations of attributes that underlie successful performance.

(b) Both attributes of the practitioner and performance on elements or key occupational tasks are essential ingredients of the above definition of competence. This means that attributes of individuals do not in themselves constitute competence. Nor is competence the mere performance of a series of tasks. Rather, the notion of competence integrates attributes with performance. According to this integrated conception, competence incorporates knowledge, skills and attitudes displayed in the context of a carefully chosen set of realistic occupational tasks or elements which are of an appropriate level of generality.

Since integrated competency standards are based on the idea that competence is a construct which is not directly observable, but rather is inferred from successful performance, it is clear that performance will be important for assessment in many cases. Some of the competency standards, however, will be less easily assessed through performance than others. Equally important will be the requirement that sufficient evidence be gathered to justify the inference. While evidence from performance will be important to assessment, it often will be supplemented by other kinds of evidence. This is particularly the case with a complex knowledge base which may not be able to be inferred from performance.

In this paper I will not discuss the processes by which competency standards are developed. However there are many methods available for their development (see Gonczi, Hager and Oliver, 1990: Section 6) and the choice of method is likely to strongly influence the type of competency standards produced. Wagner (1993) found that in the development of the Bread Baking and Cake Baking competency standards, a DACUM method identified many more discrete tasks
than a modified functional analysis, which was much better at identifying job functions and outcomes. The modified functional analysis was also much better than the DACUM for addressing the holistic aspects of the work, such as planning and contingency management.

So far, I have argued that integrated competency standards are the most educationally valuable. However all types of competency standards can be misused in ways that would hinder education and training.

How competency standards can be misused

Course development
Competency standards of whatever kind can hinder course development if the competency standards are confused with a curriculum document. That the two things are different becomes apparent when we realise that competency standards are a description of some of the things that a graduate should be able to do at the end of the course, whereas a curriculum document is a description of what is to be learnt and how it is to be learnt, as well a statement of what people should be able to do at the end of the course. In other words, a curriculum describes a developmental process by which certain outcomes will be achieved at the end, whereas competency standards describe the outcomes without specifying how they are to be learnt. Task-based competency standards are the ones most likely to be confused with a curriculum document, thereby generating a course that consists of the teaching of a series of discrete tasks. As discussed already, this results in a trivial and superficial representation of the occupation, as well as various other problems.

One of the interesting issues that competency standards raises for providers of vocational education and training is the degree to which courses can be modularised whilst still remaining effective. This is a promising area for research in the next few years.

Teaching
Similar arguments apply to teaching as applied to course development. Teaching is an important part of the process that aims to arrive at the outcomes specified in the competency standards. However, as the integrated view of competence suggests, various attributes, such as knowledge and skills are typically prerequisites for performances specified in the competency standards. Thus it will be a
waste of effort to try to teach the elements of the competency standards one by one unless the groundwork of requisite knowledge, skills, etc. has already been laid. In some cases at least, this requires a significant developmental process. This suggests that the competency standards, as a guide to actual teaching activities, will be more useful in the later, rather than the earlier, stages of a course. This is when vocational courses are usually more concerned with actual workplace conditions anyway. If as, argued above, task-based competency standards are invalid, the futility of teaching element by element from such competency standards should be obvious. Rather than raising the skill levels of Australia’s workforce, the opposite would be the result.

Assessment
Task-based competency standards are attractive to some because they offer the possibility of simple element by element assessment by direct observation of the performance of tasks against a check list. This view of competency-based assessment may have appeal to some TAFE teachers and industry trainers, meshing as it does with the behavioural objectives approach to curriculum development and teaching with which they are familiar. However, as discussed above, such assessment raises invalidity problems of several kinds. In general it assesses superficial aspects of an occupation and ignores what is involved in quality performance. Experience has also shown that, despite its initial attraction for some, this approach leads to unacceptably large amounts of time being spent on assessment of a myriad of discrete tasks.

How competency standards can help education and training

Course development
Accepting the point that competency standards are summative rather than formative, and hence are not a curriculum document, they are nevertheless a useful guide for course development. When competence is conceptualised via the integrated approach in terms of knowledge, abilities, skills and attitudes displayed in the context of realistic occupational tasks, they offer very valuable guidance for course development. For the early parts of the course, they suggest the kinds of underpinning knowledge, abilities, skills and attitudes that graduates need. For the later parts of the course, they suggest major outcomes that potential graduates should be close to attaining.
Teaching
As always, there is more than one way to teach effectively to achieve some specified outcome. Hence, though the competency standards describe the major expected outcomes of successful completion of the course, they do not prescribe in detail the teaching strategies that will best lead to these outcomes. Thus, for providers there is as much flexibility as ever to decide what to teach when and how to teach it. However, assuming that there is room for improvement in most existing courses, a good set of competency standards will provide invaluable guidance on appropriate methods of delivery.

Assessment
In the early stages of courses foundational knowledge and a range of enabling skills, which provide an essential basis for the future development of occupational competence, need to be acquired. Whenever this is so, the competency standards will not be immediately relevant to course assessment practices. This is because, as already noted, the competency standards describe competence as a major expected outcome or achievement of successful completion of the course. They do not describe the developmental process by which competence is acquired. So whatever way the curriculum is constructed, attainment of appropriate developmental stages, rather than of full occupational competence, will be most typically the concern of assessment. However in later stages of courses, assessment against competency standards is likely to become increasingly important. Since the later stages of many vocational education and training courses already feature performance assessment of various kinds, competency-based assessment is a continuation of something already familiar to teachers and trainers.

The integrated approach to conceptualising competence, that was recommended above, needs to be paralleled by an integrated approach to the assessment of competence. To demonstrate the benefits of the integrated approach to the assessment of competence, I will outline some main principles of competency based assessment.

Some principles of competency-based assessment
Given that competency-based assessment is concerned with performance against competency standards, I will now outline and discuss a number of principles that will assist such assessment to be efficient, reliable and valid. Firstly, as a general rule in competency-based assessment, the assessment method should be matched with the type of performance being assessed. For example, a
real estate agent’s capacity to identify a client’s needs is probably best assessed by direct observation of performance using a real or simulated client, whereas less tangible competencies, such as interpretation of a market report, can be best assessed more indirectly through some kind of questioning situation such as a written or oral test. Thus, we should always try to select the methods that are most direct and relevant to the kind of performance being assessed. The methods available include:

**Questioning techniques**: projects/assignments; problems; case studies; written tests

**Simulations**: simulated clients; simulated workplaces; situational exercises

**Skills tests**: standardised clients; work samples; structured problems and tasks

**Direct observation**: supervisor evaluations; placements; probational year; internship; industrial experience

**Evidence of prior learning**: portfolios; log books, qualifications, referees.

A second general principle, important for ensuring the validity of competency-based assessment, is that the narrower the base of evidence for the inference of competence, the less generalisable it will be to the performance of other tasks. An obvious example is that performance on paper-and-pencil tests alone would probably be too narrow a base for assessing competence in any occupation. Equally, observation of performance on a narrow range of routine tasks would be too narrow a base for assessing competence in many occupations. Hence, in accordance with this general principle, it is recommended that a mixture of the methods listed above be used for providing evidence on which to infer competence.

A third principle of competency-based assessment is that integrated or holistic assessments should be used wherever possible to cover multiple elements and/or units from the competency standards. This enables the assessment to be more valid, whilst at the same time saving on costs and being more efficient. The first step in choosing from the available assessment methods is to ascertain which ones are most capable of assessing competence in an integrated manner. Integrated approaches seek to combine knowledge, understanding, problem solving, technical skills, attitudes, and ethics in assessment. Integrated or holistic assessment can be characterised as:
problem oriented;
interdisciplinary;
embracing actual practice;
covering groups of competencies;
focusing on common circumstances;
demanding analytical abilities; and,
combining theory and practice.

The integration comes about by having methods which assess a number of elements and all their performance criteria simultaneously. Thus carefully planned simulations enable various elements of the competency standards to be assessed (or partly assessed) in the one assessment event. Likewise, standardised cases can be used as integrated assessment events to simultaneously assess several elements, such as conducting individual interviews, monitoring the progress of clients, and compiling case records and reports. These standardised cases are also capable of providing evidence of a number of attributes at the same time, such as attitudes, communication skills, background knowledge, and so on.

If an integrated approach to assessment is to be used there is a need to group certain of the learning outcomes felt to be desirable in the case of a vocational course, or certain elements of competence in the case of the occupations competency standards. There are various ways of grouping learning outcomes to develop an assessment strategy (see Gonczi, Hager and Athanasou, 1993). It may be helpful to consider briefly an example. The table below indicates some possible forms of assessment for pilot competencies.

Some methods of assessment for pilot competencies

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>METHODS OF ASSESSMENT</th>
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<tbody>
<tr>
<td>Observable technical performance</td>
<td>Minimum 1500 hours, six month simulator check</td>
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<tr>
<td></td>
<td>Six month route check</td>
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<td></td>
<td>Licence renewal</td>
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<td></td>
<td>Six month asymmetric check (i.e., engine failure)</td>
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<td></td>
<td>90 day requirements for non-directional beacon</td>
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<tr>
<td></td>
<td>VHF omni-directional radio range and instrument landing system</td>
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<tr>
<td></td>
<td>90 day requirements for take-offs and landings both day/night</td>
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<tr>
<td></td>
<td>5 hours instrument flight time</td>
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<tr>
<td></td>
<td>Medical check</td>
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<tr>
<td></td>
<td>In-flight assessment by check captain or simulator</td>
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Testing Times

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<tr>
<th>Problem-solving</th>
<th>Simulator</th>
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<td></td>
<td>In flight problems assessed by check captain</td>
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<tr>
<th>Knowledge</th>
<th>Aircraft systems - oral questioning</th>
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<tr>
<td></td>
<td>Civil Aviation examinations (meteorology 70%; navigation 70%; flight planning 70%; air legislation 80%)</td>
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<tr>
<th>Attitudes</th>
<th>Oral questioning on company policy and requirements</th>
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<tr>
<td>Work habits</td>
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Source: Athanasou (1992)

In this case grouped categories served as the basis for deciding specific forms of assessment, and while direct observation is emphasised, a variety of methods are employed. If direct observation were not possible, then a combination of assessment forms would be considered (e.g., simulation, written tests, etc.). A wide range of assessments can be used with these elements and it is possible to encompass some elements (or learning outcomes) within one or more forms of assessment.

Summary

Educationally valuable competency standards, if used in appropriate ways, will help significantly with course development, teaching strategies, assessment strategies, etc. As such they represent a continuation of trends towards performance assessment which has been a feature of vocational education and training. However competency standards of any kind, if used inappropriately, can hinder the aims and processes of vocational education and training. Vocational educators and trainers would be wise to treat with caution those whole-hearted advocates of competency standards who seem to think of them as a simple solution to every problem. Equally misguided, in my view, are those who simply reject competency standards without real consideration of their possibilities.
Acknowledgement

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Bibliography


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