

## **Module 3      Instructional Techniques**

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### **Unit 3.3      Competency-based Education and Training**

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# Introduction

## About this unit

This is Unit 3.3 “Competency-based Education and Training” of Module 3 “Instructional Techniques”.

- Section 1 introduces the concept of competence and related terminology.
- Section 2 looks at the features of competency-based education and training.
- Section 3 examines the relevance of this system of training to employers, colleges and industry trainers, and learners.
- Section 4 considers how best to assess competency.
- Section 5 deals with the steps in implementing a competency-based system
- Section 6 discusses the competency-based learning environment.

## How to use this book

As well as information about competency-based education and training this book includes some questions and exercises.

These activities don't play a part in your assessment for this unit, they are there to help with your learning.

Read the information, then answer the questions or do the exercises as you work through the book.

Answers and examples are provided throughout the manual for some of the exercises, and others suggest you discuss your responses with your tutor.

The assessment for this unit will be based on the assignment.

**It's these tasks that determine your competence in this unit.**

## How you'll be assessed

To be assessed for this unit you will be given two assignments.

The assignments will be done at the completion of certain sections of the work in the manual.

Your tutor will assist you to understand the requirements for the assignments - do not hesitate to ask for clarification of anything you do not understand.

## Finding your way

As you work through the text you'll see symbols in the left margin of some pages. These "icons" guide you through the content.



Read



Important - take note!



Self- checking questions or exercises



Assessment task



## Competency

The curricula on this training programme for Technical Teachers are competency- based. The competency for each unit is expressed as a number of learning outcomes and assessment criteria.

Assessment criteria specify what you must be able to do to show that you have gained the knowledge and skills needed to achieve each learning outcome.

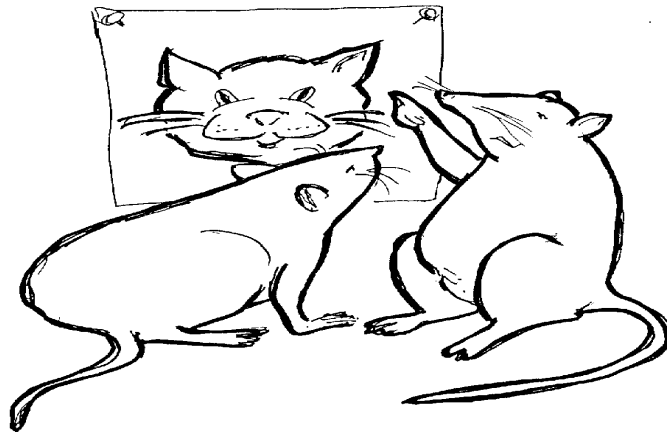
Each unit has its own assessment criteria specified. Recognition of prior learning is encouraged. If you feel confident that you have the necessary level of competence to successfully complete the elements shown under Assessment Criteria on the next page you may be able to take the assessment without studying the unit.

### Learning outcomes

- When you have completed this unit you should be able to:
- Describe competency-based education and training (CBET) and list its characteristics.
- Identify how CBET differs from other types of training.
- Explain the relationship between time and standard in CBET.
- Explain the rationale and relevance of CBET to TVET and employers, highlighting the rationale.
- Identify instructional strategies suited to CBET.
- State the requirements for implementing a CBET system in a learning environment.
- Analyse the teacher/student/employer relationship in a CBET learning environment.
- Apply the principles of CBET in a teaching situation.

**Assessment criteria**

- Accurately define Competency-Based Education and Training, with reference to performance, conditions, standards and its characteristics.
- Distinguish correctly between CBET and other types of training.
- Explain the relationship between time and standard in CBET, the explanation to refer to the reversal of the ratio of time to standard from traditional to CBET.
- Explain the relevance of CBET to TVET and employers, emphasising the confidence of assessment.
- Identify, including reference to self-paced training, instructional strategies suited to CBET.
- State, including functions defined in supplied information, requirements for implementing a CBET system in a learning environment.
- Describe, including reference to the teacher as a facilitator, not expert, the teacher/student relationship in a CBET learning environment.
- Implement CBET principles in a micro-teaching situation.





# Section 1



## Concepts of competence

Unit 3.2 of the module “Instructional Techniques” introduced you to writing behavioural objectives.

Competency-based education and training, which we shall refer to as CBET from now on, extends the concept of behavioural objectives beyond observing a task being performed and measuring the performance with a pre-determined standard.

CBET is concerned with knowing whether someone is competent at performing a task, or a group of tasks, or a job.

Before we consider the concept of competence, however, let’s briefly refer to the work of two people who developed theories about human behaviour and applied them to education and training.

B.F. Skinner, a leading American psychologist, explained human behaviour in terms of how we respond to things that urge us into action. Skinner rejected what he couldn’t see and concerned himself with patterns of responses to rewards and punishments.

He developed a theory of behaviour which proposed that individuals will select behaviours that are followed by desirable results. These desirable results can be manipulated by others to change the behaviour of an individual in a required way.

Skinner achieved examples of unusual learned behaviour in animals by using rewards. He applied the idea to human learning in his invention of a teaching machine.

The teaching machine was used with programmed instruction, a sequence of small, gradual steps leading to mastery of a task, or the learning of information. Learners worked at their own pace and the results of this approach to learning affected theories and methods of instruction.

Skinner believed it was enough to analyse behaviour rather than the processes of the mind because behaviour could be observed and measured.

The basis of Skinner's theory (called ***operant conditioning***) is that a reward or punishment that comes after a behaviour will change that behaviour. The wanted behaviour is encouraged by reinforcement.

A teacher's reaction to the work of a student may condition the behaviour of the student. A poor reaction to unsatisfactory work may condition the student to feel nervous or anxious when doing a similar task in the future, while praise for a task well done will encourage the student to try even harder.

Workers who are paid by the quantity of work they produce, work faster to get a greater reward at pay time. People late for work may have their pay reduced to deter future lateness.

Operant conditioning is often used in training:

A trainer instructing someone in a complicated series of tasks will initially praise actions of the learner which nearly reach the desired level of behaviour. As the learner becomes better at the tasks the trainer will only praise fully correct actions until the learner has mastered the tasks.

Our responses to methods of changing human behaviour are individual.

Skinner's work suggested that instruction is best directed to the individual learner.

Carl Rogers, also a psychologist, had different views to Skinner, saying that man was not simply the result of conditioning. He said that individuals had free will and there were differences between them.

The way Rogers developed his ideas in the 1940's is called the ***humanistic approach***.

Rogers applied his ideas of freedom of the individual to education and training, and was concerned with improving the way in which people are instructed.

Most of us prefer to manage our own affairs. Rogers believed that people also want to manage their own learning. Where people are managers of their learning, teachers become facilitators of the learning process, creating the conditions under which people can learn. Learning becomes centred around the learner.

The humanistic approach of Rogers has strongly affected how the learning of adults is conducted.

Here are two references that may be of interest:

Skinner, B.F. (1975). "The steep and thorny way to a science of behaviour". *American Psychologist*. No.30.

Rogers, C. (1983). "Freedom to learn for the 80's". Charles Merrill. Columbus.

### **So, what is competence?**

If you are told you are competent at something you do, what does that mean? Are you happy to be considered competent, or does it upset you?

You may not like to be called competent if that means "satisfactory" when "good", "very good" and "excellent" mean there are higher levels of performance.

We often think of competence in a negative way, noticing when someone, in our opinion, is not competent. At some time dentists, doctors, electricians or plumbers, for example, were each awarded a certificate by a relevant authority who considered they were competent at what they do.

We believe them to be competent until they do something we think is incompetent. Quite often it is a single incident which affects our ongoing view of their competence.

## **The nature of competence**

A broad definition of competence is the:

***“ability to perform activities within an occupation to the standard expected in employment”***

Competence is often confused with “task” and “skill”. A competence relates to a broad area of competency and contains skills and tasks.

The main competence of a spray painter may be “to apply paint coatings to motor vehicle panels”. This could include both the task of mixing the paint and the skill of using a spray gun.

The performance of a task can be seen and measured. Competence is something you can’t see directly but it can be inferred by testing for knowledge, skills and other attributes and watching a person’s performance of a task.

The idea of competence takes into account many of the personal characteristics that enable people to do a job in the workplace, including the ability to:

- perform separate tasks
- respond positively to changes in routine
- manage several different tasks as part of the job
- apply knowledge and skills to new and changing situations
- handle the responsibilities and expectations of the workplace
- work with others

When you are competent at a job, or some part of a job, you apply knowledge and skills that are often hidden from others watching you perform a task at work.

## **Look out for jargon**

Here are some terms we will use in this unit to describe work activities:

- job
- area of competence
- unit of competence
- element of competence
- skill

Keep in mind that the definitions and names of these terms are not the only correct ones. The word “job” can have a variety of acceptable meanings:

“I hear you've started a new job”

“This job won't take long”

“How many jobs do you have to do today?”

For our purposes we'll define a JOB as something related to an industry or organisation and is the work done by an individual, for example, warehousing.

### **Jobs**

Jobs can be broken down into units of competence.

A unit of competence is a task, procedure or process of what people do in their job. It is a specific work activity.

For example, units of competence (tasks) for warehousing might be:

- operating transport component
- receiving inward goods
- racking and binning inward goods
- receiving customers' orders
- picking and packing goods
- despatching customers orders
- stocktaking
- ordering goods

Elements of competence are sub-tasks that make up a unit of competence. For example, if we took the unit of competence for operating transport equipment, the elements might be as follows:

- operating a fork lift
- operating an electric hand truck
- unloading and loading vehicles
- transporting goods and equipment
- maintaining and servicing transport equipment

Each element of competence will then have performance criteria statements which are the level of performance the employee **must demonstrate on the job**.

Operating a fork-lift is a routine procedure. It ends in a predictable outcome - the fork lift being operated to pick-up and move goods and materials.

Operating an electric hand truck is a different situation. It is a different method of operation with emphasis being on operator safety, as with this item of equipment, the operator walks with the equipment.

With the maintenance and service of the equipment, there may be the need for some additional knowledge on what has to be serviced on each item of equipment which should give a predictable outcome of the equipment being properly and safely serviced.

From the performance criteria, skills and knowledge required to reach the level of competence can be identified (**See example on following page**).

**SKILLS** are the abilities you bring to your performance of a task.

The term “skill” can be used to identify any of the abilities you may have, such as being able to:

- work with accuracy and speed
- lead a group activity
- estimate quantities
- work well with others
- measure precisely
- line up parts by eye
- adapt to changes

A skill can be placed into one of three groups:

1. **cognitive skills** - these are thinking and knowing skills. They involve using the knowledge one has of principles and processes to carry out tasks. A builder reading and interpreting a house plan has the cognitive skills of understanding and using language and symbols.

2. **Perceptual skills** - skills involving the senses. Judging angles, estimating distances and feeling surface finishes are examples of perceptual skills in using the senses of sight and touch.
3. **Psychomotor skills** - the manipulative or “doing” skills. Moving some part of the body, such as the hands and arms when sawing a piece of timber or making a pot on a potter’s wheel, involves using psychomotor skills.

When you first learn to perform a task, you may find each part of the new task presents some difficulty. At this stage the skills needed for the task are not readily observable. As you gain experience through practice, the skills you need for satisfactory task performance become more visible. These visible skills are task skills.

Supporting the task skills are others which are not so visible, such as learning skills, task management skills, interpersonal skills and workplace skills.

**Learning skills** include training others, directing self-learning and supporting workplace learning.

Examples of **task management skills** are performing several tasks in the right sequence, minimising wastage, foreseeing and avoiding problems, and coping with equipment breakdowns.

Among **interpersonal skills** are the abilities to work in a team, establish and maintain good work relationships, and discuss work issues and problems at group meetings.

**Workplace skills** are abilities like identifying and resolving health and safety issues, working effectively in a particular department or area of an organisation, or working within restraints.

### **Jobs combine all types of skills**

If you were a potter, for example, your job may involve the tasks of selecting clay, dyes and glazes, preparing the furnace, throwing the pot, applying colour and glazes, firing the pot and maintaining equipment.

To perform the tasks that make up the job of a potter, you need particular skills, such as being able to operate a manual or powered potter’s wheel, adjust clay consistency, shape the clay into a pot, decorate the pot, and adjust kiln temperatures.

Your competence as a potter can't be seen directly but is a mixture of your knowledge, skills, underlying attitudes and personal qualities. It will include your ability to solve problems and make decisions, your relationship with your colleagues and your ability to organise your workload.

**Now do the following activity.**



### Activity 1

1. Think about tasks you do which are routine activities and select one at which you consider yourself competent. Describe the task by completing the following statements:

- The task is:

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- The predictable outcome of the task is:

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- The series of steps in the task are:

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- The clear beginning of the task is:

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- The clear end of the task is:

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2. List the skills and knowledge you have which you believe support your competency at the task you have described.

- Skills

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- Knowledge

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**Discuss your responses with your tutor.**



## Section 2



### The characteristics of CBET

CBET places a strong emphasis on what a person can do as an outcome of learning rather than on the processes used to provide the learning.

Not all CBET programs are structured in the same way, but generally they have the same characteristics.

**The content of a CBET program is based on the skills and abilities needed by a person to do a job.**

An analysis process is used to identify the competency areas (duties), units of competence, elements of competence (tasks), skills and knowledge which make up the job.

**Performance objectives are written for each competence to indicate how the competency should be done.**

The performance objective statements will have in them:

- the PERFORMANCES linked to the competency
- the STANDARD required for each performance
- any CONDITIONS which apply to the performances

The performance objectives for a printing company representative could be put like this:

**Job:** Company representative

**Area of competence** (duty): Sales

**Unit of competence** (task): 1. Presenting the company to the market place.

**Element of competence** (sub-task): 1.1 Marketing the company's services

**Performance objective:**

- Communicate company capabilities clearly and accurately to the client at a level suited to the status of the client.

**Element of competence** (sub-task): 1.2 Determine the contract.

**Performance objectives:**

Negotiate terms and conditions of contracts with clients in accordance with company sales policy.

- Prepare a quotation, using accurate estimates and in accordance with company sales policy, which advises the client of the cost to produce the job.

**Element of competence** (sub-task): 1.3 Liaise with clients.

**Performance objectives:**

- Communicate technical advice clearly and accurately.
- Maintain the good will of clients with respect to future work.

Further analysis of each competence (task) identifies what **SKILLS** and **KNOWLEDGE** the sales representative should have to demonstrate the range of competencies within an area of competence.

In the case of element 1.1 “Presenting the company to the market place” the **SKILLS** relevant to the area of competence could include being able to:

- Research client needs
- Present company capabilities (electronic imaging, typesetting, etc.)
- Arrange meetings
- Communicate at all levels
- Calculate the value of jobs
- Advise clients on technical matters

KNOWLEDGE needed to support this area of competence may include:

- Who is the client contact person
- Client background information
- The company's production capacity and limitations
- The terms and conditions of contracts
- The current company workload
- Quotation requirements (client's specifications, price list, electronic calculator, quote form)

The following represents another way of stating a performance objective in CBET especially as it applies to Technical/Vocational Education and Training.

**Job: Auto Mechanic Technician**

**Area of competence (duty): Perform engine overhaul activities**

**Unit of competence (task): Reface valves**

<b>Performance Objective</b>
------------------------------

**Given:** Intake and exhaust valves, a service manual and required valve grinding equipment and tools

**You will:** Reface valves

**How well:** Written and performance tests must be completed with 80% accuracy

<b>Enabling Objectives ( sub-tasks )</b>
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1. Clean valve and inspect for wear and warpage
2. Set up valve grinding machine
3. Check valves for run- out
4. Grind valve face

You will notice that the three main features of the performance objective – **condition, performance and standard**, are included and are represented by terms: ‘Given’, ‘You will’ and ‘how well’

**Given:** The condition of performance( what the student will have available to use when doing the task for evaluation, and under what circumstances he/she must perform.

**You will:** The task itself ( the actual performance the student must demonstrate )

**How well:** The standards of performance (how well the student must perform the task. This will include a minimum acceptable level and may or may not have a time constraint)

Note that the enabling objectives (sub-tasks ) must be mastered in order to obtain the standard(s) required.

- **A distinct feature of competency-based education and training is the importance given to regular assessment throughout a program.**

The most objective way of assessing a learner’s competence is to have the learner perform a task in the workplace. The performance of each learner is measured against a standard rather than compared with the results of other learners.

Assessment takes place when the learner is ready to demonstrate mastery of a competence. However the assessment is done, it must be based on learner’s demonstrating competent performance before s/he is told they have completed that part of their learning. This means that s/he may be required to repeat aspects of that part of his/her learning until competence has been achieved and before s/he is allowed to move on to another part, component or duty in the program.

- **A record of each learner’s progressive achievement of competencies is maintained by the provider of the education or training.**

Records include how much practice (number of hours) was needed before each competency was tested, the conditions under which competencies were tested, dates on which competencies were achieved by the trainee and validated by the signature of the trainer. The complete record is given to the learner at the end of the learning program.

- **Teaching and instruction methods must be flexible and structured for individualised learning.**

Instructional materials are designed to suit the learning styles of individual learners. Learners are helped towards achieving competencies with workbooks, videotapes, computers and other media.

- **The time for learning is flexible.**

In a traditional system of education or training, students were all given the same amount of time to learn a concept or skill. All were tested and the results or standards varied significantly. Some students gained 45% while others gained 90%. Time was held constant and the standard allowed to fluctuate.

In CBET, the reverse applies - the standard is held constant and the time allowed to fluctuate. All students are required to meet a given level of competence (standard) but the time required varies from student to student.

Competency-based programs allow learners to work at their own pace by taking into account the various needs, capabilities and backgrounds of the learners. Slow learners are not disadvantaged, and learners able to reach competency quickly are not held back. This requires skilful management and sufficient learning resources to be successful.

- **Learning can take place in various surroundings.**

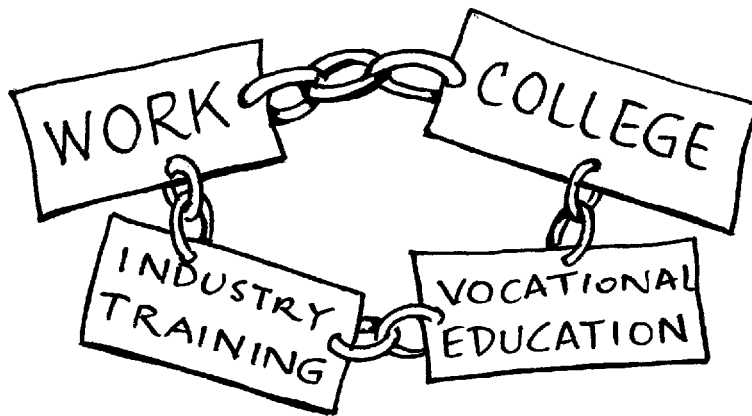
For some aspects of learning, a training room or classroom may provide an adequate setting. A simulated workplace environment might be appropriate in some situations, while for others the workplace itself may be the best location. This flexibility is important to the integration of on-the-job and off-the-job learning.

- **Feedback provides a guide to progress.**

A competency-based program can provide regular feedback to learners on their acquisition of skills. Reference materials, self-checking questions, checklists and skill tests give learners a guide to their progress when they first attempt to demonstrate a competency.

- **Learners' existing levels of competence can be taken into account.**

Recognition of previous learning focuses on the actual competencies a person has, no matter how, when or where the learning took place. This approach gives individual learners access to education and training by linking different levels of education, training and industry-based training. Learners can move between courses and training programs, or between education and employment.



## Activity 2

### Check your progress

1. On what basis is the content of a CBET program structured?

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2. What three features will be present in performance objective statements written for units of competence?

- i) 

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- ii) 

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- iii) 

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*continued*

3. State 2 features of a CBET program which are important to the determination of a learner's mastery of competencies.

i) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ii) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Write 2 advantages of CBET's flexible learning times.

i) \_\_\_\_\_

\_\_\_\_\_

ii) \_\_\_\_\_

\_\_\_\_\_

5. What are ways learners can get feedback on their progress while they are working through modules of a CBET program?

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\_\_\_\_\_

6. How does recognition of their previous learning assist learners in their education and training?

\_\_\_\_\_

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\_\_\_\_\_

**Check your responses on the next page.**



## Activity 2 Answers

1. CBET programs are based on the identified skills, knowledge and abilities needed by individuals to do a job.
2.
  - i) The PERFORMANCES needed to show competency
  - ii) The STANDARD required for each performance
  - iii) The CONDITIONS which apply to each performance
3.
  - i) Regular assessment throughout the program
  - ii) Recording each learner's progressive attainment of competencies
4.
  - i) Learners can work at their own pace
  - ii) Slow learners are not disadvantaged, fast learners are not held back
5. Reference materials, self-checking questions, check lists, skills tests
6. Learners can move between courses or training programs, or education and employment.

Learners can access education and training because recognition of prior learning links different levels of education, training, and industry-based training



## Section 3



### What's so special about CBET?

#### How is CBET different from other types of training?

##### Credential

- The credential awarded upon completion of competency-based training certifies that the holder has achieved competence, to specified standards, in the tasks which make up a specified competency area, or the competency areas that make up a job.
- Credentials awarded for other kinds of training are simply indications of successful completion of a course. They do not indicate the particular competencies that the participants have achieved from that course.

##### Curriculum

- The curriculum for a competency-based program of training is developed from competencies derived from industry or the area of employment. Certification is based on the achievement of competence rather than the time to be spent in training to complete a course.

This makes it possible for the training process to be speeded up but that's not the main purpose of CBET and the specification of nominal but flexible periods for the duration of all or part of the training is not incompatible with a CBET system.

- Other forms of training are generally “time-serving”, requiring trainees to spend rigidly specified periods of time for each unit and module of a course within a set overall duration for the whole course.

### **Courses and outcomes**

- The content of a CBET course and its stated learning outcomes are consistent with the required competencies to be achieved by trainees undertaking the course.
- In other kinds of training the course content and its outcomes may be influenced by the teachers who conduct the course and not be fully relevant to the competencies needed by the employees of an enterprise.

### **Assessment**

- Assessment in a CBET system measures a trainee's competencies in relation to some specified standard. Employers have a clearer indication of whether a person can or cannot do a job. Assessment based on national competency standards\* generally provides a reliable and consistent way of measuring competency.
- Other training systems use a variety of assessment processes which compare individual performances but do not measure each one against a specific industry competency standard.

### **Relevance of CBET to TVET and employers**

Economic conditions are changing all over the world and there is more competition in the world marketplace. The demands of consumers are altering. Manufacturing technology is rapidly moving forward. Mobility of people is placing greater demands on hospitality and tourism.

Neglect of skill development policies and practices can bring about a shortage of personnel who have the skills needed for modern industry.

The mixture of skills some workers have may no longer suit an industry's needs. Some workers may have high level skills in areas that are no longer wanted but don't have the skills they need to adapt to changes in their industry. When a country's workforce is under-skilled there is a strong need to develop effective skill-forming policies and programs.

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*\* National Competency Standards refer to levels of competence established by a Trade Advisory Committee or regulating authority representing an industry.*

Industry reform and the restructure of outdated industrial awards are ways of improving productivity. New approaches to industrial relations recognise the issues of skills, job satisfaction, career paths and equity in the workplace and their effects on productivity.



### **The advantages of CBET to employers, colleges, and trainees**

For **employers** CBET programs can make training more flexible and improve productivity. Employees can be trained in the competencies needed for their job without having to complete all of a course. CBET certifies that each competence of an employee has been assessed to the standards needed in the workplace.

What employees already know and can do can be recognised in a CBET program to give them credit for previously acquired knowledge and skills relevant to their job. Some trainees will become competent in a shorter time and there will be a lower cost to the employer for their training. Employees can be involved in the development, presentation and assessment processes of training.

For **colleges** and **industry trainers** CBET makes assessment a simpler process as it requires that trainees achieve stated training outcomes by reaching or bettering the specified standards.

Various delivery methods can be used, such as self-paced learning, and there is greater flexibility for trainees to enter or leave CBET programs.

Teachers and trainers can be more confident about whether or not a trainee can do a job because trainees are assessed individually.

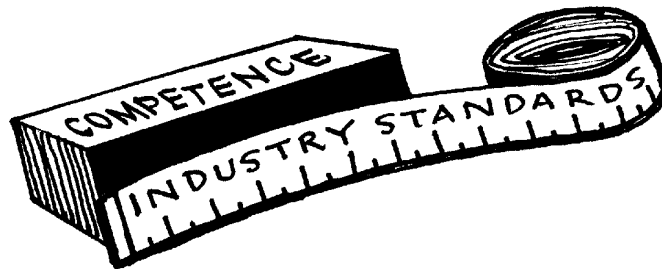
Evidence of competence allows trainees to move between industry training programs and colleges more effectively. The competencies needed for the job can be aligned with training outcomes.

For **trainees** CBET allows them to accept responsibility for their own learning. CBET programs can reduce the time of training for some trainees.

Self-paced learning gives trainees time to master a competency before proceeding to the next and takes in to account the needs of individual trainees.

CBET programs improve trainees' chances of doing well in a course.

Trainees are better motivated and more focused on learning. Career paths are more related to skills and multi-skill development.



### **What does CBET have to do with a worker's salary and conditions?**

Changes to the structure of an industry award which aim to improve productivity and industrial relations should:

- develop new ways to organise work and make workers adaptable to change by increasing their skills (multi-skilling).
- allow enterprises to introduce new technology in ways that comply with occupational health and safety regulations.
- make enterprise work agreements easier to negotiate by removing outdated job classifications, conditions and structures.

- introduce competency standards, suitably certified and recognised by appropriate training authorities.
- establish new classifications that enable workers within a company to do a different job at their present level or move to jobs with more responsibility and higher pay.
- specify the work to be done in new classifications and the level of competence to be reached through training.
- support changed awards and classifications with improved payment systems, such as pay linked to performance.
- give lower paid workers access to career paths determined by training and skills.



**Activity 3****Check your progress**

Complete this table which compares CBET with traditional methods of training.

	<b>CBET</b>	<b>TRADITIONAL TRAINING</b>
<b>CREDENTIAL</b>		
<b>CURRICULUM</b>		

	<b>COURSES AND OUTCOMES</b>		
	<b>ASSESSMENT</b>		

**Compare your completed table with the one on the next page.**





**Table comparing CBET and traditional training**

	<b>CBET</b>	<b>TRADITIONAL TRAINING</b>
<b>CREDENTIAL</b>	Credential certifies that the holder has achieved competency to specified standards for the competencies in a specific area or job.	Credential indicates a course has been successfully completed.
<b>CURRICULUM</b>	<p>Developed from competencies derived from industry and/or industry competency standards.</p> <p>Certification based on achieving competence, not time spent, in a training program.</p>	<p>Usually “time-serving” courses.</p> <p>Trainees spend rigid periods of time on units and modules of a course, which has a specified duration.</p>
<b>COURSES AND OUTCOMES</b>	Content and outcomes are consistent with competencies trainees must achieve to complete the course.	<p>Course content and outcomes may be influenced by teachers who conduct the course.</p> <p>May not be fully relevant to competencies needed by an industry.</p>
<b>ASSESSMENT</b>	<p>Measures a trainee’s competencies with a specified standard.</p> <p>Employers are clearer on whether or not a person is able to do a task or job.</p>	Various assessment processes which compare individual performances but does not measure them against an industry standard.



## Section 4



### A measure of confidence

#### Effective assessment in an industry situation

If learning is to be effective and result in more competent graduates and employees, assessment has to be part of the process.

Relevant assessment must cover all aspects of competency development. If an employer knows what an employee can and cannot do competently then they can be given other tasks to do when the opportunity arises, or when a new requirement is made of the enterprise.

This knowledge also enables the employer to steer training towards developing additional competencies. This gives employees more job satisfaction and the employer gets a more productive employee.

Assessment could lead to employees being reclassified and getting higher wages. Formal recognition of competencies held by employees may offer alternative job options or career paths.

Assessment of off-the-job learning in the workplace, at a college, or other training site rounds off on-the-job assessment. A range of assessment methods can be used to assess actual performance to find out how a learner is likely to perform in similar circumstances on the job.

Sometimes just the performance is assessed; at other times assessment finds out what relevant knowledge, skills, personal qualities and attitudes learners have. To develop assessment items for a competency-based program, you need skill in deciding the best way to assess each of the learning outcomes.

The method of assessment you choose must be relevant to the expected performance, the conditions and the situation. It must measure what it's supposed to measure, and not something else. It's not much good

measuring literacy skills when the performance is a manual one like mixing cocktails.

You can't determine if learners are competent bar attendants by having them write about the tasks they do. With reliable assessment items the assessment can be made by a different assessor, or at some other time, yet still give the same result.

## Kinds of assessment

Assessment tests can be prepared for two different reasons;

1. To compare the performance of a learner to the performance of others doing the same assessment task. This kind of assessment is called *norm-referenced assessment*
2. To compare the performance of a learner with a set of fixed criteria. This kind of assessment is referred to as *criterion-referenced assessment*

### Norm-referenced assessment

Norm-referenced tests are intended to **compare the performance of individual learners on a set of tasks**. Tests used in norm-referenced assessment usually produce a range of scores. They tend to spread the learners out.

For example, a norm-referenced test might involve marking learners' work then using the score to:

- decide who passes and who fails by ranking learners and then allowing a fixed percentage (for example, 80 per cent) to pass;
- decide who are the best learners in the group;
- give grades such as A+ and B–, or marks like 60 per cent and 75 per cent.

Norm-referenced tests are popular and convenient. Society encourages competitiveness. Many learners, teachers, trainers and employers want to know how each student's test score compares with his or her peers. This can be an important factor for promotion in a job, or recruitment to a job.

The score or mark learners get doesn't indicate very much about what they know or can do. A learner may have scored 81 per cent on a test and been ranked third in a group, but we will not know the level of competence that has been reached.

A criterion-referenced test finds out whether or not individual skills or competencies have been mastered to a specified level.

### **Criterion-referenced tests**

Criterion-referenced tests are used to determine whether a learner has a particular level of mastery. Criterion-referenced tests tend to clump learners together. Spreading learners over a range is not essential to criterion-referenced testing.

Learners' performances are assessed in terms of whether or not particular criteria have been achieved. For example, a criterion-referenced test for secretarial students could indicate the **competence** to be demonstrated:

*“type copy from hand-written text” ( performance )*

the **criterion** for satisfactory performance: (standard)

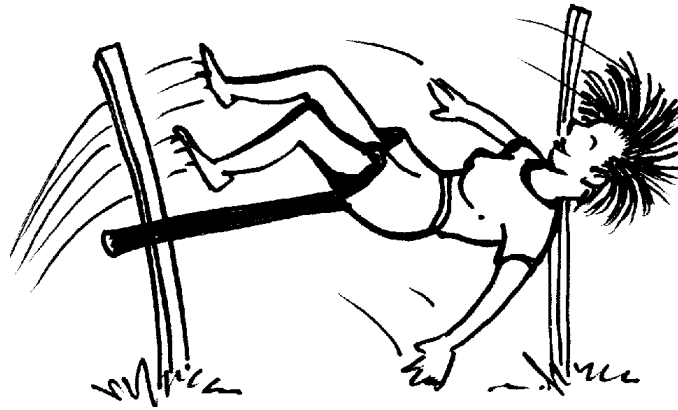
*“typing an average of 50 words per minute with a minimum error rate of 2 errors per minute”*

and the **conditions** for the performance:

*“using Word 6 word processing software on an IBM-compatible computer”*

Instead of a mark or a grade the learner would get a tick or a cross against each competence.

A criterion-referenced test is like a high jump. The criterion for a successful jump might be to clear the bar when the bar is set to a height of one metre. Everyone clearing the bar is a successful jumper.



Those who fail to clear the bar are unsuccessful jumpers. It doesn't matter by how much a successful jumper clears the bar. To pass the test the jumper's task is simply to clear the bar.

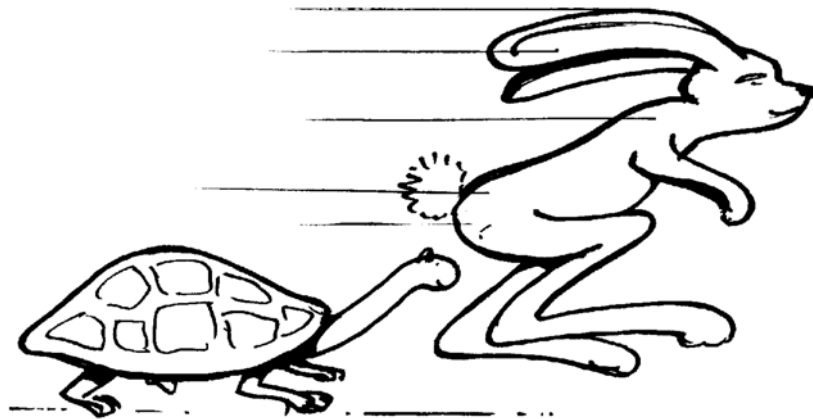
An assessment system based on criterion-referenced tests caters for the majority of learners, not just the small percentage of high performers. All learners should eventually be able to reach the standard. Particular weaknesses will be highlighted which can then be dealt with.

Criterion-referenced tests must distinguish between people of different skill levels. The results of a valid test should closely match performance in the workplace and predict how well learners will perform on-the-job.

The result of a competency test is an estimate of the real level of a person's skills. The reliability of a test is related to the absence of error in the estimating process. Reliable tests consistently estimate the real level of skill no matter who conducts the test, which learners are tested, and who marks the test results.

Some disadvantages of criterion-referenced assessment are:

- It does not give an incentive to strive beyond the standards set
- High achievers may lose interest because there is no recognition of "first" or "best"
- It does not allow selection on relative merit for prizes, promotions or hiring



Criterion-referenced assessment is more suitable to the workplace because employers need to know whether a person can do the job or not.

It doesn't ignore the slow learners or the disadvantaged. Emphasis is on everyone achieving the standard at their own pace with whatever training each learner needs.

It should be noted that whilst being trained to learn the knowledge and skill for a sub task, times will vary for a person to achieve the level of competence either in the training centre or college.

**However; when demonstrating competence on the job in the work place, it will be necessary to demonstrate the level of competence within the required time cycle.**

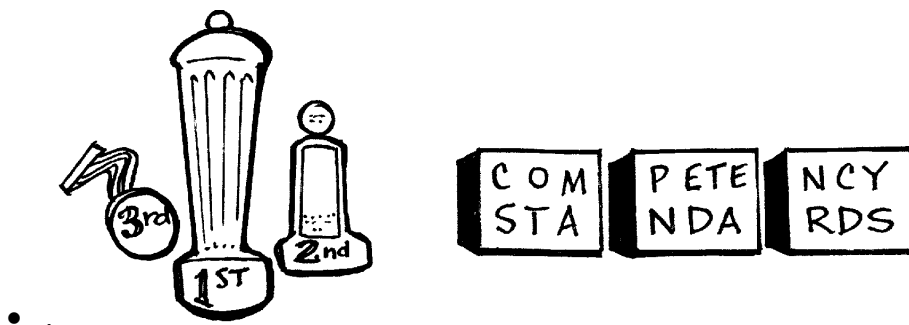
For example, the sub task is operating a cash register at the supermarket.

When training, the operator would have to demonstrate his/her competence “to accurately check out 40 items and enter them on the cash register”.

When demonstrating competence on the job, the operator would have to accurately check out 40 items and enter them on the cash register **within 90 seconds.**

## Summarising norm-referenced and criterion-referenced assessment

- **Norm-referenced** assessment is used to make a selection from individuals competing for something e.g. an award or a prize. The ranking of an individual in a group of learners is determined relative to the group
- The teacher conducting a course may have decided the content of the course and described it with general objectives
- Test results provide information about how a learner performs compared with others in a group and indicate what a student can do
- High scores indicate excellence of performance
- Grades of students vary where scores differ
- Questions distinguish between individuals when it is necessary to compare the performances of different learners
- **Criterion-referenced** tests are a stopping point to determine if a student has gained the knowledge and/or skills to proceed to the next stage
- Course content is defined by specific objectives and standards
- Scores give an accurate indication of what students can and cannot do
- Identification of excellent performance often not appropriate
- Grades are not necessary as achievement of standards is the goal
- Questions must match the objectives and are required to obtain information about what a student can or cannot do





# Assignment No. 3.3 –1

## Unit 3.3 Competency-based Education and Training

You are now required to do **Assignment 3.3 – 1** which will be found at the end of this unit or distributed by your Tutor.



## Formative and summative assessment

Assessment used progressively throughout a course (e.g. tests, exercises) to monitor learners' progress is called *formative assessment*. When assessment is made at the end of a module or course (e.g. a final exam), it is called *summative assessment*.

**Formative assessment** provides information about an individual learner's progress with a view to making on-going changes. Formative assessments are flexible and improvements can be implemented as soon as they are needed.

An important skill for independent learners is the ability to be their own assessors. Formative assessment activities can be used as a way of learners testing themselves. This self-checking assessment is often in the form of exercises with which learners evaluate their ability to carry out a particular task.

Learners may do this to:

- find out their standard before they start a part of the program
- measure their progress as they work through the learning material
- review their mastery of the content of the learning materials when they finish working through a training program

**Summative assessment** provides information about an individual's attainment at some predetermined point in time or on the completion of a training program. Summative assessments have little flexibility. They may be designed with improvement in mind, but any changes aimed at improving things are made at the end of the assessment period.

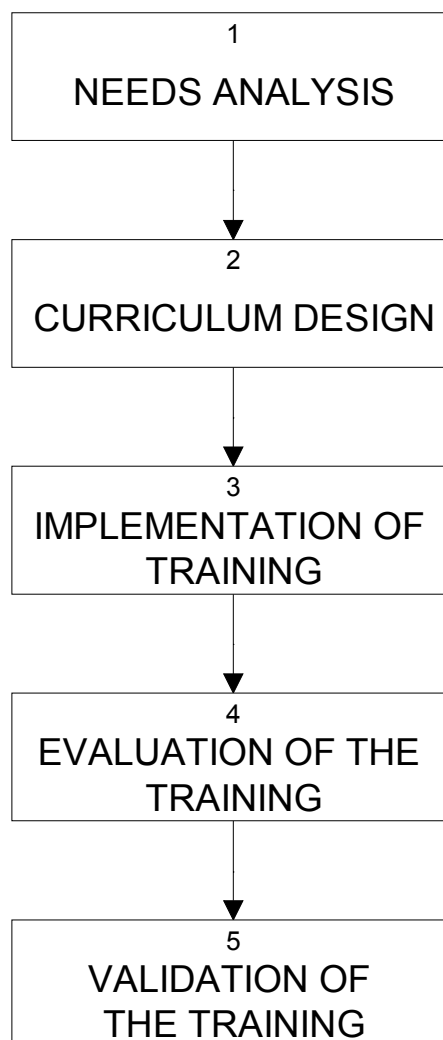
## Section 5



### Implementing a CBET system

There are several approaches to developing and implementing a competency-based system of education and training.

The following five stages have been used successfully in adapting a nationally endorsed industry course to meet the specific needs of a range of enterprises in the industry.



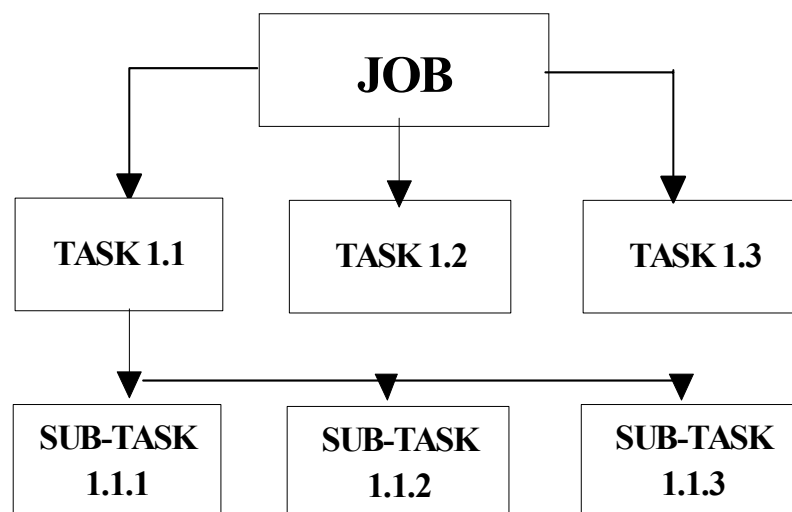
## 1. Needs analysis

Before a competency-based program can be developed, the skills which apply to each job in the particular industry have to be identified.

There are several ways to get this information, including:

- interviews with people who are competent at the jobs or tasks
- questionnaires
- seeking consensus from a group of the industry's "experts" on the future directions and trends in the industry. This group could be designated a 'Technical Advisory Committee'.
- a panel of "experts" provides data about a job, its duties and its tasks and a facilitator leads a workshop activity to define the job with increasing detail, identifying the skills, knowledge and attitudes relevant to each task.

One way of presenting this analysis of a job is with a chart that shows the breakdown of a job into tasks, and tasks into sub-tasks. Sometimes sub-tasks are further refined into task elements.



## 2. Curriculum design

Competency standards are the starting point for the design of a competency-based education and training curriculum. They are the indicators of *workplace requirements* and to be considered competent, learners must be able to perform to these standards. *The standards must be the reference points for the format and content of training programs.*

### Developing industry standards

Many countries have established, or are in the process of establishing, national standards for their industries.

Competency standards for a particular industry may have been approved by a country's national training authority. These endorsed industry standards cover the common competencies needed by enterprises operating in that industry.

Linked to national competency standards for a specific industry are those which are common across several industries. They allow more efficient development of uniform standards, and competencies can be more easily carried from one industry to another.

However, a manufacturer of refrigerators, washing machines, or other kitchen and laundry appliances, might think that some of the competencies related to the design and manufacture of its products are the reasons for the company staying ahead of its competition in the market place.

The management would be reluctant to give information about these competencies to developers of national competency standards, believing these competencies are exclusive to the company and give it a lead over competing manufacturers. Just the same, the company managers should consider the advantages of higher levels of competence in the workplace to be gained from quality training.

An enterprise may use a mix of standards:

- complete industry standards
- modified industry standards, in which competencies have been replaced or altered to suit the needs of the enterprise
- its own standards, developed within the enterprise

### **What do competency standards look like?**

Industry competency standards should be easy to understand and have a similar appearance.

They need to be:

- clear to employers, industry trainers and workplace supervisors
- relevant to the way the workplace functions
- stated as workplace outcomes of training

The standards should:

- give a guide to curriculum development
- assist the design of relevant courses
- have flexible ways of delivering training
- have flexible methods of assessment
- apply to any enterprise in the industry
- provide flexibility in the use of standards within a work organisation
- provide portability and recognition in an industry training system
- recognise prior learning
- assist in giving workers more than one skill (multi-skilling)

A competency statement includes the tasks (Units of Competence) which make up the competence and the criteria by which competence can be assessed. The statement also contains the level of performance expected of the person doing the tasks and other factors related to the outcome of that performance.

The knowledge, skills and attitudes required for the competent performance of each task or sub-task are derived from the competency statements so that **learning outcomes** (performances), conditions and assessment criteria (standards) for a competency-based training curriculum can be written.

The means of assessing competent performance in a training situation is developed from the objectives. The “assessment instruments” set out the requirements to be met by trainees when demonstrating mastery of a competence.

How it all develops can sometimes be confusing. The following charts show the flow process of developing training objectives which would be used to actually train personnel from Industry Competency Standards.

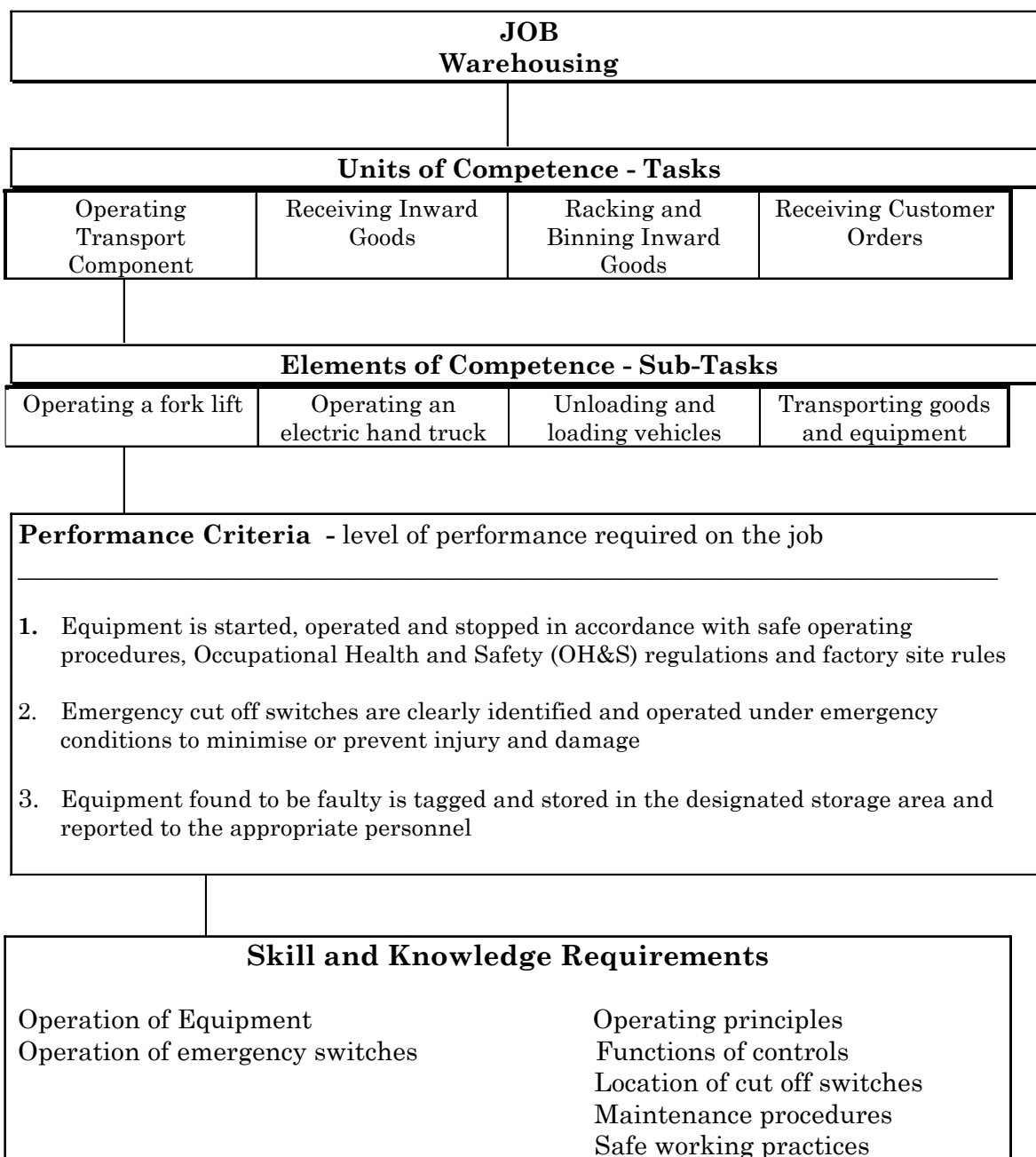
The key points to remember are:

- identify the job
- identify the tasks which are called UNITS OF COMPETENCE
- identify the sub-tasks which are called ELEMENTS OF COMPETENCE
- these ELEMENTS OF COMPETENCE will have performance criteria statements from those performance criteria statements we can list the skill and knowledge training required
- the element of competence becomes the training objective heading
- the identified skills and knowledge headings can become the learning outcomes

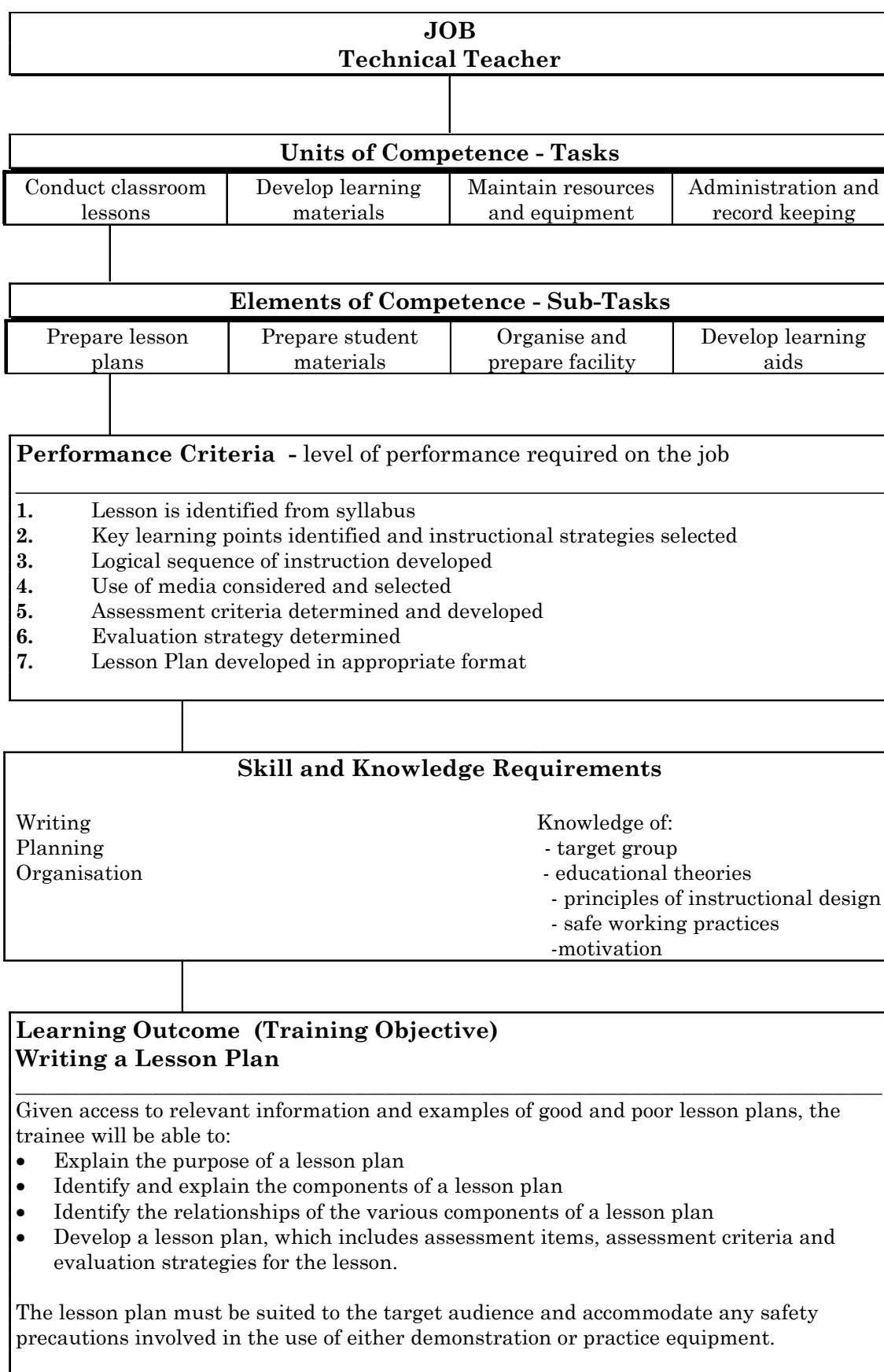
Hence from the identified industry jobs we have developed the:

- Industry standards
- Training objectives

**As stated earlier, your main concern will be to know how to read the training objectives which, in most cases, are already written for you.**









## Activity 4

### Check your progress

- (a) From your own subject area, fill in the blank flow chart on the next page with the following information:
- identify your job (eg. nurse, artist, hairdresser)
  - identify a unit of competence
  - identify four elements of competence
  - identify the performance criteria for one element of competence
  - list the skills and knowledge required for a person to be trained to achieve the competency standard
  - list the training topic heading (Element of Competence)
  - list the learning outcomes (training objective)
- Note:** All entries on the flow chart should be in point form only.
- (b) When you have completed your flow chart, check your topic headings and learning outcomes against the ones in your syllabus document you are currently teaching from, if this is appropriate.

<b>JOB</b>
------------

<b>Units of Competence — Tasks</b>			

<b>Elements of Competence — Sub-Tasks</b>			

<b>Performance Criteria — level of performance required on the job</b>

<b>Skills and Knowledge Requirements</b>

<b>Learning Outcomes (Training Objectives)</b> <b>Writing a Lesson Plan</b>
--



## Learning Outcomes

In CBET, objectives for the training program are based on the Units of Competence, the Elements of Competence and the Performance Criteria.

Learning outcomes specify what trainees should know and be able to do, at the end of training in a clearly defined competence, to achieve the required level of competency.

Haven't we come across this before?

When you worked on unit 3.2 "Writing Objectives" you developed statements about performances you could see taking place.

Learning outcomes are much the same but may include components of knowledge and skills which support the performance but are not observable during performance.

For example:

### **Learning outcome 6.8**

The trainee will be able to operate and adjust the controls of a video editing suite.

You need to know the operating principles of the equipment, and the function of each control for you to be able to operate and adjust the equipment.

The other parts of a learning outcome are the assessment criteria, the conditions, and the assessment method.

The assessment criteria set out what the trainees are expected to do to show they have the needed knowledge, skills and attitudes to achieve the learning outcome to the specified standard. For example:

## **Learning outcome 6.8**

The trainee will be able to operate and adjust the controls of a video editing suite.

### **Assessment criteria**

- 6.8.1 Explain, in accordance with given information, the basic principles and functions of a video editing suite.
- 6.8.2 Operate the equipment to demonstrate the full capability functions.
- 6.8.3 Demonstrate the adjustment of the controls in accordance with the manufacturer's recommendations to obtain the clearest image possible.
- 6.8.4 Identify any equipment faults, and make a report.

The conditions part of the learning outcome states the conditions which will apply to learning and assessment, and may indicate relevant materials, equipment, reference information. For example:

### **Conditions**

Trainees must be given access to:

- information on the principles and operation of the video editing suite
- the video editing suite & raw stock and blank tapes
- equipment manufacturer's specifications and recommendations for adjustment

The assessment method states how the learner will be required to demonstrate achievement of the competency. Knowledge may be assessed by paper-based or computer methods of assessment. Workplace skills can be determined by actual or simulated demonstration.

For example:

**Assessment method**

The learning outcome may be assessed by:

- written assignment/short answer test
- oral test
- a practical demonstration\*

The complete learning outcome would look like the example below. It is another form of how a behavioural objective can be set out. The Technical and Vocational Teacher Training Curriculum uses this format.

**Learning outcome 6.8**

The trainee will be able to operate and adjust the controls of a video editing suite.

**Assessment criteria**

- 6.8.1 Explain, in accordance with given information, the basic principles and functions of the video editing suite.
- 6.8.2 Operate the equipment to demonstrate:
  - insert editing
  - assemble editing
  - fade up/fade out
  - fade to black
  - superimposition
  - titling
- 6.8.3 Demonstrate the adjustment of the controls in accordance with the manufacturer's recommendations to obtain the best image possible from an image deliberately distorted.

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\*Special arrangements may be needed if the assessment is to be done on-the-job.

- 6.8.4 Identify any equipment faults, and make a report which specifies:
- equipment identification
  - nature of fault
  - date, time and circumstances in which fault was detected
  - name of operator

### **Conditions**

Trainees must be given access to:

- information on the principles and operation of the video editing suite
- the video editing suite & raw stock and blank tapes
- equipment manufacturer's specifications and recommendations for adjustment

### **Assessment method**

The learning outcome may be assessed by:

- written assignment/short answer test
- oral test
- a practical demonstration

### **Competency assessment instruments**

These are the means by which competency is measured. Assessment instruments determine if trainees have achieved competency to the standard shown in the assessment criteria. The effectiveness of the learning process can also be assessed with the assessment instrument. As mentioned previously, criterion-referenced assessment is the more suitable method of measuring a learner's level of performance.

### **3. Implement training**

#### **Instructional strategies for CBET**

Skills are based on a foundation of knowledge. Any attempt to learn a skill will also involve the learning of necessary knowledge.

Learning a skill involves three steps:

1. Acquiring necessary knowledge (facts, concepts, procedures and principles)
2. Seeing a competent demonstration of the skill, and practising the skill under supervision.
3. Continuing practise of the skill until competence is achieved.

Instructional strategies have been investigated in an earlier unit of this module,

Unit 3.1 “Instructional/learning strategies” and what follows is a brief review of those most useful to learner-centred CBET.

#### **Teacher-centred instruction**

Teacher-centred presentations of CBET are mostly classroom activities such as theory sessions, group discussions, role plays and simulated demonstrations. This strategy is most suited to the knowledge components of the learning activities specified for a particular learning outcome.

#### **Learner-centred (self-paced) training**

A large part of the responsibility for trainees’ learning and achievement competence rests with the individual trainee. Learning is organised so that trainees work through the learning materials in a way that reflects what would happen on-the-job.



## **Self-directed study**

The features of self-directed study are that learners are responsible for their own learning and the learning can take place anywhere. A formal program is only one of the options open to self-directed learners.

Learners are assisted by a facilitator or counsellor to clarify what they want to learn and to design their own learning situation. Facts, concepts, procedures and principles can also be learned by self-directed study.

## **Learning guides**

Where a large part of the learning content for all or part of a CBET program is available in existing resources, the preparation of learning materials and associated teaching strategies may not be necessary.

Text books, handbooks and other reference materials are the basis for developing an educational guide for trainees as they work through a learning program. The format of a learning guide helps learners by:

- telling them what to do
- showing them how to do it
- giving them adequate practise at the skills needed
- allowing them to test themselves on their understanding of the material
- testing skills and knowledge frequently

An example of a student learning guide is outlined below.

---

## **STUDENT LEARNING GUIDE**

**PROGRAM:** Auto Mechanics

**DUTY:** ( B1 ) Perform engine overhaul activities

**TASK:** ( 0 1 ) Reface valves

**INTRODUCTION:** Valves become carbonised, burned and warped after several thousand miles of operation. They will need to be cleaned and trued in order to make a good seal to maintain compression. A valve that does not seat properly because of excessive carbon, cracks, warps or pits, will cause the engine to give a poor performance, waste gas , lose power and will be hard to start. This guide will show you how to clean and grind valves to restore proper performance. This is a frequently performed task in an engine overhaul operation.

## **STUDENT PERFORMANCE OBJECTIVES**

### **(i) TERMINAL PERFORMANCE OBJECTIVE :**

(Include condition, performance and standard)

**GIVEN:** Intake and exhaust valves, a service manual and required valve grinding equipment and tools

**YOU WILL:** Reface Valves

**HOW WELL :** Written and Performance Test must be completed with 80% accuracy.

### **(ii) ENABLING OBJECTIVES :**

1. Clean valve and inspect for wear sand warpage
2. Set up valve grinding machine
3. Check valve for run-out
4. Grind valve face

**LEARNING ACTIVITIES FOR ENABLING OBJECTIVE # 4**

<b>ENABLING OBJECTIVE :</b> Grind Valve Face	
<b>LEARNING STEPS</b>	<b>RESOURCES</b>
1. Review resource #1 to identify the procedure to grinding the valve face.	Text: <u>Auto Service and Repair</u> Stockel, Stockel and Johanson 1996; Chap. 13: pages 219-223
2. Read resource #2 to review the basic steps in grinding the valve face.	Instructional sheet enclosed: <u>Steps in grinding valve face</u>
3. When you think you <b>know</b> how to do this task correctly, take the written test.	Written test for task #01: <u>Reface Valve</u>
4. When you think you can perform the task for assessment. You will be assessed using the performance test on the last two pages of this learning guide.	Performance test for task #01.

**NB:** To complete the learning guide for task #01, learning activities for **enabling objectives 1,2 and 3** would also have to be written. **Enabling objective #4** was chosen only as an example.



## SELF-CHECK FOR ENABLING OBJECTIVE # 4

**Direction:** Evaluate your knowledge by responding **True or False** to the items below on a separate answer sheet

1. A wire wheel on the Bench Grinder is used to remove carbon from a valve
2. The cutting stone is used for grinding the valve
3. A diamond- tipped dressing tool is used for truing the cutting stone
4. The diamond dresser is kept against the stone until smooth
5. Valve **run-out** is indicating a straight valve stem
6. Common valve angles are 30° and 45°
7. It is recommended that a 30° valve face angle should be ground to 30°
8. The 'Interface angle' is the difference between the valve seat and valve face
9. 'Pits' appearing on the valve face during grinding, is indicating burning of the metal.
10. A properly ground valve face is bright, smooth and free of all defects.

Now check your answers with the answer key on the next page.

**Self-check for enabling objective #4****Answer key (True and False)**

1. T.
2. T.
3. T.
4. F.
5. F.
6. T.
7. F.
8. T.
9. F.
10. T.

All of your answers should agree with the answers in the answer key. If you missed any, go back and repeat one or more of the learning activities for this enabling objective.

**Knowledge test for:**

**DUTY ( B 1 )** Perform engine overhaul activities

**TASK ( 01 )** Reface valves

**DIRECTIONS:** The items below are multiple choice. On the answer sheet provided, place the letter of the correct answer on the blank space to the left of the question.

**DO NOT MARK ON THIS TEST**

1. The wheel used to remove carbon from a valve is called
  - (a) dressing wheel
  - (b) diamond-tipped wheel
  - (c) wire wheel
  - (d) grinding wheel
  
2. The cutting stone is used to
  - (a) dress the grinding wheel
  - (b) grind the valve face
  - (c) make the grinding wheel smooth
  - (d) clean the dressing tool
  
3. A 'cutting stone' can only be trued by using a
  - (a) diamond-tipped dressing tool
  - (b) carbide-tipped dressing tool
  - (c) carborandum grinding wheel
  - (d) valve grinding wheel

4. The technique in dressing a cutting stone is to remove the tool
  - (a) quickly across the stone
  - (b) slowly across the stone
  - (c) back and forth slowly across the stone
  - (d) back and forth quickly across the stone
  
5. In mounting the valve in the chuck for grinding, what would happen if an excessive amount of valve stem is allowed to protrude?
  - (a) The valve could chatter
  - (b) The valve stem could become warped during grinding
  - (c) The cutting stone would not be properly seated
  - (d) 'Pits' would not be removed from the valve face
  
6. If a noticeable amount of wobble is seen when the valve rotates in the chuck, this is known as valve
  - (a) warp
  - (b) run-out
  - (c) wobble
  - (d) wear
  
7. The recommended practise to grind a 30° valve face angle is grind the valve to
  - (a) 32 °
  - (b) 31 °
  - (c) 30°
  - (d) 29°

8. Interference angle is the difference between the
- (a) valve face angle and the top of the valve seat
  - (b) valve face angle and the bottom of the valve seat
  - (c) cutting stone angle and the valve face angle
  - (d) dressing tool and the cutting stone angle
9. 'Pits' seen on the valve face after grinding indicates that the
- (a) operation is incomplete
  - (b) cutting stone is dull
  - (c) metal was burnt
  - (d) valve is not good
10. What indicates a properly ground valve face?
- (a) Light and dark spots
  - (b) Angle is correct
  - (c) Smooth and shine
  - (d) Fits properly into seat
11. Before the valve grinding operation begins, you should ensure that the valve face is parallel with the
- (a) dressing tool
  - (b) cutting stone
  - (c) grinding tool
  - (d) facing tool



12. The grinding procedure should begin with moving the turning valve slowly to the stone and then move the valve face
  - (a) leftward across the stone
  - (b) right ward across the stone
  - (c) back and forth across the stone
  - (d) up against the stone firmly
  
13. The amount of 'cut' the valve face should be allowed when moving it across the face of the stone is approximately
  - (a) 0.025 to 0.05 mm
  - (b) 0.025 to 0.07 mm
  - (c) 0.075 to 0.09 mm
  - (d) 0.025 to 0.10 mm
  
14. When should the valve face be centred on the stone during the grinding operation?
  - (a) There are stubborn pits to removed
  - (b) All dark spots have disappeared
  - (c) There is unevenness on the valve face
  - (d) There is extra pressure to remove pits
  
15. The micrometer feed dial is used to check the
  - (a) angle of the valve face
  - (b) dept of cut on the valve face
  - (c) amount of material removed from the valve
  - (d) valve margin for trueness

Now check your answers with the answer key

**Knowledge test answer key for:**

**DUTY ( B 1 )** Perform engine overhaul activities

**TASK ( 0 1 )** Reface valves

1. c.

2. b.

3. a.

4. c.

5. a.

6. b.

7. d.

8. a.

9. a.

10. c.

11. b.

12. c.

13. a.

14. b.

15. c.

**Performance test for:**

**DUTY ( B 1 )** Perform engine overhaul activities

**TASK ( 0 1 )** Reface valves

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Student Name

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Date

**DIRECTION TO STUDENTS :** when you think that you have had enough practise to grind a valve face, contact your instructor for the **performance test**. He will observe you as you set up the grinding machine , insert the valve into the chuck and grind the valve

**DIRECTIONS TO ASSESSOR:** When the student has practised the task of grinding a valve , he will contact you. Instruct the student to prepare and set up the grinding machine, fit the valve in the chuck and follow the required procedure for grinding the valve . **Assess** the student for safety, proper procedure, manipulation of tools and accuracy, by using the criteria listed.

Critical Items*	CRITERIA/ ITEMS TO BE ASSESSED	YES	NO
1. *	Grinding machine is checked for adequate coolant		
2. *	Valve is correctly placed in chuck and made secure		
3. *	Machine is turned on, valve rotation is observed for <b>run-out</b>		
4. *	Valve face is checked for correct angle- 30° or 45°		
5.	Chuck is moved with valve up close to the cutting stone		
6.	Chuck drive is started to spin the valve		
7 *	Coolant is turned on and stream directly towards the valve		
8. *	Valve face and cutting stone are placed parallel to each other		
9.	Valve is turned slowly as it advance to the stone to start cutting		
10. *	Valve face is slowly moved back and forth across the face of the stone		
11. *	Valve is not allowed to run off the stone		
12. *	Light cuts are made with each movement of the valve across the stone		
13. *	Valve is inspected at intervals, until dark spots and pits disappear		
14.	Chuck drive is disengaged and valve moved away from cutting stone		
15.	Valve face is inspected for shine and smoothness		

**NOTE:** For mastery , 80% of items, including all the critical ones, must score a 'yes' response. A 'yes' response is an indication that the activity has been accurately performed . A 'no' response should indicate that the activity was either not performed or it was poorly done .

Score: \_\_\_\_\_ Mastery \_\_\_\_\_ Non- Mastery \_\_\_\_\_

Assessor's Signature \_\_\_\_\_

#### **4. Evaluate the training**

CBET programs need to be evaluated to determine the worth of the training, in terms of:

- their value to the company or enterprise
- their value to the employees/trainees
- the alignment of the training with industry competency standards
- the need to modify any aspect of the training

#### **5. Validate the training**

The training must be validated to establish that it has:

- improved the skill and knowledge levels of the employees who completed the training program
- improved the quality of the output or product of the company or enterprise
- been of benefit to all parties involved in the training



### Activity 5

Identify a unit of competence (task) for a job in your area of industry expertise and write a training objective for the unit under the following headings:

**Learning outcome:** the trainee will be able to:

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**Assessment criteria:**

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**Conditions:** trainees must be given access to:

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**Assessment method:** the learning outcome may be assessed by:

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**Discuss your response with your tutor**

## Section 6



### The CBET learning environment

#### The changing role of teachers

In a CBET program the traditional role of the teacher/instructor changes.

Learners are able to get hold of a lot of the course content from resource materials developed for CBET. In the past, learners listened as teachers or instructors explained and watched as they demonstrated.

In CBET the teacher/instructor does less direct presentation. Learners do more of the work themselves. The teacher/instructor remains a central resource, but has a different role in guiding, supporting and assisting learners.

Sometimes this function is called “facilitating” students’ learning.

The change can be difficult for some teachers who don’t like to give up their direct role in the teaching process.

In a flexible CBET system, teachers may have to:

- identify, select, plan and develop learning resources
- evaluate the existing educational structure and the processes being used
- use their educational experience when planning flexible learning strategies
- have a less direct role in the learning process
- become a facilitator of students’ learning
- become a manager of the learning environment

In addition to being a facilitator and a resource, a teacher in a CBET program needs the attributes of a leader, a role model, a motivator, an actor, a supervisor, a manager, a guide, an interpreter, and an educator.

## **Changing student learning practises**

Flexible, resource-based learning requires learners to be more responsible for their progress in learning. Students in a CBET program will have to learn in ways different from those they may have experienced with traditional teaching approaches.

They often need support during the transition to independent ways of learning. Their experience in conventional schools and colleges will lead them to expect presentations of most of the material from teacher or instructor directly to students.

With less direct contact, but often more individual and personal contact between teacher and learner, students will find their progress depends on being able to read instructions and carry out a number of tasks on their own.

This could involve testing themselves to check on their understanding of what they are learning and what progress they are making. Learners new to CBET may not have the skills to study, read, search out information, and organise their time and work sessions.

Students finding it hard to change to resource-based learning and accept responsibility for their own progress need to be identified quickly and supported by programs that are part of the learning strategy.

To develop a CBET learning strategy, a teacher must have a clear picture of the learners and their educational needs.

You need to know if the learners:

- are able to learn independently
- are from a disadvantaged group
- are from non-English speaking backgrounds
- will do some of their learning off-site
- will have access to what they need for their learning
- will be able to cope with the program's learning demands
- need special support programs



### **Requirements/Implications for the establishment and management of a training facility to accommodate CBET**

Before venturing into the realms of establishing a system of instruction that allows for competency based, student centred learning, ensure the following can be accessed or accommodated:

- a curriculum document stated in competency terms that has been derived from a task analysis of the job or occupation
- a range of learning resources that support the implementation of the curriculum
- physical facilities that support the teaching/learning strategy
- an adequate system of administrative support, including student progress records
- system of assessment suited to the concept of competency but that meets the requirements of any external authorities
- effective management of resources, human and non human
- built in incentive to encourage student performance
- an adult staff/student relationship based on mutual respect

### **Curriculum**

This unit has covered the value of a curriculum document based on competencies for the effective training of personnel for employment in technical and vocational fields. The details of developing it have been covered on pages 41 to 57. From the perspective of an instructor or teacher training adults, the importance of the curriculum cannot be overstated. This is the yard stick which prescribes what has to be achieved by the trainees and to what standard. It will determine the resources that are needed to implement the programme and the infrastructures required to support it. The curriculum is the connecting link between the demands of the industry and the charter of the training institution.

### **A teaching/learning strategy to accommodate competency based student centred learning**

To try to implement a system of CBET in the same structure as that in which a traditional form of teaching operates would be to restrict the benefits that the system offers. It is necessary to develop a system that allows:

- students to move through the programme uninterrupted by administrative hurdles
- students to become competent in the practical skills and knowledge elements of their field, giving credit for skills already possessed
- integration of related instruction, theoretical background and practise
- differing entry levels of students
- different learning styles and rates

### **A range of learning resources**

A system that is intended to cater for student centred learning and assessment based on competency infers that a certain amount of the training will be committed to programmed instruction. This means access to well designed training materials that:

- cover the requirements of the objectives
- accommodate all levels of academic ability of the target group
- accommodate various preference in learning styles
- offer positive support to the practical outcomes

There is a tendency to insist on developing all materials in-house without giving credit to the value of materials from other sources - the “not invented here” syndrome. This is an expensive viewpoint and use of existing materials should be well researched. Negotiating access to and modification of existing learning resources can often be a very viable and cost effective option.

The second aspect relating to learning resources is that students must have free access to them at times appropriate to their needs.

## **Physical facilities**

A traditional class room would not support the implementation of a system focused on CBET or student centred learning. Students need access to learning resources and equipment as their progress demands. Inherent in a system of this nature is increased student mobility. As students work independently of one another, and the teacher becomes a facilitator rather than the font of all knowledge, there is a need to accommodate this increased student movement in the planning of the layout of a training facility.

## **Adequate system of administrative support**

The thread that will hold the entire system together is that of administrative support. When all the necessary elements of the physical facility have been determined and the student and instructor identified, the administrative infrastructures necessary to monitor and control it will be essential. This would include systems and procedures to:

- monitor and record student data, including enrolment and progress
- record student assessment
- organise industry liaison
- develop and monitor staffing schedules
- monitor resource management
- develop, review and evaluate training materials
- monitor curriculum relevance
- ensure appropriate student support

Although many of these activities are carried out under different models of training, in a system where students are more responsible for their own learning and may be at different stages within a course, it is essential to have a system and the procedures to support it that allow for precise tracking and control where no function is allowed to fall through the cracks.

**System of assessment suited to the concept of competency but that meets the requirements of any external authorities**

CBET implies that a student has achieved an objective by mastering the competency or has not yet reached the standard required. Because of this, a numerical form of assessment is not appropriate. The philosophy of CBET and its different assessment requirements are not always either understood or accepted by authorities outside of the industry and workshop/training facility. This often means that a compromise has to be established.

While the training provider will have identified the elements in a competency that have to be achieved, and the assessment will be either “achieved” or “not completed”, an outside authority may demand a percentage assessment. It is therefore sometimes necessary to determine a percentage rating against accepted competency, which may be established as 85% to 90%. In these circumstances, all students who achieve competency would be rated at this level.

Those who have not achieved the required level of competence are harder to assess on the numerical scale. They must be rated as “incomplete”. This is a difficult area to manage and it is strongly recommended that it be avoided if at all possible. Every effort must be made to convert the thinking of those authorities requiring numerical assessment to the more enlightened approach of competency, and what it means in terms of standard.

**Effective management of resources, human and non human**

When instructors/teachers become facilitators of the learning process, their role changes. They are required to ensure that they provide every assistance they can to students to allow them to achieve the objectives of their training plan. This will include access to whatever form of instruction is appropriate, whether it be through learning materials and the associated equipment, demonstration, the opportunity to practise or one-to-one support and counselling.

The management of the team of people concerned in a department that offers CBET must therefore be concerned with ensuring that the most appropriate staff are given the tasks that they are best at and/or most competent in. Many of the functions of running a training facility that accommodates CBET are different or have a more pronounced focus

than in a traditional style of facility. For instance, the place of learning resources in the system requires that someone is made responsible for this aspect, and not all teachers would be comfortable with this role.

It is important to identify the functions required and manage the human resources to best match the needs. Likewise, it is essential to ensure that all non human resources are available, in the required quantities and/or operational. This is another aspect of CBET that needs careful planning and organisation to ensure that everything is available, when it is required, so that students are not inhibited by a lack of responsiveness in the system.

### **Built in incentive to encourage student performance**

One of the common criticisms of a CBET system is that students may not strive to achieve their maximum potential if the competency level set is easily within their reach. A good system will acknowledge that student motivation needs to be nurtured and there are strategies that can be built in to strengthen this. The most rewarding from a student's point of view is if the employer pays on level of competence. For example, a trainee is paid according to the level of competence achieved rather than on a time basis.

In a college or training facility where students are tied into a set period of time for which they are required to attend, those who achieve all competencies earlier than the allocated time frame, should be able to be offered incentives such as the option to:

- study advanced units
- study units from related fields (an auto body repairer may do additional work in auto mechanics or a bar attendant may do additional units in food preparation or front desk operations)
- study Small Business Management/Entrepreneurship units
- work on a personal project related to the field

Although a system that allows for this may seem totally foreign to the way your training facility currently operates, it is within your power as a teacher/instructor to impact on the way the facility will operate in the future. It is your responsibility to provide the most meaningful training experience that resources will permit.

**An adult staff/student relationship based on mutual respect**

For those teachers/instructors who are working in the post secondary sector of education and training, or in the basic vocational sector, it is critical to remember that the students or trainees in your care are either adult or embarking on their preparation for life in an adult world. In the unit on Writing Objectives you were introduced to the teachings of the humanist psychologist, Carl Rogers. Rogers maintains that the most single important aspect of the learning process is the relationship between a student and the teacher/instructor. From your own experience, you will recall that the teachers you thought were “good” were probably those with whom you had a good relationship - where you felt understood and supported.

It is critical, in an instructional environment such as that of CBET, which will be new to most students, that they are supported and encouraged on an adult-to-adult basis, rather than dictated to from a standpoint of superiority. A good relationship with your students, as individual adults, will be the most motivating element you can bring to your teaching.

**To summarise learning in a CBET environment:**

- Students are not dependent on the teacher for their learning but are helped to direct and manage their own learning.
- Teachers present to learners as normal human beings rather than as “expert” sources of subject knowledge in an adult to adult relationship.
- Teachers look at a student’s needs from the student’s point of view. Students become involved in directing their own learning.
- Teachers maintain a positive attitude to students, not letting personal judgements influence their facilitation of students’ learning.



Now do the activity on the following page.

**Activity 6**

1. Write how you would modify your role as a teacher if you were changing from teacher-centred to learner-centred education or training.

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2. State some of the ways learners taught in a teacher-centred system would need to change their approach to learning in a CBET environment.

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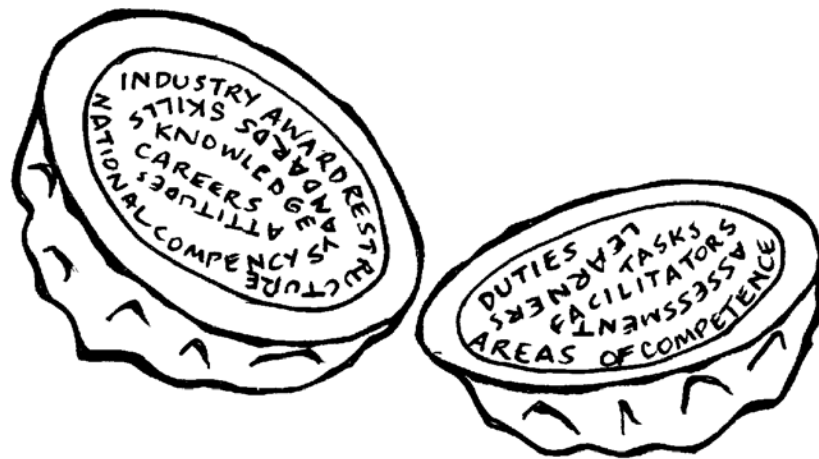
**Discuss your responses with your tutor.**





## CBET in a nutshell

- Industry award structures are highlighting the need for national competency standards for industries
- The concept of competency is important to the development of present day training programs
- Competencies are not the same thing as tasks and skills
- Competencies are the fundamental duties and skills of jobs
- Competencies can be grouped together into broad areas of competence
- Industry standards provide confidence in the assessment of competence
- Teachers are facilitators, not “experts”, in a CBET environment
- Learners can accept responsibility for their own learning



# Assignment No. 3.3 –2

## Unit 3.3 Competency-based Education and Training

You are now required to do **Assignment 3.3 – 2** which will be found at the end of this unit or distributed by your Tutor.

# Assessment Instrument

## Module 3      Instructional Techniques

### Unit 3.3      Competency-based Education and Training

#### Assignment No. 3.3-1

This assignment has been designed, as a short answer type. It tests whether you have understood the basic differences between the two forms of instruction and assessment.

Question 1 requires the correct word to be inserted into each space. All responses must be correct.

Question 2 should indicate without doubt that the concept of operant conditioning is fully understood. The example given can be either reward or punishment.

Question 3 response must indicate the difference in relation to performance.

Question 4 - any two advantages and disadvantages, according to the information in the manual is acceptable.

Question 5 - careful reading of the summary of norm referenced and criterion referenced assessment will allow you to answer this question without difficulty. The bullets act as an indication of the points you are looking for. Of the 15 points indicated, it will be necessary to give a minimum of 13 correct responses according to the information given, to successfully achieve competency on this question.





## Assignment Number 3.3 – 1

### Unit 3.3-1 Competency-based Education and Training

To be completed and returned to your tutor for assessment.

This is an Open Book assignment and you may refer to whatever references you have at your disposal.

Name: \_\_\_\_\_ Due date: \_\_\_\_\_

#### Question 1

Complete the following sentences using the words from the list provided.

*perceptual, learning, competent, praise, psychomotor knowing, cognitive, performing,*

- 1.1 Competency based education and training (**CBET**) is concerned with \_\_\_\_\_ whether someone is \_\_\_\_\_ at \_\_\_\_\_ a task, or a group of tasks, on the job.
- 1.2 It is good teaching practise to \_\_\_\_\_ trainees for ***almost achieving*** a required competence while they are \_\_\_\_\_ the particular skill or task.
- 1.3 \_\_\_\_\_ skills are those that relate to knowing and thinking
- 1.4 Skills that involve movement or physical action are referred to as \_\_\_\_\_ skills.
- 1.5 Seeing a garment and being able to estimate the amount of fabric required is classified as a \_\_\_\_\_ skill.

***1 mark each/total 8 marks***

**Question 2**

From your own learning experiences, give an example of ***operant conditioning***, which is the basis of Skinner's theory of reward or punishment following a response. This need only be a paragraph long.

***5 marks***

**Question 3**

Describe, in your own words, the main difference between ***norm referenced testing*** and ***criterion referenced testing***.

***4 marks***

**Question 4**

List two advantages of criterion referenced testing and two disadvantages

**Advantages:**

**Disadvantages:**

***2 marks each/total 8 marks***

**Question 5**

From the information in this section, complete the table so that it illustrates the comparison between norm-referenced and criterion referenced assessment in terms of their:

- Uses
- Content
- Results
- Grades
- Question type

Please use your own words to complete this task to indicate your comprehension.

***1.5 marks for each point***

***total 15 marks***

**Total 40 Marks**

**Comparison table of norm-referenced and criterion-referenced assessment**

	<b>NORM-REFERENCED</b>	<b>CRITERION-REFERENCED</b>
<b>USES</b>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>CONTENT</b>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>RESULTS</b>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
<b>GRADES</b>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>QUESTION TYPE</b>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>



# Assessment Instrument

## Module 3 Instructional Techniques

### Unit 3.3 Competency-based Education and Training

#### Assignment No. 3.3-2

This requires the trainee to present a written assignment that includes:

- A definition of Competency-Based Education and Training (CBET) which includes reference to conditions, performance and standards.
- Consideration of the characteristics of CBET
- Charting the advantages and disadvantages of CBET from the perspective of the trainee, training institution and the employer
- Explaining the relationship between time, standard and course completion in CBET and traditional courses.
- An explanation of the relevance of CBET to training institutions, employers and trainees, including reference to confidence of assessment.
- Describing the teacher /trainee relationship in a CBET learning environment.





## Assignment Number 3.3 – 2

### Unit 3.3 Competency-based Education and Training

To be completed and returned to your tutor for assessment.

This is an Open Book assignment and you may refer to whatever references you have at your disposal.

Name: \_\_\_\_\_ Due date: \_\_\_\_\_

Answer the following questions on separate sheets and attach then to the Assignment Attachment Form .

#### Question 1

Write a definition of Competency-based Training (in your own words). Include reference to Conditions, Performance and Standards in your definition.

**10 marks**

#### Question 2

- 2.1 Prepare a two column chart headed Advantages and Disadvantages of CBET and list these from the perspective of a *trainee*. Brief explanations of why you consider these either advantages or disadvantages must be included.
- 2.2 Prepare a similar chart and list the Advantages and Disadvantages of CBET from an *employer's* perspective

**5 marks**

**Question 3**

Explain the difference in the relationship between instructor and student in a CBET learning environment and that in a more traditional approach.

***10 marks***

**Question 4**

Explain in about 150 – 200 words, the relationship between the time spent in training to attain the learning outcomes of a CBET training programme, and the relationship between the time spent and course completion in a traditional training programme. Your answer should include reference to the different methods of instruction used.

***10 marks***

**Question 5**

Write a statement ( of no less than 1000 words) of whether you believe this form of training is appropriate to your field of expertise. You must qualify your answer with logical argument of support, to indicate that you have a sound knowledge of this learning/instructional strategy.

Consider assessment, and the characteristics, advantages and disadvantages of Competency-based training to stake holders, (trainees, employers, training authorities and institutions) in your supporting argument as it will help you qualify your opinion in a logical manner.

***20 marks***

**Total 60 marks**