ED 317 849   CE 054 724

AUTHOR   Foyster, John
TITLE   Getting to Grips with Competency-Based Training and
                Assessment.
INSTITUTION   TAFE National Centre for Research and Development,
                Ltd., Leabrook (Australia).
SPONS AGENCY   Australian Dept. of Employment, Education and
                Training, Canberra.
REPORT NO   ISBN-0-86397-054-0
PUB DATE   90
NOTE   78p.; For a related document, see CE 054 723.
AVAILABLE FROM TAFE National Centre for Research and Development,
                Attn: Sales, 252 Kensington Road, Leabrook, South
                Australia 5068 ($9.00 Australian).
PUB TYPE   Reports - Descriptive (141) -- Reference Materials -
                Bibliographies (131)

EDRS PRICE   MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS   Adult Vocational Education; Competence; *Competency
                Based Education; Cost Effectiveness; *Employment
                Qualifications; Evaluation Criteria; Foreign
                Countries; Industrial Structure; Job Development;
                *Job Skills; *Job Training; Skill Analysis;
                Specifications; Standards; *Student Evaluation; Task
                Analysis
IDENTIFIERS   *Australia

ABSTRACT
                Written for the Australian general reader who wants
to understand important trends in vocational education and training,
this document consists of a description of competency-based training
(CBT) and assessment, a short test of readers' CBT understanding, and
an annotated bibliography. The introduction states the aims of the
document, lists five major steps in the development of CBT programs,
and explains that CBT's superiority over traditional methods in
bringing employees' skills to required levels is what accounts for
its frequent adaptation. The five steps in CBT development are skill
identification, organization of the skills into appropriate groups
from which learning activities can be developed, development of the
physical materials upon which the training program will be based,
staff development, and detailed recordkeeping. The second section
defines competence and applies that definition. The third section
describes competency-based training programs, including desirable
characteristics of such programs. The fourth section addresses the
issues surrounding testing for competency, including why it should be
done, gathering evidence, articulating standards, the validity and
reliability of standards, cost-effectiveness, methods of assessing,
recordkeeping, and maintaining standards. The fifth section considers
the implications of CBT for employers, teachers, and learners. A
short test of readers' understanding of CBT, 27 annotated references,
and the answers to the test conclude the document. (CML)

TAFE

TAFE NATIONAL CENTRE FOR RESEARCH AND DEVELOPMENT LTD

ED317849

GETTING TO GRIPS WITH
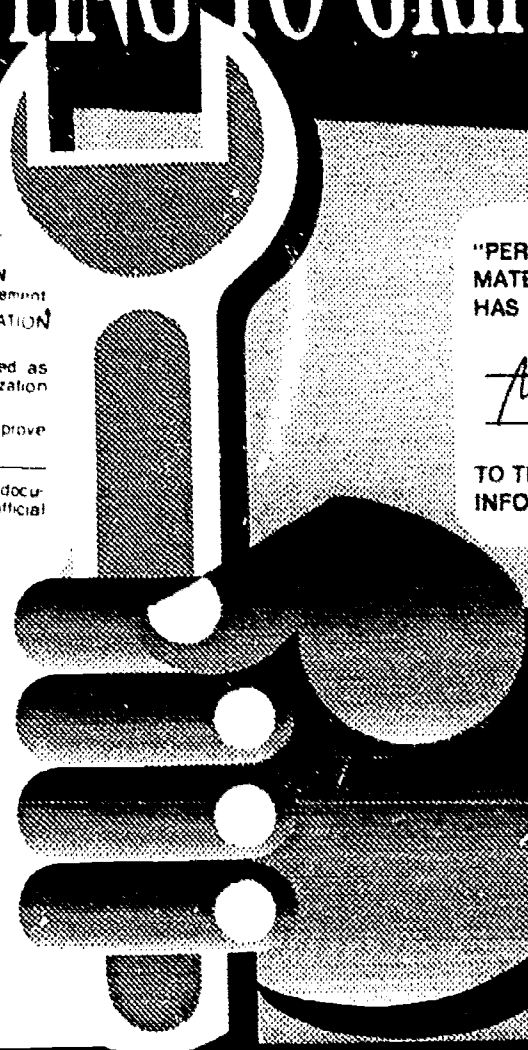
COMPETENCY – BASED
TRAINING AND ASSESSMENT

2

GETTING TO GRIPS WITH COMPETENCY-BASED TRAINING AND ASSESSMENT

John Foyster

ABOUT THE SERIES

The "Getting to Grips With . . ." series has been written for the general reader who wants to understand important trends in vocational education and training. The first two booklets in the series have been generously funded by the Commonwealth Department of Employment, Education and Training.

Each booklet is in two parts. The first part comprises a description of the subject matter in a manner which is intended to be clear to any interested layperson. The second part gives an annotated list of publications for those who want to read further.

Other titles in the series include: *Getting to Grips With Skills Audits* and *Getting to Grips With Industry Restructuring.*

The Series Editor is Dr. William Hall, Executive Director, TAFE National Centre for Research and Development. The Series Designer is Bain Middleton. Photographs were provided by Advertiser Newspapers Ltd and CALS Media Unit, Adelaide College of TAFE.

ABOUT THIS BOOKLET

This booklet has been written by John Foyster who is Co-ordinator of Evaluation and Curriculum Development at the Senior Secondary Assessment Board of South Aus'ralia. Much help was provided by Peter Thomson, Gar Hilton, and Geoff Hayton.

4

CONTENTS

INTRODUCTION

Getting To Grips with Competency-Based Training and Assessment is a document intended to *introduce* the general reader - who could be involved in training or retraining in any of several roles - to the ideas associated with this form of learning.

One of the points made in the document is that success in carrying out a task depends upon mastering an extensive range of skills.

Mastery in the conduct of competency-based training programs should *not* be expected to follow from reading an introductory document like this. But the reader should become sufficiently expert to understand the development of a competency-based program by someone else with more expertise.

And the reader should be able to handle the short test which appears at the end of the document!

Competency-based training (CBT) requires more planning and management than traditional education.
Competency-based training is spreading, despite this 'handicap' of additional planning, because it usually works much more effectively to bring employees to the required skill levels than do traditional methods.

There are five major steps in the development of a CBT program.

* An extensive consultation process is required to identify the skills relevant to the particular position in the given industry.

* The skills which have been identified must then be organized (both intellectually and practically) into appropriate groups from which learning activities can be developed.

* The physical materials upon which the training program are to be based will have to be developed; these are more extensive than those in traditional programs.

* Those administering the CBT program need to prepare themselves for 'teaching' in a style differing significantly from the traditional approach, and they also have to manage some preparation of the learners, who will probably be expecting the traditional approach to teaching/learning.

* There is also a need to maintain rather more detailed records than is customary; this takes some preparation and some time during the operation of the program.

If there is so much additional planning, why adopt competency-based training?

Because those who *have* adopted it have found that CBT produces more skilled, more satisfied workers, more quickly. And because the flexibility of the CBT system is better able to adapt to changing industrial structures, it is more suited to the Australian industrial climate.

8

Competency-based training makes more sense for all of those involved. But like most good things, you have to work to get it.

THE MEANING OF COMPETENCE

The meaning of *competence* will be explored through discussion of the following:

* Are you competent?

* What is competence?

* The components of competence

* Applying the definition of competence

* Needing to know

* Schools and training

* Competence in what?

* Dealing with the problems of defining skills.

Are you competent?

Are you competent to read this document?

'Competent' is an interesting word to use about people. Its meaning seems to change depending on whether you are using the word about someone else or whether someone else is using the word about you. A question about *you* being competent might offend you, but a question about someone else being competent somehow seems quite acceptable.

But memory also plays a part. Some readers would be happy to be told that they were 'competent' - for example at their jobs. Others might not be happy to be told they were 'competent' because they remember from their school days that 'competent' seemed to stand for 'marginally satisfactory', and that 'Good', 'Very Good', and 'Excellent' were higher categories.

In a publication about competency-based training and assessment it naturally becomes important to understand just what is meant by 'competence'.

(CALS Media Unit)

11
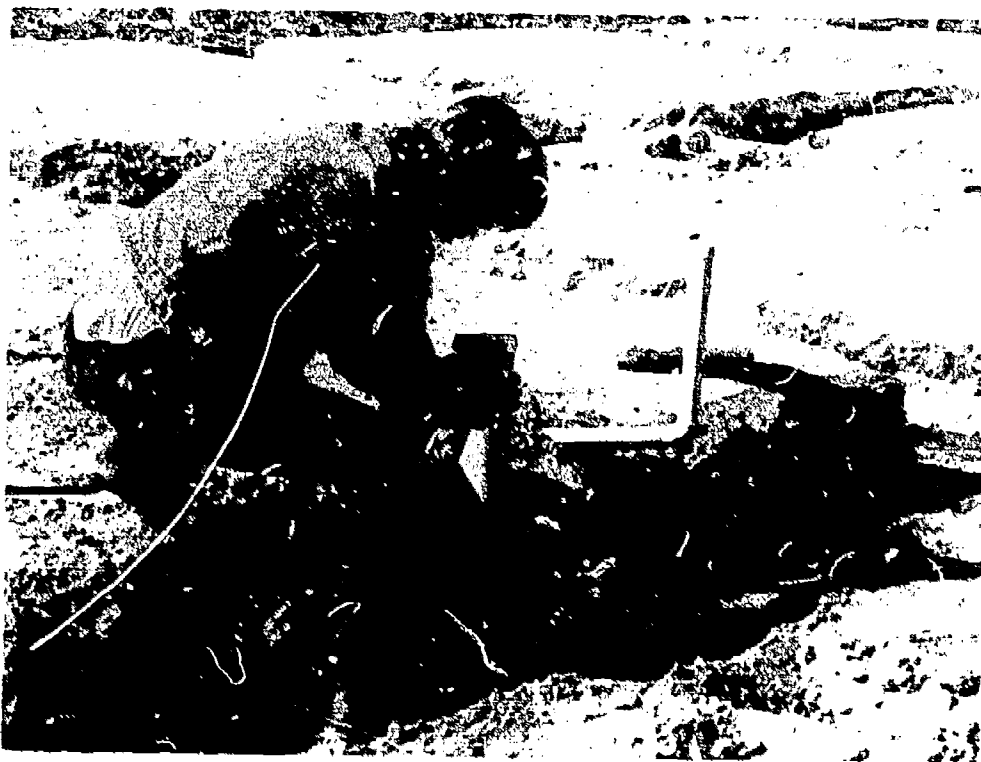
Try yourself on these phrases:

a competent doctor

a competent teacher

a competent plumber

a competent cricketer

a competent test cricketer.

We probably feel we have a fairly clear idea about what these descriptions mean - at least until we reach the last two. The cricketing comparison introduces the notion of differing levels of performance within one vocation. This complication will be discussed in more detail later.

If you test your thinking about what 'competent' means in the above cases, you'll almost invariably find yourself looking at the negative side - judging in terms of *incompetence* - an 'incompetent' doctor, an 'incompetent' plumber, etc. You may wind up with the idea that people are *competent* only if they are *not incompetent*.

Using that approach revea's a couple of the uncertainties about 'competence' which will have to be resolved. Here they are:

* at some stage, someone certified that the doctor/teacher/plumber (etc.) *was* competent (was the 'someone' a 'competent' authority?)

12

* you probably think of a doctor/teacher/plumber as 'competent' until you have direct experience of an action which strikes you as 'incompetent te that it is probably a single action or incident).

We will deal with both of these problems later. But first we have to wrestle with exactly what we mean by 'competence', specifically within the context of industrial training.

What is 'competence'?

Currently there is no uniform agreement about the meaning of 'competence' across industry and training institutions. As the planning and management of training on a national scale becomes more important it increasingly becomes important for a general understanding of competence and its assessment to be achieved. Without this understanding, individuals and groups will pursue diverging paths while wrongly assuming that everyone is working towards the same goals.

A broader interpretation of competence would be reached *if all the different approaches were heaped together and thoroughly analyzed.* But the reality is that such combination and analysis cannot be achieved.

As a result any one person, who has to learn or teach within a single program based upon an individual concept of competence, may have teaching/learning experiences which are narrow in focus, and hence restrictive of opportunities.

The purpose of this booklet is to bring together ideas about competence, and to use those ideas to outline sound training and assessment practices which will support the progressive restructuring of industry.

Let's start with a straightforward description and then apply it to a particular case.

The components of competence

A useful statement about the nature of 'competence' must provide evidence about three elements:

(i) details of the range of skills performed within the competence. This needs to be stated precisely and concisely and will refer to two kinds of skills:

. routine skills, which usually have a definite outcome (for example, a typist typing correspondence);

. non-routine skills, which require the ability to deal with irregularities and changes in the work environment, such as managing time and stress;

(ii) the standards of that performance in terms of such things as -

. a production rate

. an error rate

. a level of quality;

(iii) the conditions under which performance is required, such as the work environment(s), time constraints, equipment constraints.

14

In the earlier sections of this document we will tend to use sporting analogies to amplify what we mean, rather than choosing examples from particular vocatic..is. Choosing particular industries could discourage the reader not involved in those particular industries. Later in the booklet we will increasingly focus on industrial examples.

Applying the definition of competence

To illustrate the above three-point statement, consider diving. ...Er, I mean diving into a diving pool, not out of an aeroplane or from a boat! (The competence needs to be stated precisely and concisely.)

...To be quite precise let's specify *highboard diving* in an Olympic competition.

(Advertiser Newspapers)

9

The *standards* which must be reached for the *routine skills* are concerned with:

* quantity (the diver must perform a certain number of dives selected according to specific rules).

* quality (dives of varying degrees of difficulty with a point-scoring system which includes penalties for errors).

There are also *standards in terms of non-routine skills.* Divers have to manage the stress of competition. For example, this could be diving just after a fellow competitor has completed a 'near-perfect' dive. Such stress will vary considerably over the period of a competition.

For an extreme case of non-routine skills, consider Gold Medalist Greg Louganis's performance at the Seoul Olympic Games after striking his head on the board during one dive (an error for which he was penalized). In subsequent dives he alone amongst the competitors had to overcome the psychological and physical consequences of that accident before going on to win the competition.

The *conditions* relating to the diving performance might need to be described in terms of such factors as temperature, humidity, and the time interval between dives. For a familiar example from tennis, consider the varying quality of performance of even the world's best tennis players on grass and clay surfaces. Or consider the differences between amateur and professional performance in any sport; consider the differences between test cricket and grade cricket.

Needing to know

Now are all these statements and conditions really necessary? They certainly are!

(i) If someone is described as being a competent diver we have to know the circumstances and nature of the performance ('diving' is certainly *concise*, but there is also skydiving and scuba diving and deep sea diving to be considered, so we must also be *precise*).

(ii) The number and difficulty of the dives and the scoring rules for those routine skills must all be described, and our rules must also cope with unusual circumstances (so that when Greg Louganis strikes his head and must use non-routine skills to continue in the competition the rules have to prescribe the circumstances under which this is allowed to occur).

(iii) The conditions under which the diving is to be performed must be described carefully so that divers can prepare for the competition; all divers must compete under the same conditions.

To put this another way, if someone asserted that 'Greg is a competent diver' then all of the above would need to be investigated - What sort of diving? What sort of dives? Under what rules? And if someone asserted that 'Greg is a competent doctor' we would ask similar questions.

So what? Is there anything different in this way of describing learned skills? Isn't this what schools do every day?

Schools and training

One of the purposes of this booklet is to show that competency-based training does **not** do what schools do, and indeed that using the 'school' model for training is inefficient.

For the compulsory years of schooling, schools, and the teachers in them, usually provide general, non-specific education. Competency-based training involves targeting specific skills and fostering their development *for a particular set of conditions* (our third point above). Schools do not prepare learners for particular conditions.

In a more general environment, and with a group of learners not all working towards the same specific vocational goal, teachers use techniques and practices which don't fit our description. (By the way, those are the words we will use - 'teachers' and 'learners', rather than 'lecturers or trainers or supervisors' and 'students or apprentices' etc. No matter where the training and learning might take place, those two words are more general and easier to use.)

In general education 'competent' is often thought of as representing a low standard - 'marginally satisfactory' was the phrase used earlier. And since this is the way the word might have been applied to us in our schooling past, we tend to think of 'competent' as applied to ourselves as implying (at best) second-rate. But when we, as adults, apply the word to someone else (as in 'a competent teacher') we are implying something much more positive, that this is a person who can really 'do the job'.

12
18

It is thi. positive sense which is being used in the phrase 'competency-based training'. We are implying that someone with this kind of training 'can really do the job'.

The next section of this booklet will explore further just how competence is to be investigated and defined (and we will discover that it is not as easy as we might hope).

The third section then looks at the special requirements of teaching and learning for competency-based training, while the fourth section does the same for the assessment aspect of competency-based training.

Finally we summarize the implications of the adoption of competency-based training, and the promised test of your ability to apply some of the concepts described here appears just before the 'Further Reading' section.

Competence in what?

Competence has to be *competence in something*. It is not as simple or easy to decide this as you might hope. We need to start by asking apparently basic questions like: What skills are needed?

If particular competencies are to be taught and learned, then we need to establish which ones are appropriate for particular learners.

To make this a concrete discussion, let's start with a specific example, showing what can happen if you *nearly* do things right.

What Skills Does a Carpenter Need?

Recently this question was investigated in a research study on carpentry skills.

The answer to one key question was that carpentry workers possessed about 140 carpentry skills (the study involved almost 500 carpentry workers).

From a training point of view, this suggests that someone learning carpentry has a very large number of skills to master.

The answer to a second key question showed that most of these 140 skills were reported to be used by fewer than 1% of the carpentry workers.

From a training point of view, the second answer indicates that anyone mastering all 140 skills would not, on the job, use even half of them!

Does this help us know which skills should be taught in a carpentry training program?

The Problem

The problem is that the design of studies such as this requires a decision about how far the investigation should go.

* Should the study identify the skills needed by carpenters in general?
* Or should it try to identify only those skills needed by carpenters working in a specific job situation?

Because the major aim of this particular investigation was to improve training for carpenters generally the investigators felt they had to consult widely. As a result they came up with a list which was too extensive and overspecified the requirements for competencies for any one carpenter.

Obviously, for any given carpenter only some of the identified skills are 'essential'.

In this particular case the result was that about 40% of the 140 skills were classified as 'essential' skills, with the remaining 60% being in the 'desirable' skills category. But that doesn't deal with the difficulty adequately.

(CALS Media Unit)

Dealing with the problems of defining skills

Refining the list of skills in some way will help, but it will not solve all the problems. The situation just described could occur in a whole range of different vocations. What steps can be taken?

We *must* understand that this situation leads to a problem for any competency-based approach if we try to teach and assess the program and ignore the fact that *learners will make different uses of the skills being taught.*

We usually solve this problem by sorting the skills into two groups. Those skills which a learner 'must have' we normally call 'essential' skills. Those which the learner 'should have' or 'could have' - which together we normally call 'desirable' skills.

Unfortunately there are some difficulties with this 'classification'.

One difficulty, which exists for both *teachers and learners,* is that learners will usually focus their energies on mastering the essential skills (which teachers will emphasize and encourage) at the expense of - or even to the exclusion of - the desirable skills (which teachers may *not* emphasise).

It is not intended by the teacher that learners will ignore the learning of a particular skill in a course. Even if it is 'only' a desirable skill, the teacher still wants the learners to acquire that skill.

A different problem arises for *learners and employers*.
Different job situations mean that the classification into
'essential' and 'desirable' isn't universal. What is essential
for some is desirable for others, and vice versa.

Both the learners and their employers will be dissatisfied
with the training if many of the skills important to
employer and learner have been ignored, or treated
superficially, in the training program.

A third problem arises which mainly concerns *teachers* in
their role as assessors, though learners and employers may
also be affected.

It is difficult enough, as we shall see below, to provide
appropriate assessment in a competency-based program
when just a single level of skills is involved - the essential
skills. But the difficulty increases considerably when
combinations of essential and desirable skills are involved.

Consider just one example - the case of two learners with
different employers who are in the same course. (Perhap
they shouldn't be in the same course!) They have both
mastered to exactly the same extent the same skills (the
essential skills were completely mastered but the desirable
skills were *not* acquired to an acceptable level).

Now suppose that for one of those learners the employer
requires the essential skills plus some of the desirable
skills, while for the other learner the employer requires
only the essential skills.

Have the learners satisfactorily completed the same course?

23

No. Not so far as the first employer is concerned. (The second employer will probably not worry.)

Here is a situation in which the *outcomes* for the learners wou'! appear to be the same, but the learners will *not* have equal capacities to meet the needs of their particular employer. This suggests that we have to change an old-established emphasis and spend rather less time thinking about the learner and much more about the needs of a working society.

In a real learning/assessing environment, assessment rules would have to be developed and implemented in order to cope with such complex combinations of events. In addition, it is also important to recognize that job analysis is a very sophisticated activity, and that it is easy to get it wrong.

Since its introduction by Frederick W. Taylor early in this century, there have been many developments in technique, largely in reaction to the growing use of technology in our society and society's increasing complexity.

Techniques for cataloguing the required competencies must deal not only with the kinds of problem which arise in the analysis of carpentry, as described above, but also for wide-scale workplace changes such as award restructuring and increasing requirement for a more highly skilled and acceptable workforce. It is now necessary for the analysis of a job to focus not only on that particular job but also upon its likely development and upon the context within which that job exists.

Carrying out analyses which will come up with sensible and appropriate statements about competencies in this complicated situation is both difficult and very important. The whole area at the enterprise level is dealt with in a separate booklet in this series called 'Getting to Grips with Skills Auditing', to which the interested reader is referred.

Despite these difficulties we can, however, set out three specifications for an adequate statement of job competencies, which we will require before developing a teaching/learning program which is competency-based.

* The list of competencies have to apply to the whole range of learners taking the program.

* The competencies have to be appropriate both in the immediate working environment of individual learners and in the broader context of industrial redevelopment.

* The competencies have to be seen to be relevant by both employers and learners.

COMPETENCY-BASED TRAINING PROGRAMS

> The competency-based approach to training will be described in the following sections:
>
> * What's involved in competency-based teaching and learning?
>
> * Two examples of competency-based programs
>
> * Putting it together - essential characteristics
>
> * Putting it together - desirable characteristics.

What's involved in competency-based teaching and learning?

Competency-based training has been around for quite a while, but implementing it widely in the vocational area is a relatively new idea.

Since most readers will have had a 'traditional' education it makes sense to try to sort out some of the ways in which the competency-based training that this document describes differs from traditional teaching approaches.

It should be made clear right at the start that the competency-based approach means some radical rethinking about *the role of the learner;* the next box illustrates this.

A truly competency-based system required that 'competence' be divorced, initially, from the needs of the learner and be viewed from the stance of the requirements and expectations of the economic and social system. An individual's performances are then matched to these expectations in order to determine the individual's competence on various aspects.

Learning/training are the means of helping individuals meet these expectations.

Assessment is the process by which we do the matching.

Note the word 'initially' in the first paragraph in the box. In order to generate effective competency-based training we first need to establish a structure in which we can try to describe what society needs, not what the learner needs. This should produce a program which can, if properly managed, take into account both the needs of individuals and the differences between them.

Rather than discussing competency-based programs in a theoretical way, we will describe two specific examples, then draw out the lessons to be learned. These two examples illustrate different approaches to competency-based training applied to slightly different situations.

In the descriptions which follow the emphasis is upon the essential characteristics rather than upon details of the programs themselves (which can be found in published reports).

Two examples of competency-based programs

Panel-beating

The first example is a South Australian panel-beating course. All the students taking this course would expect to be doing very similar body repair jobs on the completion of their training.

Teaching and learning in this program are well described in the various evaluation reports which have been issued. This program grew out of research studies and so it is not typical, but some of what was learned is likely to be generally applicable.

The competencies in this program were developed over a period of time, but were not checked for accuracy or 'verified' with industry until after the first year of the program. The individual competencies are relatively 'large' in size. They involved the performance of many individual skills.

Here, for example, are the five competencies listed under 'Dismantling and Re-assembly':

* remove and refit major body components

* remove and replace vehicle air-conditioning components

* remove and replace a section of vinyl fabric headlining

* remove and reassemble the hardware of a sedan type door

* drain, remove, store, and replace petrol tanks.

The total number of these individual competencies reported for this program in 1985 was 93. Learners are required to demonstrate that they have achieved each competence.

25

Food production

The second example is a UK Food Production course designed in Canada as well as some learning materials prepared (independently) in Canada. The students in England taking this course expect to be doing a range of jobs in the catering industry on the completion of their training. Accordingly the program is more complex than the panel-beating example.

The individual competencies are fairly small in size, each containing relatively few skills.

Here are five competencies extracted from the set of 32 competencies listed under the general heading 'Prepare vegetables and fruit':

* deep fry vegetables and fruit

* identify and select nuts

* fry vegetables and fruit

* select, prepare, and cook mushrooms

* sauté vegetables and fruit.

The total number of individual competencies listed for this program was 353.

In addition, in this program it is necessary to describe the standards relating to performance in far more detail than was the case for the panel-beating program. This is because the learners will make different uses of the skills they acquire.

Furthermore, in this case competence is reported in terms of a grade, from 0 to 6, with each higher grade implying additional skills, as follows:

0   No competence

1   Can perform the competence if constantly supervised and with some assistance

2   Can perform the competency with periodic
     supervision

3   Can perform the competence with assistance or
     supervision

4   And with more than acceptable speed and quality

5   And with initiative and adaptability to problems

6   And can lead others.

Such an approach is more adaptable for use by a range of
learners. It also makes it possible to manage ideas about
levels of competence which arise, for example, when
talking about a 'competent test cricketer'.

Different grades can be required of different learners,
depending on the position of the learner in the kitchen.
So while the trainee butcher might not require any of
these fruit and vegetable preparation competencies, the
trainee vegetable chef would require quite high grades for
all of them. Other positions would require different
combinations of grades. (See Kenyon & Hermann)

Putting it together - essential characte; istics

These two programs have common elements. They make it
possible to identify common elements in competency-based
programs.

1   *An occupational/job analysis was carried out*
     This is a fundamental element. Note that in the case
     of the panel-beating program a verification of the
     competencies with industry was not actually carried
     out until the program had been running for some
     time.

3u

24

2   *There is a focus on competencies*
In both programs the focus is on the competence to
perform rather than on the ability to pass
examinations.

In competency-based training the theory relating to a
particular competency has a place. It provides a
framework or context within which the competencies
are to be learned, but theory is not an end in itself.
Accordingly, one would not expect to find a great
emphasis or the testing of 'theory' in competency-
based programs. It is much more important that the
learner demonstrate competence in the practical skills
to which the theory may relate.

3   *Learners have access to statements of the competencies*
In both programs which have been described the
learners knew beforehand exactly which competencies
they had to achieve. In addition, in the food
preparation course the learners knew which grade or
level of competence they needed.

It has been found that giving learners prior
knowledge of what is expected enhances learning.
This isn't at all surprising, since if you are told
what it is you have to learn you can focus your
energies on what is essential.

4   *There are appropriate assessment procedures*
We are going to use some jargon words for a
moment. We'll explain them after establishing
the context.
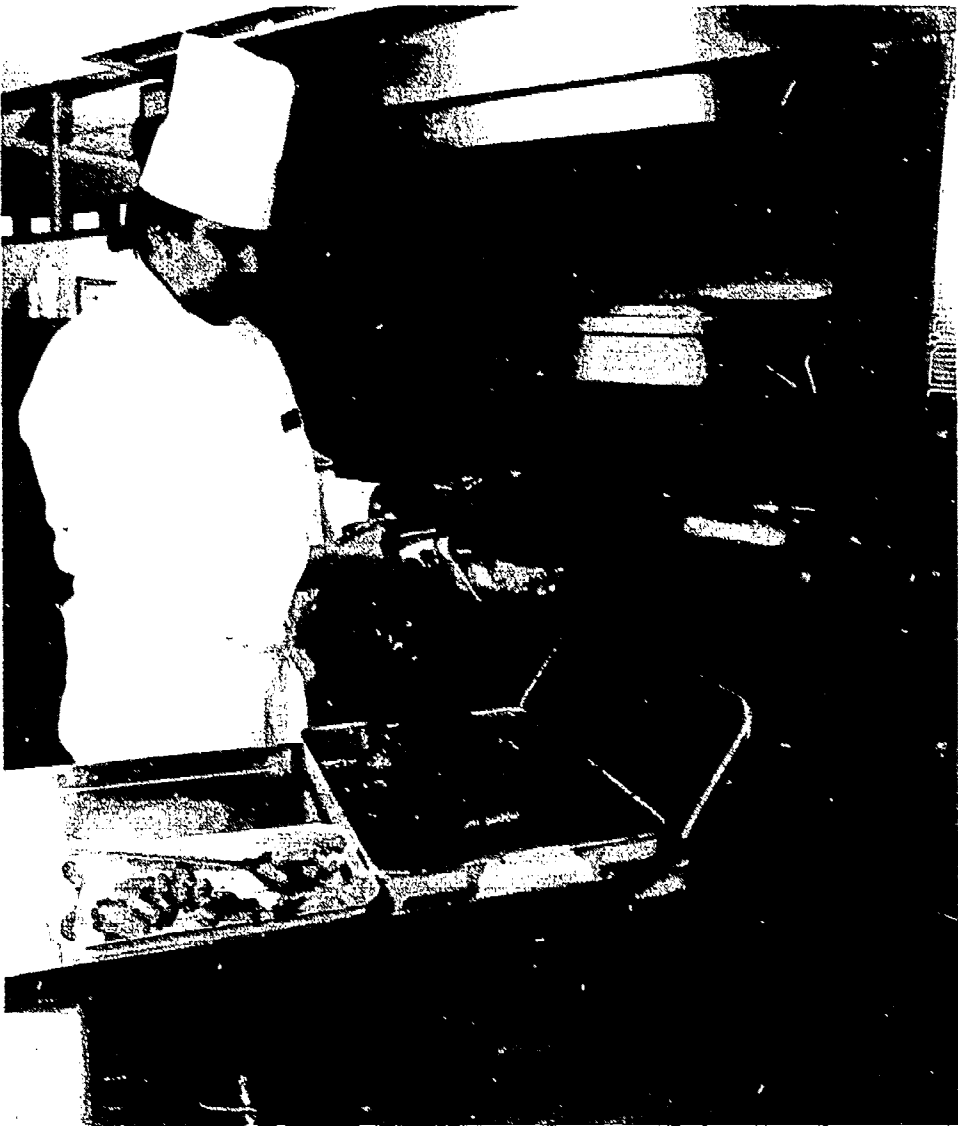
(CALS Media Unit)

The Food Preparation program procedures were
criterion- referenced. In the Panel-beating course
the bulk of the assessment appears to be
criterion-referenced, but at least in the first years
of implementation there were some elements of
norm-referencing; a practical project was assessed
in percentage terms.

Now let's clear up the jargon.

Generally speaking, we expect assessment in these programs to be *criterion-referenced.* This is best understood by comparing it with the alternative, *norm-referenced assessment,* which we've also mentioned. A pure norm-referenced test is one which tells us that a carpenter named Bill does better at the test than does another carpenter named Col. But a norm-referenced test doesn't *necessarily* tell us whether *either* of them is a competent carpenter. They might both be competent; they might both be incompetent.

In competency-based teaching/learning we really are interested in competency (for example, in just who is a competent carpenter), and we are less interested in a competition between learners in somewhat artificial situations.

This does *not* mean, of course, that there can be neither competition nor encouragement to excellence in competency-based training. On the contrary, the fact that this form of education focuses on the competencies which are actually required promotes the achievement of meaningful excellence; excellence based upon achievement of recognized objectives rather than excellence based upon being a big frog in a small pond.

In brief, norm-referenced assessment concentrates on who is ahead of whom (and not on whether the race was finished according to standards and rules), whereas criterion-referenced assessment is not interested in the order in which the competitors finished, but in establishing that they each attained a minimum level of compentence according to the stated rules.

Earlier we indicated that theory was mainly useful in terms of providing a context for the performance of skills, so the testing of theory as

such would have limited use. Evaluation studies of
the panel-beating program did report some concern
that students in the competency-based program
seemed less successful at a written knowledge
retention test, indicating that some educators within
competency-based programs nevertheless regard
theory-testing as important.

Both of the variations in the panel-beating program
(the use of norm-referenced testing and some
emphasis on theory/knowledge testing) from what
have come to be regarded as standards for
competency-based programs are common to many
early versions of these programs. In general, those
implementing competency-based programs might
expect that in the testing area, at least initially, there
will be remnants of earlier approaches to teaching and
assessing (norm-referenced testing in particular).
These elements will have to be progressively removed
in the shift to an emphasis on competence.

5   *The results are reported as competencies achieved*
     Both programs operated in this way.

     The focus on competencies continues with the
     reporting of what has been achieved. Norm-referenced
     testing usually leads to a letter grade or mark which
     is awarded for overall achievement. The natural way
     to report in a competency-based program is to list the
     competencies achieved.

6   *Detailed records are maintained*
     Because the panel-beating course was a
     research/development/evaluation activity more

detailed records than usual were maintained. Full records should normally be kept within the education system. The Food Preparation course maintained full records.

This very distinctive and desirable feature of competency-based programs is one which is sometimes overlooked, but should not be if the maximum benefit from competency-based programs is to be obtained. (This may be overlooked because the benefit - which is to the industry as a whole rather than to an individual employer or training institution - may not be obvious in the short term.) The maintenance of lists of individual competencies achieved by learners facilitates:

* progression over the learner's career - on moving to a new position the learner need only master the new required competencies, rather than undertake a whole course or program;

* transfer of credit between training organizations;

* sharing of responsibility and certification by each of the many involved parties - employers, colleges, training bodies - since each has to testify only in terms of a specific competency (or competencies) rather than for the whole of a program;

*   improved educational services for learners since individual competencies can be targeted for development and mastery; and

*   development of programs for competency ma'ntenance or upgrading of skills within an organization.

These six characteristics might be described as 'essential', although some would argue with this classification. But there are many other characteristics which are usually found in competency-based programs. We might call these 'desirable' characteristics.

Putting it together - desirable characteristics

1   *Detailed support materials should be developed*
    For both programs learners worked from a series of workbooks as well as ancillary materials. The scale to which the written materials may grow is indicated by the amount of material provided for the food preparation course, for which there were 174 workbooks and 254 associated colour microfiche.

2   *There should be a statement of criteria for each competency*
    While in some cases the terms might be 'agreed' or 'understood', in most circumstances we need to say exactly what is meant. For example, what exactly is meant by the description 'fry vegetables and fruit'?

36

3 *There should be careful selection of competencies for each specific program*
The need for this has been made clear in the consideration of the carpentry study. Verification as the program runs, as well as before it commences, is also important.

4 *There should be an integration of theory and practice, with an emphasis on applications*
The reasons for this have been set out when considering the need to ensure that practical competence, rather than theoretical knowledge, is the outcome of the program.

5 *Programs should have a modular structure*
This approach, which produces a program based on 'bite-sized chunks', follows from the structure of the competencies within a given vocation. It also facilitates more efficient use of resources, as indicated in the next few points.

6 *The method of instruction should involve mastery-learning methods and should include immediate and comprehensive feedback to learners*
Since learners are in all cases required to master the competencies, it follows that the mastery-learning method, with learners having the opportunity to go on to another section of work as soon as they have mastered the present one, should be used. It also follows that learners must be formally told, as soon as is practicable, that they have mastered a competency.

7   *Criterion-referenced testing of skills already possessed should be available to learners on entry*
If learners already have a competency when they enter a program this should be discovered and the learners given the opportunity to move on to the competencies they have not yet mastered.

8   *Learning should be self-paced*
This follows immediately from the previous paragraphs.

9   *There should be open-entry/open-exit scheduling*
With learners entering with differing background competencies, and different rates of progression, this becomes almost mandatory. Absolute open-entry is, however, very expensive to establish, and is dependent upon the availability of suitable course materials, other resources and equipment. In practice, organizations need to be careful not to erect unnecessary bureaucratic barriers either to entry by suitable learners or to rapid completion of course requirements. In particular, the purely 'time-serving' notion of training should be recognized as being frequently counter-productive.

10   *There should be changes from conventional teaching-learning practices*
In particular, we would expect that learners will be given more assistance in 'learning to learn', and will be encouraged to accept more responsibility for their own learning; teachers will devote more time to acting as 'facilitators' of learning.

TESTING FOR COMPETENCY

Competency-based training consists of the teaching/learning aspects we have already discussed, *and* testing. Only if the testing component of a training program is competency-based do we gain the benefits which have been outlined.

We need to understand that the major reason for identifying competencies and then structuring the teaching/learning program around those competencies was that this would enable us to *assess* and *certify* in terms of the competencies.

Assessing competencies is demanding for those conducting the assessment program. We have to be very sure not only of what we are doing but why we are doing it. To gain an understanding of the important principles, we discuss the following issues:

* Why assess?

* Gathering evidence

* Articulating standards

* The validity and reliability of asessments

* Cost effectiveness

* Methods of assessing

* Reporting and record keeping

* Standards maintenance.

33

Why Assess?

In the context of competency-based training *we assess in order to be able to infer competence*. Assessment is the process of gathering evidence and making judgements about the evidence.

An important point to remember here is that we are not thinking about inferring competence in a general sense (for example, competence as a carpenter) but in the *particular* sense: has *this* learner at *this* point in time demonstrated *this particular competence?*

We should also note the two distinct stages:

* gathering evidence, and

* making judgements about the evidence.

To make clear this distinction, and to introduce some other considerations, let's return to one of our sporting examples, diving.

Greg Louganis completes a particular dive. He has now carried out his side of the testing program. What happens as a result? How is competence inferred?

There's a panel of judges. This panel of judges *gathers evidence* by observing the dive under test conditions. They then individually *make judgements* about the *quality* of the dive (in other words, using the language of our definition, they make judgements in terms of *quality standards*). We are now introduced to one of the problems we shall have to resolve if we are to have useful competency testing: not all

of the judges will agree about the quality of the dive, and they will accordingly give different scores out of ten for the dive. How do we handle this difference of opinion amongst experts? What competence (or level of competence) can be inferred?

In the case of diving there is a set of rules for resolving this problem; an averaging process, which takes account of all the judges' judgements (including, for example, the omission of extreme judgements at either end of the scale), is used to produce a final compromise statement about the quality of Greg Louganis's dive. That solves the problem so far as diving is concerned.

But we need to solve the same problem more generally (and more cheaply). To do that we need to understand why the judges came up with different quality judgements and we need to know what to do about it.

There are basically four reasons for judges coming up with different judgements about quality:

* a judge may be biased;

* a judge may be of less than the required competence for judges (for example, the judge may once have been competent but on this particular occasion a temporary illness, or advancing age, may mean less acute eyesight and could lead to the judge missing one aspect of the dive which other judges saw);

41

* there may be no objective set of agreed criteria about what constitutes 'quality' in performance (or 'standards');

* there may be different interpretations of agreed statements about 'quality' in performance.

In the judging of diving the procedure used to attempt to deal with all of these concerns is through averaging the assessments of the judges. But in the educational and training settings it is usually not practical to have so many judges and this solution is not open to us. We will therefore have to work to deal with these problems about judgement in more efficient ways.

Gathering evidence

Provided we have suitable judging procedures, we can now explore the question of gathering evidence about competence. Let's also assume that we have a good competency-based program going (as described above) so that the competencies are all objectively stated and appropriate information has been given to the learners.

We immediately come up against problems.

Problem 1: when do we gather evidence?
The simple answer, implied by a strict definition of competency-based training, is that we have to gather evidence all the time. After all, the reason for gathering evidence is to infer competence. Some learners may have the particular competence when they enter the program; others will demonstrate it after few or many hours. As soon as the judge has accumulated enough evidence the

learner should be identified as having demonstrated the competence and may leave that part of the program.

In practice this is a much more difficult question to answer. For a start, the teachers are not *necessarily* the judges, so the judges may not be available all the time. The teachers may be able to gather the evidence, but it may not be possible to make the judgement immediately.

Then there's the fact that there are competing reasons for gathering evidence, and these can confuse the issue. Teachers certainly do assess in order to make final judgements but they also assess for interim purposes, for example to see what progress the learner has made towards the final goal of competence in order to provide appropriate additional assistance.

Jargon alert!

The common phrases in education jargon for these two types of assessment will now be introduced.

Assessment which summarizes a learner's knowledge and skills, and which comes at the end of the learning program, is called 'summative assessment'.

Assessment which occurs during the learning program while the learner's knowledge and skills are still being formed is called 'formative assessment'.

Since these two types of assessment sometimes overlap, it is easy to confuse them. The next few paragraphs make just this point.

Formative assessment is generally used by teachers and learners for planning purposes. A well-conducted formative assessment program enhances teaching and learning considerably. But both learners and teachers need to know the difference; *sometimes* the teacher is gathering evidence about how the learning program is going (formative assessment) and *sometimes* the teacher is gathering evidence about whether competencies have been demonstrated (summative assessment). Teachers and learners cannot afford to be confused about these, and the normal way to avoid that confusion is to identify clearly designated activities as constituting summative assessment. So the teacher does not in fact gather evidence about competence *all the time.*

Finally, some competencies may require considerable time to demonstrate, whereas others can be wholly assessed at a single point in time. Where a competence is determined solely in terms of a constructed object - a product - the teacher or judge can examine it and make a decision relatively quickly. But other competencies which require observation by the judge or teacher over a period of time (for example a competence relating to the learner following safety precautions, or competencies relating to management of people) - processes, by contrast with products -require the learner to demonstrate the competence over an extended period.

In this discussion we have now managed to raise a second problem.

Problem 2: who is allowed to gather the evidence?
This question is implicit in our diving discussion. Diving coaches are not normally judges of their own pupils in a diving competition.

The problem can be restated in a way which will encourage a useful answer: under what circumstances and to what extent may teachers be trusted to act as judges? We ask the question this way because we *want* teachers to gather evidence - and therefore to act as judges at least to some extent. The answer we want lies in the issue of standards.

Articulating standards

Reference was made in the section on "standards" to three different kinds of standard.

There we identified as important standards in terms of *quantity, error rate* and *quality*. We now have to consider those in the practical context of judging competence.

This is because the assessment of competence involves the two steps of gathering evidence and making judgements. There are other factors to be considered as well.

The assessment of competence involves:

* developing performance criteria

* developing assessment criteria

* gathering evidence

* making judgements.

39

We can gain quickest access to the ideas here through an example. We will use the food preparation case already described. We will take a particular competency: select, prepare and cook mushrooms.

* The performance criteria - the standards referred to above - will have been established by an external authority. This will be based upon the skills analysis which was carried out in establishing the course. These performance criteria describe the standards which are to be met in employment and accordingly, for this particular competence, will vary depending upon the role of the person being trained.

A trainee butcher would not be expected to demonstrate this competence at all.

A trainee short order cook could perform the task, but with constant supervision and some help.

A trainee chef de cuisine could perform the task 'with more than acceptable speed and quality, with initiative and adaptability, and can lead others in performing the task'.

* The teacher/judge will follow agreed decisions about what particular assessment criteria are to be used (such as 'the texture of the cooked mushrooms') and in doing so will have interpreted the performance criteria.

* Evidence will then be gathered by the teacher/judge in terms of the agreed definition of the competence - 'select', 'prepare', and 'cook' all have to be defined, for example.

* Judgements can then be made as to whether a particular learner can select, prepare, and cook mushrooms.

The problem of articulating and applying standards is obviously complex. Questions about quantity, error rate and quality all have to be answered efficiently and accurately by those involved in the training program. Evidence that a learner will be able to demonstrate a particular competence in the foreseable future has to be gathered and interpreted within the structure of the program.

In such a situation we have every reason to be concerned about the possibility that the teachers/judges may themselves make errors.

The validity and reliability of assessments

In the case of judging diving the solution to the problem of errors made by the judges was 'fudged'. The procedure is to acknowledge the existence of errors, but to use an expensive process (employ many judges, reject extreme judgements, and average the rest of the judgements) to compensate for those errors. The idea is that if you average the judgements then the personal errors made by the judges will be self-cancelling.

We cannot afford to use so expensive a process in education. We have to get around the problem of potential errors by teachers/judges in another way.

We have to establish that the assessment procedures thems 'lves do not have inherent faults. This is harder to establish than it might seem.

> In the assessment business, when we talk of *validity* we generally mean that the assessment instrument *actually assesses what it claims to assess.* In the specific context of competency-based training, valid assessment procedures will mean that a person certified as possessing a particular competence will actually have that competence (and not some other) to the level specified.

When we certify we are in fact predicting the future - at least to the extent that we invite anyone looking at a certificate to infer something about the future performance of the person to whom the certificate applies. The prediction can only be valid if the assessment is, in the technical sense, valid.

Predicting the future can be tricky. The fact that someone has demonstrated a competence at a particular time does not necessarily imply that the person will always have that competence. If we take the uncomplicated case of typing speed then a certificate testifying to an individual's typing speed should also specify relevant dates. In that case the certificate has the equivalent of an expiry date, since unused skills will become rusty.

48

After all, it is generally true that if people do not use particular skills then it is likely that their performance will decline with time. In this situation, statements about competence may need to have a 'use by' date. The certificate may no longer be valid after a given period of lack of practice.

This is important in the careful definition of competence; if we include, in a particular training program, skills which the learners are not likely to use for a year or two then the validity of the assessment is in question, at least with respect to the unpracticed competencies.

We also have to watch for another aspect of validity.

In addition, we always have to watch out for the possibility of deliberately (though inadvertently) building a system which leads to assessing (and including in the judging process) things we do not want to assess.

For example, it is relatively easy to construct paper-and-pencil tests of 'theory'. In some circumstances these may be useful. However, unless we are constantly on our guard, we shall find ourselves reporting on the ability of learners to perform successfully on paper-and-pencil tests rather than on the agreed competencies.

Of course, this is only one example of how we can introduce extraneous notions into assessment programs, but it is one which is rather common.

As well as the need to overcome these validity problems there is still the need to deal with another major difficulty - the reliability of assessments.

Reliability means what it says. The assessments can be relied upon. In the context of the assessment of competence, 'reliability' means that the same judgement about a particular performance would be made if it were made by another judge (remember our problem with the diving judges having different opinions?), or if it were made by the same judge the next day.

Among the practices normally followed in education to increase reliability are:

* establishment of agreed-upon criteria;

* repeated measurement; and

* substantial training and practice in assessment for judges.

Anonymity of those being judged is also a practice sometimes followed.

The form of competency-based training described in this booklet has embedded in it some of these practices. The establishment of objective criteria is one of the strongest points.

5ii

44

The weakest of the areas is substantial training and practice in assessment. While descriptions of competency-based training all include reference to appropriate training, it is this area that has (historically and across the whole range of Australian education and training) been weakest. It is here that those implementing competency-based training need to be most diligent and demanding to ensure that reasonable practices are followed.

Cost effectiveness

It is always possible to increase the reliability of assessments by having more people involved in the assessment process, and by repeating the measurements several times over. But the benefits gained may involve an increased financial outlay.

More appropriate methods are therefore needed in order to increase reliability, without escalating the costs disproportionately. But we also have to bear in mind a different aspect of cost effectiveness - the consequences of wrongly inferring competence for the learner and for others.

> A friend of mine recalls a secondary school training program she had in 'bathing a baby', which was a combination of theory and practice (using a doll). She did well in the theory assessment, and quite well in the practical test - except that at one point she dropped the doll to the floor. In retrospect she doubts she should have been given the high mark (testifying her competence) which she actually received.

Failure to be competent has varying consequences. Rather than setting up rules about not allowing failure, we need to be aware that any system based on competence has to take into account the consequences of wrongly certifying competence for each individual competency.

This is not, however, a trivial problem to solve. We can show this by considering another sporting comparison.

During the 1980s the rugby union player David Campese established many records because of his highly rated skills. In addition, however, t re were several occasions on which newspaper columnists complained long and loud about David Campese's 'errors'; sometimes, they said, these errors had lost matches. There might have been occasions when these errors did cost matches, but the selectors kept choosing David Campese because, on balance, the team was better with him playing.

The same thing is said from time to time about many players in team sports - the cricket captain who wrongly sends the opposing side in to bat is a good example.

But selectors (read 'employers' and 'trainers') have to balance all the competencies, and may decide that some competencies are so well-developed and so important that a possible deficiency in one area can be overlooked. In these circumstances it appears to be more cost-effective to have a very good performer who sometimes makes mistakes than to have a mediocre performer who doesn't make mistakes. This is related to the fact that we are looking at team performance, rather than individual performance.

In other circumstances where we are not dealing with teams this attitude towards the cost-effectiveness question may not be acceptable; remember the early example about the 'incompetent plumber' and the 'incompetent doctor'? Here we are prepared to pay a higher price for individual all-round competence.

(Advertiser Newspapers)

Methods of assessing

It will be clear from what has been written above about assessment that the methods to be used must be carefully chosen.

The fact that assessment has to be tied so closely to potential performance on-the-job means that each deviation from the environment and context in which the competency is to be used has to be minimized. As has been said, this means cutting back on paper-and-pencil testing, not always easy for teachers or learners who have spent years becoming used to that kind of assessment.

At the same time the competencies must be appropriately portable, and generalizable across a range of (admittedly sometimes narrow) employment fields.

Once teachers (and judges) become skilled at seeing the relationships between competencies, the performance criteria which turn those competencies into objective statements, and the assessment criteria which make those objective statements measurable, assessment in competency-based training becomes straightforward and stable.

Reporting and record-keeping

Competency-based programs could operate without any significant increase in the maintenance of records. But the work which goes into deriving the competencies in the first place and then producing appropriate learning materials will not be best used if the result for the learner is simply a statement of completion of a qualification.

The same information management system which was used to maintain information about the various competencies during the development phase can then be used to maintain extended student records.

The system should automatically record the progress of each learner; the teacher needs this not only to provide appropriate counselling to students but also to monitor progress of whole groups since, although students will normally progress at individual rates, it is necessary to have an overall picture of progress in order to plan later phases of the program (when is it expected that particular 'ieces of equipment will be needed? etc.)

Because so much more information about student development is routinely kept in educational/training institutions it becomes easy to provide reports which are more informative. This can be done in several ways:

*   report successful completion of the program (current normal practice);

*   report the number of competencies demonstrated (which still has echoes of traditional reporting);

*   report the standard reached in terms of a position or grade qualified for (the food preparation course would allow this because each competency is graded in terms of particular positions);

*   report each of the competencies demonstrated (this would be a comparatively large document and might be difficult to understand)

*   report the competencies demonstrated together with appropriate interpretive material (again very long, but could be useful if the interpretive

material is carefully planned in terms of the readers' needs).

Choice of the method of public reporting will depend on the resources available and needs in the particular industrial sector. The method of reporting should be chosen to be cost-effective.

In an environment of periodic retraining and multi-skilling, the maintenance of records becomes much more important. The learner requiring retraining can advance far more rapidly when the learning program is planned on the basis of known areas requiring development.

Where the learner's competencies are known in detail (from the records maintained under a competency-based system) and the competencies needed are known (from those identified in the job analysis) then those areas requiring development can be identified quickly and efficiently.

Standards maintenance

If industry and skills were static, it would be elementary to maintain standards. Indeed, many of the arguments about maintenance of standards follow from the false belief that society is unchanging. But industry and the skills needed to help a nation to grow are not static, and accordingly systems are needed to ensure that standards are maintained not in the static sense but in the sense of keeping pace with societal development.

56

In a competency-based program, this means that the competencies, which are the objective definitions of society's needs, must be kept up-to-date. This requirement is also linked to licensing.

In practice, therefore, while individual competencies may not readily change there will be an overall increase in the number of competencies. From time to time some competencies may become outdated. In the sporting context consider the case of the skills needed in pole-vaulting. While pole-vaulters now have to have the skills associated with using fibre-glass poles, they no longer need the special skills which were involved in the use of wooden poles.

A competency-based training program therefore needs regular monitoring to ensure that the job analyses remain up to date.

In addition, the fact that particular competencies may be defined to operate across several industrial areas and that learners may be expected to transfer between those areas makes it desirable to build a system which maintains standards across industrial areas.

The proposal in a recent government paper for final 'external' assessments as one component of certification could be seen as one way of gathering relevant information in this facet of standards maintenance.

5 7

THE IMPLICATIONS OF COMPETENCY-BASED TRAINING

The recent and continuing changes in the way industry in Australia is structured imply changes in the management of the workforce. One major required change is the adoption of schemes of training and retraining which are more effective than the traditional approaches.

In particular, in the area of retraining, it is necessary to use methods of training which:

* make sense to adults,

* recognize formally the job analysis and skills the learners already have, and

* adjust the required training accordingly.

Competency-based training is more efficient and meets these requirements. This approach is therefore spreading throughout training institutions (whether work-based or college-based) in Australia.

What are the implications for all those involved in an industry when competency-based training is introduced?

Employers

Employers need to participate effectively in the development and management of training programs. This means:

* taking part in well-designed skills audits, in

particular demonstrating a clear understanding of the *details* of the required skills for the employees, but also an appreciation of the *context* of those skills in relation to

- future developments in the industrial area, and

- the career development of the employees.

* cooperating in the monitoring of training programs to ensure that they continue to address the required (and evolving) competencies, and that standards appropriate to industrial needs are maintained;

* recognizing the benefits of and adopting arrangements with respect to the scheduling of training (e.g. open-entry/open exit) which are as flexible as possible; and

* working with others to ensure that appropriate training facilities are available.

Teachers

Teachers (understood to mean anyone involved in training learners) also need to develop particular skills.

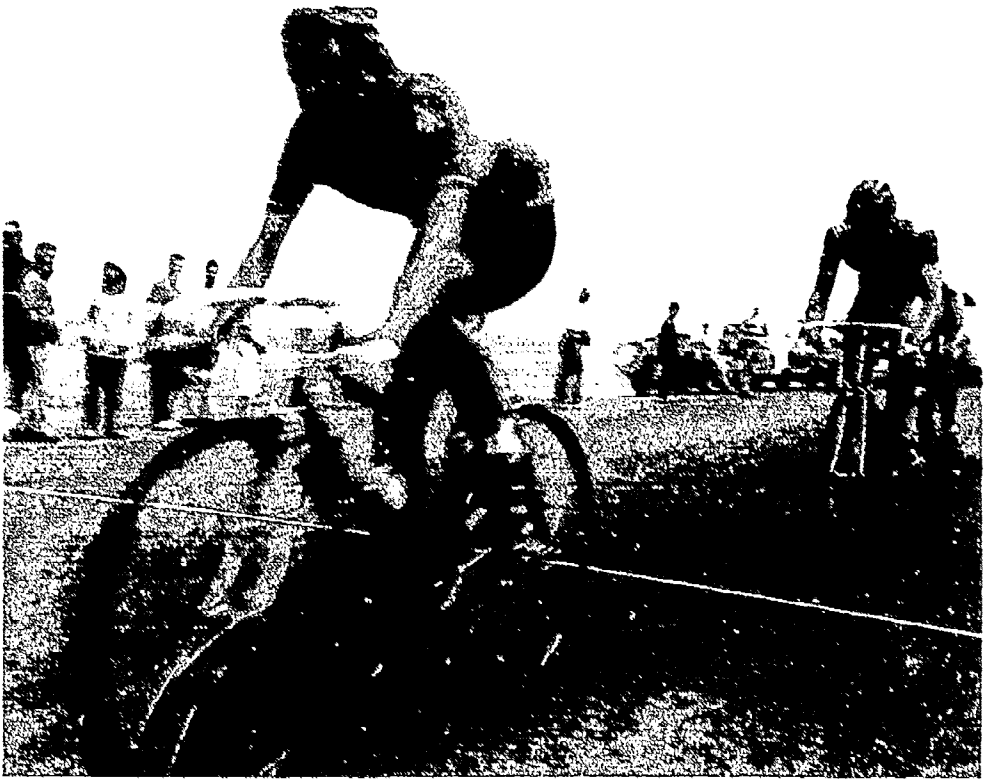In a competency-based training program teachers will be involved in:

* adapting to changes in emphasis in learning:

5!)

- less emphasis on time-serving and more emphasis on skills acquisition,

- less emphasis on the learner's needs and more emphasis on the needs of industry and appropriate locating of the learner in the industry;

* taking an increased role in researching the skills to be developed and in planning ways to enhance the acquisition of those skills;

* adopting a different role towards learners:

  - supporting their active learning rather than 'setting the pace',

  - *advising* on progress, and

  - playing a significant role in *judging* progress against specific criteria:

* participating in the preparation of learning materials on a much larger scale than in 'school-type' environments.

Learners

There are also additional expectations of learners, consistent with the greater expectations of employees in the evolving Australian industrial climate. In particular, learners need to demonstrate:

60

* greater capacity to work independently in situations in which the benefits of such approaches to learning are made clear;

* a general willingness to take more responsibility for their own learning, *including the management of that learning.*

(Advertiser Newspapers)

61

REVIEW

You were warned about this earlier

There will now be a short test of your understanding of competency-based training and learning.

You are required to develop some aspects of a competer.cy-based program.

The competence has already been identified - mending a puncture on a bicycle inner tube.

The learners have been given appropriate training, and some of them now wish to demonstrate formally 'hat they have mastered all relevant competencies, namely:

- mark the repair area;

- 'rough' the repair areas with sandpaper;

- ensure that the patch is at least 5 mm (but not more than 10 mm) larger than the puncture;

- ensure that the patch is completely sealed around the edge;

- treat the repair area with French chalk;

- ensure the repair is airtight;

- complete repair within the 10 minutes.

Questions

1   Which of the above skills should be listed as 'essential' and which as 'desirable'? (What other information, if any, do you need in order to answer this question.)

2   What non-routine skills might *also* be required in
     mending a puncture?

3   What standard should be established? (In other
     words, what is the minimum number of the
     skills listed above which a learner should be
     required to demonstrate in order to be regarded
     as having mastered the competency?)

4   Are there jobs in the bicycle-tyre repairing
     industry in which different skills and standards
     might apply? Describe them.

(See the end of the booklet for answers)

FURTHER READING

Ashenden, D. (1989). *Innovations in the Recognition of Vocational Training and Learning: A documentation.* (Project commissioned by the Employment and Skills Formation Council of NBEET.) Ashenden and Associates, Perth.

This paper describes 42 innovations and proposals for change in the recognition of vocational training and learning. The emphasis in this paper is on formal recognition and is taken to be of four kinds: defining what has to be learned and setting out what is an acceptable standard; the processes of assessment and certification; recognition of providers, courses and programs; recognition of qualifications and groups of qualifications. The innovations described in this report are classified according to the particular "recognition" category into which they fall.

Australian Manufacturing Council & Employment and Skills Formation Council. (1988). *Report of Proceedings of Workshop on Skills in Australian Industry.* Held Melbourne November 20-22, 1988. Canberra.

This report details the proceedings of the workshop whose theme was Skills in Australian Industry, concentrating primarily on the approaches and processes necessary for industries to achieve award restructuring. The benefits to flow from award restructuring are described and strategies for the development of skills in individual industries are reported. The role of ITCs and TAFE in award restructuring is described. The need for management

training to cope with those changes is also emphasized as is the funding of training.

Campbell, C.P. (1985). "Training for employment: a systematic approach." *Journal of European Industrial Training,* 9(4), 17-22.

A competency-based systems approach to job training that ensures that trainees are taught the knowledge and skills essential for successful job performance is described. The model for this instructional system follows the proceeding steps each of which is described in detail: analysis, design, development implementation and control.

Committee of Inquiry into Labour Market Programs. (1985). *Report (The Kirby Report).* AGPS, Canberra.

The Committee of Inquiry was established in December 1983 to examine the objectives and cost effectiveness of existing labour market programs, and to consider ways in which they could be developed into a comprehensive and unified strategy to address the Federal Government's labour market objectives. The report focuses on the fundamental, philosophical, systemic and structural questions concerning labour market programs and offers a blueprint for the future directions of education and training in Australia, with particular emphasis on measures to provide work experience for young people in transition from school to adulthood.

Dawkins, J.S. (1988a). *A Changing Workforce*.
Circulated by the Hon. J.S. Dawkings, Minister for
Employment, Education and Training. AGPS, Canberra.

This document deals in more detail with several of the
issues raised in <u>Skills for Australia</u> and <u>Higher Education:</u>
<u>A policy discussion paper</u> (the green paper). Then it
restates the government's intention to bring about change
in the Australian economy and the need therefore for
improved education and training as key components in a
restructured economy. It argues that industry must
become more involved in the national training system, both
by the provision of increased industry-based training and
increased financial investment in training.

**Dawkins, J.S. (1988b). *Industry Training in Australia:
The need for change*.** Circulated by the Hon. J.S.
Dawkings, Minister for Employment, Education and
Training. AGPS, Canberra.

This discussion paper on possible options regarding
training and skill formation in Australia should be read in
the context of the Minister's earlier paper <u>A Changing</u>
<u>Workforce</u> and the green and white papers on higher
education. This paper aims to: identify the broad
deficiencies in the present industry training system;
emphasize the need to increase industry investment in
training; outline the changes relevant to training in the
industrial area; prescribe a number of options to stimulate
increased participation and effort in industry training. The
paper offers two solutions to facilitate this.

**Department of Employment, Education and Training.
(1987).** *Standards-Based Trade Training: A discussion
paper.* Prepared by Leonie Segal and Bruce Johnson.
AGPS, Canberra.

This report is the result of a study into standards-based
trade training commissioned by the National Training
Council. The constraints of the traditional time-based
apprenticeship training model are reviewed, together with
an assessment of the disadvantages of introducing
standards-based training. The conclusion is reached that
there are strong educational and economic arguments for
implementing standards-based training which are currently
reflected in Australia-wide initiatives in standards-based
curricula and training models.

**Department of Employment, Education and Training.
(1989).** *Entry-Level Training: Issues and opportunities
arising from award restructuring: discussion papers,
Nos. 1-4.* AGPS, Canberra.

A comprehensive outline of the industrial relations aspect
of labour market reforms is given and links them to other
key policy areas such as employment, education and
training, and industry policy. A major restructuring of
industrial awards at the industry level is identified as the
key feature of the reform process and will provide the
necessary framework for the integration of job
classifications and the development of skill-based career
paths. Award restructuring will flow on to the training
system resulting in training more closely meeting industry's
needs.

Ebel, R.L. & Livingston, S.A. (1981). *Issues in Testing for Competency.* National Council on Measurement in Education, Washington, D.C. (ED 208001)

The booklet describes alternative views on some aspects of the use of tests in assessing professional competence. The advantages and disadvantages of verbal knowledge, multiple-choice items, norm-referenced tests, conventional test statistics and test validation are discussed. The need for reliability in testing is emphasized.

Further Education Unit (Great Britain) (1984). *Towards a Competence-Based System: An FEU view.* London.

This report describes the FEU Board of Management view of the task of accepting a training/education philosophy which is concerned with competence rather than time-serving, a principle the FEU believe applies equally to education and training. The FEU offers a wider definition of competence than that normally associated with working life and one which embraces formal and informal learning and extending beyond occupational skills into life skills. Examples from education/training are given which show how competence can be defined, understood, delivered and evaluated.

Further Education Unit (Great Britain) (1986). *Assessment, Quality and Competence: Staff training issues for NCVQ.* London.

Some of the problems, and solutions, that should be addressed if further education teachers are to cope with the requirements of the new National Council for Vocational Qualifications (Great Britain) are discussed.

The first part describes the new structure and the objectives formulated by the Review of Vocational Qualifications (RVQ) and discusses the nature and assessment of competence. The second part of the document comprises appendices which give a summary, recommendations and glossary of the final RVQ report. The document is a useful assessment procedures handbook.

Further Education Unit (Great Britain) (1987). *Relevance, Flexibility and Competence.* London. (ED 290938)

Part 1 of this document offers a curriculum framework and strategy for vocational education and training provision for young people over 14 in the U.K. Within this first part of the document is discussed the vocational preparation necessary to accompany vocational change; the aims and themes necessary to make such a framework applicable to a wide variety of clientele who may require several changes of vocation in a lifetime; the conduct of the framework and how it is delivered in terms of outcomes and how it might be delivered. Part 2 of the document provides a series of briefing notes which illuminate various aspects of the main text and should be used as an accompanying resource.

Harris, R. et al (1985). *Competency-Based Vocational Education: An evaluation.* TAFE National Centre for Research and Development, Adelaide.

This document reports a study of the design, implementation and evaluation of the first year of a CBVE program in panel beating at Croydon Park College of TAFE

in South Australia. The purpose of the study was to investigate the potential of such a program as an alternative model of occupational training: the objectives were to develop and implement the program, train staff to manage it, evaluate its effectiveness and efficiency, its supporting resources and facilities, and analyse the overall impact on college staff and students. The study concluded that the program had been successful with an end result being competent panel beaters.

Harris, R. et al (1987). *Competency-Based Vocational Education: A continuing evaluation.* TAFE National Centre for Research and Development, Adelaide.

This study continues the 1985 one and evaluates operation of the second (1984) and third (1985) years of the CBVE program in panel beating at Croydon Park College of TAFE. The objectives of his later study were to evaluate the effectiveness of the program as gauged by staff and students, the effectiveness of the resource materials over the whole program, determine costs in terms of resources, materials and staff and provide staff development on issues of CBVE management. Results indicate a high acceptance and appreciation of the CBVE approach.

Kenyon, B. & Hermann, G. (1987). *Competency-Based Vocational Education.* Further Education Unit, London.

This report is divided into five sections, the first of which introduces and reviews CBVE. The next section discusses the DACUM (Developing a Curriculum) methodology which was used to derive a list of competencies relevant to the case study. Section 3 describes the case study in the Department of Catering Services, Burton-upon-Trent

Technical College, England. The next section reports the reactions of students, tutors and employers to the CBVE project. The last section reviews the case study in the light of the FEU project aims. Appendices include information on CBVE and the DACUM process, results of the student survey, and a staff guide to using the CBVE approach.

Lenderman, E. et al (1988). *Recommendations for Alternative Credit.* Linn-Benton Community College, Albany, Oreg. (ED 300618)

Although this document specifically relates to a review of mathematics topics taught over a variety of vocational fields at Linn-Benton Community College, it is useful for the check-list of mathematics competencies offered in the courses.

Mathews, D. (1986). *Assessment in the Workplace: News from the faraway land of which we know little.* Further Education Staff College, Bristol, Eng.

This short paper describes the principles, processes and strategies involved in workplace assessment; the types of workplace assessment possible; the role of the workplace in learning; and the nature of assessment. The importance of standards is stressed as are the ways in which information relating to workplace performance is collected and used.

Messick, S. (1984). "The psychology of educational measurement". *Journal of Educational Measurement,* 21(3), 215-237.

This article highlights the measurement of educational achievement and the psychological processes of knowledge and cognitive skills which are the focus of typical achievement tests. A major point made is the relevance of student characteristics as well as social and educational experiences to current performance. Therefore the interpretation and implications of educational assessment and achievement must take account of intrapersonal and environmental factors. The way in which competence is developed and its measurement in terms of performance in a specific context is also addressed.

National Conference on Critical Issues in Competency-Based Testing _ational-Technical Education **(1988).** *Confer* *Notebook.* Vocational Technical Education Consortium of States, Decatur, GA.
(ED 301658)

This document reports the conference proceedings and includes the following topics: identification and validation of task lists for item banks; conducting task analysis for competency-based test item development; writing and reviewing test items; developing a computerized test item bank; managing test results - scoring, reporting results and interpreting data.

7 2

North Carolina State Department of Public Instruction, Division of Vocational Education (1983). *Competency-Based Employability Skills Program.* Raleigh, NC. (ED 294062)

This guide is intended for use in incorporating competency-based employability skills curricula into vocational and technical education programs. The guide is divided into sections: the first is a competency listing that includes the competencies necessary for students participating in the program and also a competency listing by program area. A content guide arranged into full units is included next. Each of these units shows identified competencies, objectives, suggested learning experiences and recommended resources. Students' activity sheets and a competency test item bank are included.

Ohio State University, National Center for Research in Vocational Education (1988). *Competency-Based Testing for Occupational Students: A resource guide.* Columbus, Ohio. (Competency-Based Vocational Education Administrator Module Series) (ED 289026)

This guide is intended to provide vocational administrators with general information about selected products that are available or being currently developed. The general information section deals with the types of test products that are available (occupation - specific tests, item banks, performance tests, etc.), availability of the products, criteria for selecting tests (validity, reliability, relevance, etc.) and procedures for obtaining information (contained in computer databases and print-based resources) about products that are not included in the guide. Specific

information is presented in the form of abstracts describing currently available products and services.

Reynolds, C. & Wheatley, A. (1988). *Profiles & Profiling: Issues and practices in the recording of student achievement.* Curriculum Development Centre, Canberra.

This document presents the proceedings of a seminar held in May 1987 in Melbourne on the topic of profiling of student achievement. Some of the papers in this collection discuss the technical aspects of profiles while others deal with issues of equity and social justice in relation to assessment in general and profiles and profiling in particular.

Rumsey, D.J. & Hawke, G.A. (1988). *Competency-Based Testing: A TAFE approach.* NSW Department of Technical and Further Education, Sydney.

This document is divided int> three sections. In the first the term competency-based testing is defined: the hierarchy of job-duty-task and the involvement of knowledge, skills and attitudes are explained as important concepts in understanding competence. The next section is devoted to explaining the significance of consistency and accuracy in CBT while the concluding section describes the implementation of CBT within TAFE. The necessity for competency-based assessment as the basis of TAFE academic awards is stressed in this sector. Also emphasized here is the need for unambiguous statements of competency objectives which are linked to national skill standards.

Texas State Technical Institute (1987). *Implementing Competency-Based Education: A resource guide.* Amarillo, Tex. (ED 285008)

This guide is intended to assist vocational and technical education teachers in implementing competency-based vocational education programs. The first section discusses what CBE is and is not, the degrees to which a course or program can be competency-based and several different approaches to its implementation. The second section deals with identifying and validating student competencies while in the third section instructional delivery within a CBE program is discussed. The next section covers management and implementation while the final section contains a glossary and sample forms for use in developing a syllabus, student learning guides, a task listing and a task analysis. Each section also includes a listing of resource materials.

Thomson, P. (1989) "The School of Hard Knocks Revisited: The Assessment of Practical Skills and Experience." Australian Journal of TAFE Research and Development, 4 (2) 30-41.

This paper argues that there is a disturbing 'academic drift' occurring in technical and vocational education. This academic drift is turning good practically-oriented sub'- into pseudo-academic ones. The paper argues that tl not the way to go and that technical and vocational education rather, should be giving more credit for practic skills and experience and, if a choice must be made, this should be at the expense of the theoretical skills.

The various approaches to assessment in technical and vocational education are reviewed and the unique characteristics of workplace assessment are emphasised.

Finally, a technique is proposed for the assessment of experience which identifies a need for the modern day equivalent of the master craftsperson to guide the assessment process.

Urzillo, R.L. (1987). "Competency testing: blessing or bane?" *Contemporary Education*, 59(1), 13-14.

This report, while admitting the virtues of competency testing in measuring achievement in the basic skills areas, stresses that it may not be entirely satisfactory in core curriculum areas. The article points out that use of competency testing in these areas may result in teachers teaching for the "test", leading to minimal standards at the expense of excellence and stifling the transfer of learning and creativity.

Wood, R. & Power, C. (1987). "Aspects of the competence-based performance distinction: educational, psychological, and measurement issues". *Journal of Curriculum Studies*, 19(5), 409-24.

This paper argues that the concepts of competency and performance must be separated and contends that a student's actual competency level is not accurately reflected through standard performance measurements: it also shows how competency levels might be assessed more accurately through the use of multiple sources of data and innovative assessment programs.

ANSWERS (for questions on page 56 and 57)

In fact, 'Answers' may not be the best word, because one thing you will have learned in reading about competency-based training and assessment is that performance is related to conditions. Therefore a typical response to each question could begin, 'It depends on what you mean by .....'. If that is what you thought, then you are on the right track.

Q.1 One's view of 'essential' and 'desirable' will be dependent on the circu..istances. But if repairing punctures is part of a person's job the suggested answer is:

. mark the repair area;	DESIRABLE
. 'rough' the repair area with sandpaper;	ESSENTIAL
. ensure that the patch is at least 5 mm (but not more than 10 mm) larger than the puncture;	ESSENTIAL
. ensure that the patch is completely sealed around the edge;	ESSENTIAL
. treat the repair area with French chalk;	DESIRABLE
. ensure the repair is airtight;	ESSENTIAL
. complete repair within the 10 minutes.	ESSENTIAL

Q.2 As the competence of repairing the tube requires that the task be completed in 10 minutes, one non-routine skill that applies is 'the ability to work under time constraints'. But we really need to know the conditions under which the competency is being demonstrated before we can identify any others. In a typical workplace there would be non-routine skills such as 'managing the work load' and 'dealing effectively with the personalities of customers and workmates'.

Q.3 Obviously, all essential skills must be achieved otherwise the competence has not been demonstrated. It is suggested that in the answer provided for Q.1, at least one of the desirable skills should also be included.

The standard therefore becomes:

. 100% of essential skills, plus

. 50% of desirable skills.

Q.4 The answer must be yes, again because the conditions can vary so much. Consider the differences between repairing a puncture in a bike shop, being called out to conduct a repair on the side of the road, and working as repairer for the Pirelli Team on the Sun Tour road race operating from the back of a truck and not understanding Italian!

7 5