

Module 5 Educational Theory and Practise

Unit 5.2 Characteristics of TECH/VOC Education

© 1999 The Commonwealth of Learning

Revised May 2001

Contents

Introduction.....	1
About this unit.....	1
How to use this book.....	1
How you'll be assessed.....	2
Finding your way.....	2
Competency.....	3
Learning outcomes.....	3
Assessment criteria.....	4
Other resources you may find useful.....	4
 Section 1 Education and training	7
The binary system	8
Activity 1	9
Answers	10
TVET and universities.....	11
Activity 2.....	13
Answers.....	14
TVET and work.....	16
Apprenticeships and work training.....	16
Traditional learning methods.....	16
The industrial revolution.....	17
The growth of technical schools and institutions.....	18
New work-based training processes.....	19
Activity.3.....	20
Answers.....	21
Summary.....	22
 Section 2 Primary elements of TVET	23
Work-related.....	23
Skills-based.....	24
Competency-based assessment.....	24
Standards.....	25
Involvement of industry.....	25
Other characteristics.....	26
The role of the teacher.....	26
Activity 4.....	27
Answers.....	28
Summary.....	29

Section 3 Developing the curriculum	31
Activity 5	33
Answers	34
The planning dilemma	35
What is learning?	36
Teasing out the problem	36
Summary	37
 Section 4 Curriculum development in Jamaica	39
Student-centred	40
Modular	41
Non-modular	42
The modular curriculum outline	43
Standards (Competency-based)	46
Delivery Systems	46
Proficiencies/ performance levels	47
Assessment for credit and certification	48
Accumulating credits	49
NCTVET certification level	49
Activity 6	52
Answer	53
Summary	54
 Section 5 The Diploma in Exotic Tropical Fish Breeding	55
Needs analysis	56
Industrial Advisory Committee (Lead Group)	56
Skill and knowledge analysis	56
Activity 7	57
Answers	58
Developing the modules	59
Examining the modules	59
Filling the diploma basket	60
Work-based programme	62
Industry involvement	62
Summary	63
 Section 6 The teachers' role	65
 Glossary	67
 Assignment 5.2–1	69
Assignment 5.2–2	71

Introduction

About this unit

Welcome to Unit 5.2 on characteristics of Technical and Vocational Education and Training (TVET).

This unit examines the features of TVET and its relation to industrial, societal and other requirements. The focus is on the curriculum development process and the different demands made on that process. Different training options, such as apprenticeships, are explored.

Students are encouraged to identify particular demands in their own society and the ways TVET attempts to meet those demands.

How to use this book

As well as information about characteristics of TVET, this book also includes some questions and exercises.

These exercises don't play a part in your assessment for this unit. They are there to help you check your learning progress.

Read the information, and then answer the questions as you work through the book.

Answers and examples are provided for you to check progress.

Assessment tasks will be provided by your tutor to assess your achievement of the learning outcomes. These will relate to your particular experience and work situation.

It is the successful completion of these tasks that will determine your competence in this unit.

How you'll be assessed

This unit has two assignments.

Assignment 1 consists of an interpretive exercise, explaining some of the material on curriculum development. The assignment should be provided for the student at the beginning of the unit. It is completed at the end of the unit. The assignment is marked out of 30 marks. It is worth 50% of the total grade for the unit.

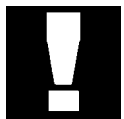
Assignment 2 is a short answer open book test. The test should be provided by the tutor at the end of the unit. The assignment is marked out of 30 marks. It is worth 50% of the total grade for the unit.

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!



Check your progress



Assessment task



Things to do



Things not to do



Competency

The curriculum of this training programme for technical and vocational teachers is 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 specified its own assessment criteria. Recognition of prior learning is encouraged. If you feel confident that you have the necessary level of competence to successfully complete the assessment criteria, you may take the assessment without studying the unit.

Learning outcomes

When you have completed this unit you should be able to:

- Identify the primary elements of TVET.
- Identify the elements of a curriculum process for TVET.
- Explain how processes that accommodate industrial, societal and other demands contribute to the determination of goals, objectives and content of the TVET curriculum
- Analyse trends in apprenticeship and non-apprentice training options
- Analyse the role of a National Training Accreditation Council in the TVET System
- Discuss the role of the teacher in curriculum development

Assessment criteria

In demonstrating the learning outcomes you should be able to:

- List four (4) characteristics of TVET.
- Illustrate by flow chart, a curriculum development process for TVET.
- State five (5) indications of the relationship between TVET and societal and industrial demands.
- Discuss the processes involved in apprenticeship training in the Caribbean.
- Discuss the role and importance of a National Accreditation Council in the TVET System
- State five (5) reasons why teachers should participate in curriculum development.

Other resources you may find useful

- Ashworth, Peter. "Being competent and having 'competencies'." *Journal of Further and Higher Education*, 16 no. 3 (Autumn 1992): 8–17.
- Ashworth, P.D., and Judy Saxton. "On 'competence'." *Journal of Further and Higher Education*, 14 no. 2 (Summer 1990): 3–25.
- Bell, Gordon H. and Winnie Wade. "Modular course design in Britain: some problems, issues and opportunities." *Journal of Further and Higher Education*, 17 no. 1 (Spring 1993): 3–12.
- Boud, David. "Experience as the base for learning." *Higher Education Research and Development*, 12 no. 1 (1993): 33-44.
- Commonwealth of Learning. International Workshop on Technical and Vocational Education and Training. Pakistan: COL, 1992.
- Dale, R., ed. *Education, Training and Employment*. Oxford: Pergamon, 1985.
- Gibbs, Graham. *Improving the Quality of Student Learning*. Bristol: Technical and Educational Services, 1992.
- Jonathon, Ruth. "The case for and against modularisation." *Scottish Educational Review*, 19 no. 1 (May 1987): 86-97.
- Juchau, R. "Education for life, education for work: tensions for professional curricula." Keynote address at Continuing Professional Education Conference, Auckland, October 1990.

- Marshall, Kenneth. “NVQs: an assessment of the ‘outcomes’ approach to education and training.” *Journal of Further and Higher Education*, 15 no. 3 (Autumn, 1991): 56-64.
- Rowntree, Derek. *Exploring Open and Distance Learning*. London: Kogan Page/Open University, 1992.
- Scott, Peter. *The Crisis of the University*. London: Croom Helm, London, 1984.
- Smithers, Alan. *The New Zealand Qualifications Framework*. Auckland: Education Forum, 1997.

There may be other activities provided by your college to support you as you work through the unit. These might be:

- audio conferences by phone
- group discussion sessions
- seminars
- workshops

Your tutor or somebody from the college will tell you if any of these activities apply to this unit.

Section 1



Education and training

Technical and vocational education and training! A bit of a mouthful, wouldn't you say? But what does it mean? What are the characteristics of TVET?

If I asked you what education was for, what would you reply? Would you make some comments such as:

“Education is about realising people’s potential.”

“Education is about changing people’s perception of the world.”

“Education is to give people the skills and knowledge to do their work well.”

“Education is about performance. We need people who perform better in their jobs.”

There is a clear and useful distinction between “education” and “training”. **Education** is more concerned with changing your way of thinking, your orientation or understanding about the world. **Training**, on the other hand, consists of learning how to do things by process or method— the accepted way.

These two ideas are often in conflict. John Codd¹, for instance, says that learning about commonly accepted practise is not so much “education” as “socialisation”. To really **learn**, you must be able to question and challenge traditional ways of doing things.

You must be able to accept ideas and practise, not because they are the usual ways of thinking and doing, but because you have made decisions about their being the best way.

The difference is clear. If you are socialised, you may not ever question how things are done. If you are educated, you will question how things are done, even if you decide to do them the way other people do them. (It might be the best way!)

¹ Codd, John. “Educational leadership as reflective action.” In *Critical Perspectives on Educational Leadership*, John Smyth (Ed.), Lewes: Falmer Press, 1989:157–178.

The binary system

In Britain and many other countries, the education process developed as a **binary** system: A binary system is one with two equal paths.

One path, for those who were classed as bright, was the university route, which took students away from useful and practical skills into the realm of the academics. Students who came out of this system were meant to be the leaders and managers of society.

Can you see why this academic route of grammar school or what is now being referred to as the traditional high school and university, often led to the 'professions', civil service and management jobs?

The other path was for those who failed the 11+ examinations. Instead of going to grammar school, those students went to other secondary schools of lesser status or technical schools, where they were meant to study practical programmes. They were destined to be the workers of society.

Can you see why this technical route was designed to lead to a skilled, unquestioning workforce?

All sorts of changes in society and in thinking about education have meant that the binary system is becoming less relevant.

But it lingers in distinctions between universities and technical colleges, as well as in the subjects taught in the two institutions. For while universities do not concentrate on specific job skills, they certainly do much of the training for many professional jobs, such as doctors, lawyers, engineers and accountants.

The technical schools, and later technical institutes and polytechnics, started by offering programmes to run with and supplement apprenticeship courses, or to provide basic social and living skills.

The courses that were offered to provide specific job training were called *technical*. The ones that provided general life or basic job skills were called *vocational*.

Recently the distinction between the two paths has been blurred by the establishment of technical universities or universities of technology, where theory is combined with practise to produce graduates who can manage and supervise those performing skills.

Activity 1 is where you can put down your ideas about education and training. You can really go to town on this one. There is nobody to see the results!



Activity 1

This is a reflective exercise, a sort of brainstorm.

You need a large blank sheet of paper and pens of different colours.

On the left-hand side of your sheet, write the term EDUCATION.

On the right-hand side of your sheet, write the term TRAINING.

Now around each, write all the ideas or thoughts you have relating to the term.

Several ideas will relate to one term and not the other.

Several will relate to both terms.

Build up a diagram or picture of education and training, and the relationship between them.

Work quickly, paying more attention to the mental juices than to the neatness or completeness of the finished product.

Aim for around 20 ideas.

Check your ideas against those on the next page.



Activity 1 suggested answers

These are the sort of answers you will probably have ended up with:

Education	Training
General skills	Technical Skills
School	Workshops
Thinking	Competence
Culture	Practical
Learning	Instructors
Examinations	Tests
Reading	Work experience
Teachers	Experts
University	Polytechnics
Knowledge	Computers
Academic	On the job
A better person	A better worker
Theory	Short courses
Qualifications	Monkeys
Excellence	Standards
Not vocational	Vocational
Individual	Working together
Sophisticated	Hard working
Brainpower	Hands-on
Airy-fairy	Active
Broadening horizons	Never good enough
Challenging	Taxing
Lectures	Working class
Power	Powerlessness
Middle class	



TVET and Universities

There is a difference between the sort of courses offered at a technical institute or workplace training programme and those offered at a traditional university.

The programmes normally offered at the traditional university are not designed to teach specific skills that enable graduates to do a job. They are designed to provide theoretical and research skills, and the complex thinking and problem-solving skills that apply to an occupation.

The university teaches people how to judge between different theories and points of view. Its strength is that it encourages people to question and develop new ideas about how things should be.

But most graduates in law or accountancy or medicine or engineering need to undertake on-the-job professional training before they are able to do the work properly. This extra training is often called ‘internship’ or the ‘professional year’.

The university approach is generally called **academic**, because it is good at giving students the chance to think and study around their subject areas. The word academic is used to mean “relating to an academy”. One of the purposes of an academy is to take people out of their normal life and put them in an environment of thinking and debate.

In that sense, TVET is very different. TVET is strongly focused on the ordinary lives of people, and the jobs they do.

The word “**technical**” in TVET refers to specific skills, knowledge, understanding and the practical application of basic principles of science and mathematics, as they relate to a particular job area or career. In mechanical engineering for example, the student not only learns how to operate a metal lathe, but should also be able to determine by calculations, spindle speed in relation to type, characteristics and size of metal to be machined.

The word “**vocational**” on the other hand, is usually used to describe knowledge and skills that are needed to do a specific job such as carpentry. These might include the related knowledge of constructing a budget, doing estimation, calculating costs of articles for the market, etc.

Of course it is difficult to make clear distinctions between what is professional, vocational, or technical. Distinctions are often arbitrary, or dependent on the sort of person undertaking the skills.

For instance, I have taught letter and report writing skills to managers, as part of their “professional” training. The same skills are taught to would-be secretaries, where they are called “vocational” skills. Computer skills are usually regarded as being in the “technical” area, but they are skills which all sorts of people now need, so they can be classed as vocational, professional or even life skills, depending on who takes the courses and their purpose in taking them.

Technical and vocational education focuses people on doing simple or complex tasks accurately. It does not engage students so much in questioning the reasons for doing a particular job or whether the job is worthwhile.

This does not mean that TVET instructors and trainees do not or should not question what they do and the way they do it — that is, of course, valuable and proper. But as the purpose of TVET is to improve job skills, so the questioning is often about how rather than why.

TVET is really a *tool* or *instrument* for the improvement of industry and workplace practise. Its aims are often referred to as **instrumental**.

Here are some differences between TVET and general or academic education:

- It is usually concentrated on particular processes rather than broadly based
- TVET is usually assessed in terms of competence in performing a task and not so much in your ability to pass a course
- Industry usually has a major say in what is taught and how it is taught
- Teachers are usually specialists in the job area or occupation they are teaching, and bring their practical knowledge and skills into their tuition
- Accuracy is generally valued over imagination. Students are expected to understand and perform set job tasks rather than invent new ways of doing a job

Now try **Activity 2**. It is another reflective exercise, where you look at your own views and experiences.



Activity 2

Here's another exercise that is speculative in part. What you have learned so far, however, should provide some guidance to completing the exercise.

- (a) Describe for a person who can't read, five main characteristics of technical education, and five characteristics of vocational education.

This time you are going to stretch your drawing abilities. Use a large sheet of paper and your same coloured pens.

You will need to draw five items that symbolise technical education and five items that symbolise vocational education. These should show the differences between the two forms of education.

When you have finished, turn to the next page for my set. See if you can interpret them!

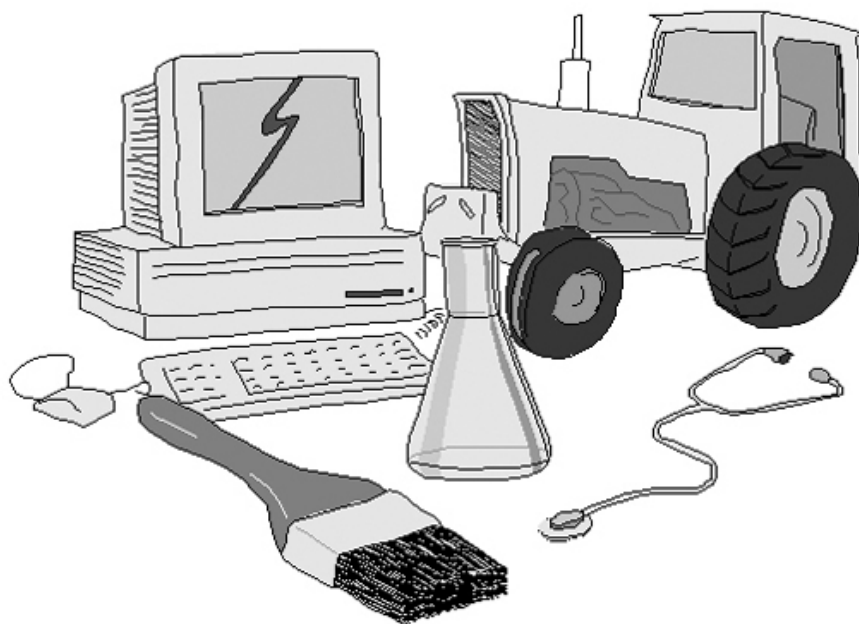
- (b) State for your readers, five characteristics of technical education and five characteristics of vocational education.

See the responses given on the next page. How much have they matched with yours?

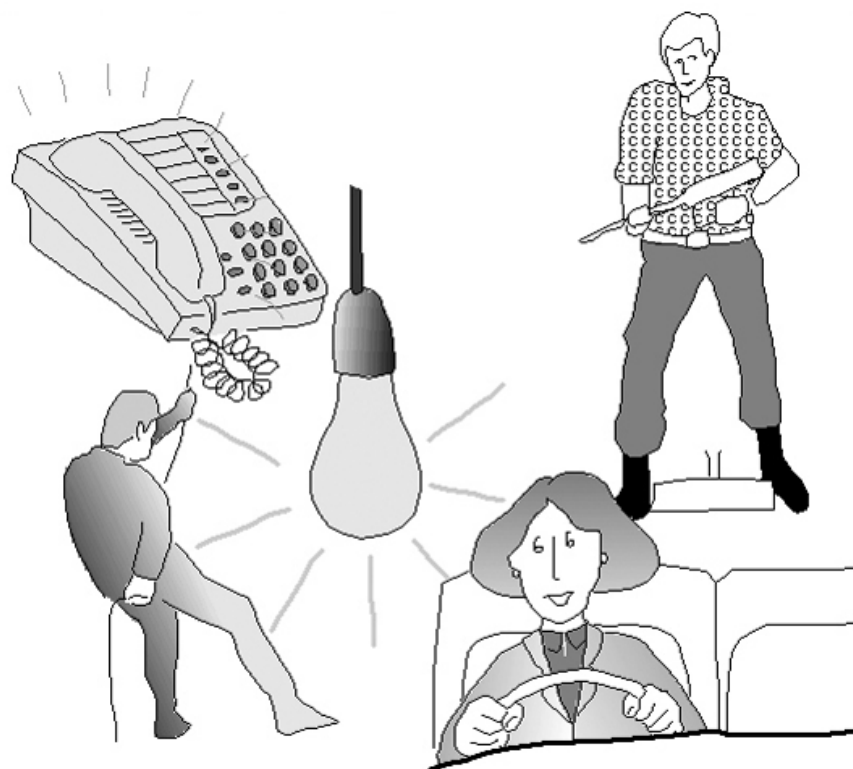


Answer: Activity 2a

Technical



Vocational



Answer: Activity 2b

CHARACTERISTICS: These could be stated as listed below.

Technical Education

1. Training in specific skills, knowledge and understanding relating to a job area or career
2. Principles taught which can be applied to solve practical problems
3. Training is more theoretical than practical
4. Demands an academic orientation and a scientific approach

Requires more imagination than study following the 'accepted way' in an unquestioning fashion

Vocational Education

1. Specific job training
2. Learning how to do things by process or method (the accepted way)
3. Competence driven
4. Emphasis on practical hands-on skills
5. Conformity to occupational standards



TVET and Work

Apprenticeships and work training

The idea of technical colleges came as a result of the industrial revolution in the eighteenth and nineteenth centuries.

The industrial revolution involved a change in the sorts of jobs people did and in the whole organisation of labour. Instead of family crafts and trades, things were now mass-produced with machinery in large factories.

The skills of the craftsperson were no longer valued. Instead, factory owners wanted to employ large numbers of people on routine tasks for little pay.

Before the industrial revolution, the system of apprenticeships had worked well for centuries.

In the original apprenticeship system, children were “sold” from the age of 12 or 13 years into the employment of a tradesperson from one of the trades’ guilds.

They were to remain there for a set time of around five to seven years.

During that time they were to learn the skills of the trade. They were also to undertake any duties required of them. In return, they received board and lodging.

The tradesperson the apprentice worked for also had a duty to teach the apprentice good working habits and a sober, Christian way of living.

The usual practise was for the apprentice to be employed at the end of the time as a partner in the trade.

Traditional learning methods

The apprenticeship system used ways of learning based on gradually developing competence through observing the “experts”, talking and experimenting.

This is still probably the most important way of learning. It is probably the main way children learn to speak and walk.

It is different from most institutional learning because the

- skills being taught are considered to be precious and to be cherished — they are not free for anybody to learn
- owners of the skills have prestige within the community
- skills are not just a means to getting a job
- learning is considered a privilege rather than a right
- learners “earn the right” to learn through showing interest and dedication
- learners learn when they are ready, not when they reach a certain age
- learning is done on the job, rather than in a classroom
- learning occurs through the skill and dedication of the learner rather than the skill of the teacher who can put barriers in the way
- main roles of the teacher are to demonstrate, coach and assess — there is often little direct “teaching”.
- learner learns the traditional methods — new methods are not usually accepted.

The industrial revolution

In Britain, the system of guilds and apprenticeships was changed as a result of the industrial revolution.

The use of machinery and mass production saw the end of a large number of the cottage industries and the rise of large factories.

Traditional ways of doing things were seen as slow and ineffective. Machinery could do a better job faster and more cheaply.

Many of the crafts and guilds were still practised in country areas. But more and more people crowded into the industrial cities, where they thought they could find better employment.

There was no need to train people for the new jobs. Most of the work was boring, repetitive and unskilled. It was also dangerous, and workers suffered from dreadful accidents and health risks.

New cities were built, often without running water or sewerage. Landlords charged such high rent that often there was little money left over for food.

Women and children were preferred as workers because they could be paid lower wages.

The growth of technical schools and institutions

Initially, all the labour in the factories was done by working people. But gradually they were replaced by machinery. The new industrial cities became appalling slums of largely unemployed people.

Eventually laws were passed preventing child labour, reducing hours of work and improving conditions.

There was increasing demand for people with new skills, in areas that did not exist before the industrial revolution. Factories needed specialists in designing and producing goods, selling them, and investing the proceeds. Therefore, a need for engineers, mechanics, builders, traders, bankers and police grew.

At the same time, concern about the lack of education of most of the working class developed, and the idea of compulsory schooling was born. Schools were really the application of mass production to training. Instead of each worker being trained individually, large numbers could be trained at once.

Technical schools and institutions were the result of a whole range of events:

- the move from family and guild trades to large factories where work was performed away from living space
- the change in the nature of work, from the protection of traditional industry to promotion of new ways of doing things
- reluctance of employers to invest in long-term commitments to train their workers when everything was in a state of change
- the need for jobs
- the migration of workers from rural areas to towns and cities
- reduction in the need for specialist skills
- the introduction of compulsory education, so that young people who would traditionally have been apprenticed were now in school
- the change in the philosophy of education, from one where learning was precious and valuable, to one where learning was considered necessary and universal

New work-based training processes

The industrial revolution was no sudden thing, and it hit different countries and societies differently. Some industries, such as baking and many which are agriculturally based, are still largely undertaken in traditional ways.

In many countries, plumbing, carpentry, panel beating and other skilled craft areas have some form of apprenticeship system that is the main path to enter those trades.

But the modern apprenticeship system is very different from those of the past. Apprentices are usually paid a wage and don't live with the family of the person employing them. As well as learning on the job, apprentices usually go to block courses at technical institutions. And, they end up with qualifications, which can often be used as a basis for different trades or areas of work.

As the need emerged for a huge range of specialist labour roles from the 1970s onwards, there was a move in most countries to broaden the range of courses offered at technical institutions, and they began to be seen as a better alternative to apprentice systems.

In many jobs the training was undertaken completely outside the workplace.

But there is now a move back to on-the-job training as a part of the total technical and vocational training programme for students.

This training can be:

- an extra module
- a component of some of the modules
- a “sandwich”, where the student does one year of training, followed by a year of work, then a second year of training
- a requirement for entering a particular programme — the programme could be offered only to those working in a relevant area
- an apprenticeship type programme. The students attend diploma courses as part of their apprenticeship, and so supplement their practical components.



Activity 3

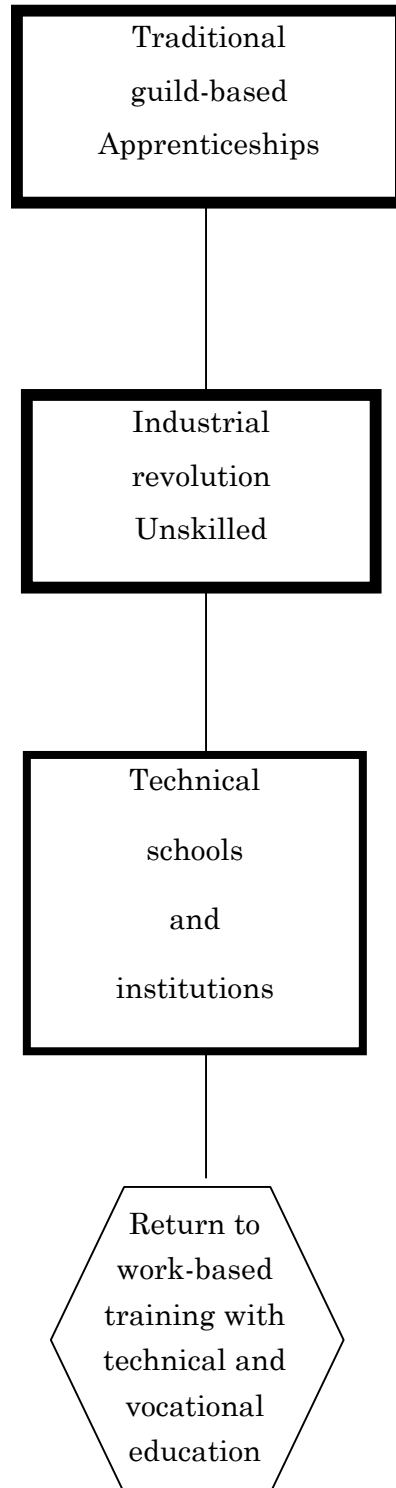
Read back over Section 1.4.

Now identify four stages in the development of technical and vocational education.

Turn to the next page for the suggested answers.



Activity 3 Suggested Answers





Summary

Section 1 explains the words technical and vocational, education and training. It also explores the growth of technical and vocational education and training.

Education is about changing your world-view and moving away from the way you thought before. Training is more about doing things better, more accurately, and with more skill.

The binary system was originally developed in England to make a distinction between those who were going to be academically educated and go to university and those who were going to enter the workforce and needed technical and vocational skills.

Those who were considered “bright” went to grammar school, while the others went to technical schools and later to secondary modern schools, and then into technical colleges or into the workforce.

Technical and vocational education and training is very different from university education, in that it focuses on the work skills of ordinary people.

Professionals who have been educated at university often need to undertake “professional” training to learn about their jobs.

“Technical” is used to describe knowledge and skills relating to a job area or career.” Vocational” applies to skills relating to a specific occupation.

The apprentice system and other traditional training processes were challenged in the industrial revolution.

Gradually, new systems of training emerged through the technical institutions.

Recently, there has been a move back to work-based training, supplemented by programmes in institutions, and a blurring of the lines between traditional academically oriented universities and technologically oriented universities.

Section 2



Primary elements of TVET

We have examined the difference between *education* and *training* as well as the difference between *technical* and *vocational*.

We know what the differences are, but TVET combines all four elements. So what is the common ground between them?

The elements below are by no means exhaustive, and I am sure you will find many more as you go through the unit.

Work-related

Probably the primary and most important feature is that TVET is about employment.

All employment, no matter how menial or simple, requires particular and special skills. When you fold laundry, for instance, you may be slow and inaccurate compared with someone who has long experience and practise gained through running a laundry.

Or a young couple adept at using videos, computers and all the technologies of the 21st Century, may find themselves quite overwhelmed when it comes to changing a baby's nappies because of their bumbling fingers!

With many, if not all jobs, much of the learning is on-the-job. Secretaries and managers learn what makes an office tick by watching, listening and asking questions. They cannot learn that at college or university.

Similarly, learning to ride a bike or walk or talk is all learnt by observation, practise and experimentation.

The purpose of TVET is that it ensures that the on-the-job training is faster, more accurate, according to safety requirements and according to common practise — in short, TVET provides a strong basis for learning how to do a job properly.

Skills-based

TVET is about learning the skills and processes and understandings required to do a particular job.

A lawyer needs to know and understand a great deal about the law. Law students learn about the law for three or four years at a university. But at the end of that time, they still cannot practise. They still do not know the technical skills of preparing briefs, choosing the most appropriate papers, or filing writs in court. They need to learn all the technical aspects of law. The best way of doing that is to work in a practise, being mentored and coached by a colleague, and attending evening classes to consolidate what they have learned.

In other words, they have the knowledge but they lack the skills of practising law.

TVET courses, while providing knowledge, emphasise gaining the skills of doing a job. A student graduating from a TVET course can usually apply his/her skills in the workplace immediately.

Competency-based assessment

If TVET is about learning workplace skills, the way to assess whether the learning has been successful is by judging if the person is better able to do the job. So, even if the assessment is within an institution, the best forms of assessment will be based on the student's ability to do the job.

The assessment might be through a simulated experience, such as role-play. It might be through observation of the student at work, through laboratories, workshops or practical classes where the skills are practised and developed. It might be through projects. It might be through work experience, where students are actually placed in work situations for a while.

Of course, many TVET students are enrolled part-time while they are working. In those cases, the assessments can be made of actual job performance over time.

Standards

In academic programmes, the measure of success is one of “excellence”. Because assessment often measures the student’s ability to reproduce theory provided by the teacher, students can achieve high grades. However, the assessments are individual to the student and have no clear comparative benchmarks, except in competition with others in the same programme/course.

In technical training, in particular, there is a right and a wrong way of doing things. There is less interest in a person’s “brilliance” than on the accuracy and skill they display in getting the required result.

Sometimes that result may be something minimal. But sometimes, especially when safety is at stake, the standard that is set may be as much as 100 per cent mastery. After all, there is no use for a pilot who is only 70 per cent careful!

If students reach the required standard, then they are **competent**. Until they reach the required standard, they are not considered competent. However, they can keep trying to improve their skills until they reach that competency level.

Involvement of industry

A fifth characteristic of TVET is the involvement of industry in the setting of standards and often, in the writing, assessing and moderating of the courses themselves.

Industries are involved in developing programmes relevant to their work because the:

- students are learning the skills for working in the industry
- industry knows most about the work, and so is best qualified to develop the programmes

Industry involvement is not just in terms of programmes. Many trainees are sponsored or paid for by the particular firms who employ them. These workplaces are making commitments to the training of their own staff, with the assurance that training will reap benefits for them in the future.

Many industries regard courses run at the TVET institution as just one part of a more complete training programme, which includes workplace apprenticeship and cadetship training.

Other characteristics

- Courses are often taught through a variety of modes, to suit trainees who are employed, and to meet the job requirements of the programme. They are often part-time, short courses. They may be taught in intensive blocks. They may alternate with on-the-job or work-based training.
- Courses are generally modular and can be taken in any order.
- Credit can often be claimed for experience or prior learning.

The role of the teacher

While industry needs to play a vital part in the development and standard-setting relating to tech/voc programmes, it must not diminish the role of teachers in the planning.

In **Activity 4** you are asked to list some of the huge range of teaching processes that apply to the learning of skills.

One of the reasons for moving much of the training into an institution is that teachers are able to create environments, experiences and conditions that help students learn. Teachers are specialists in the art of teaching and learning.

But that is not all. By teaching using a variety of interactive processes, teachers are also teaching, modelling and setting the stage for a range of skills, such as creativity, cooperation, initiative, questioning, and decision-making, which are essential to workplaces but not specific to a particular job.

These are the skills which industry people are unlikely to include in a course, even though they value them when they are there.

Finally, teachers should be part of the planning process because they do not have a stake in the job area, and therefore are more likely to be impartial. They can play a vital role in ensuring that different points of view are represented in the course.

Now try Activity 4.



Activity 4

One of the characteristics of TVET that has not been mentioned so far in this unit is the different teaching and learning processes used by many teachers. Skills' learning is very different in this respect from academic learning.

Throughout Section 2, mention has been made of a number of teaching and learning methods appropriate for TVET.

Read through the section again and see how many you can list.

I'll start you off:

Experience

Practise

Turn to the next page for answers.



Activity 4 Answers

You should get most of these:

Experience

Practise

Use

Learning on-the-job

Watching

Listening

Asking questions

Observation

Experimentation

Mentoring

Coaching

Evening classes

Simulated experiences

Role-play

Laboratory

Workshop

Practical classes

Work experience

Part-time courses

Actual job performance

Apprenticeship

Cadetship

Short courses

Block courses

Prior learning



Summary

Section 2 explored the primary elements of TVET.

- The learning is work-related.
- The outcomes are based on acquiring skills.
- Assessment is competency-based.
- The courses are designed to meet industry standards.
- Industry is involved in the development and review of the courses.
- The courses are designed in modular format, so that parts can be taken separately.
- They are generally taught in a variety of teaching styles and processes.
- Students can often have some choice in time, place and mode of delivery.
- The skills and knowledge that students bring into the course are often recognised and given credit.

Section 3



Developing the curriculum

I would like you to start the planning process with a case history. Your case history! I am making a number of assumptions. I may have got it wrong, but I don't think so.

First, you have chosen to be a teacher trainee. You are probably looking forward, with some apprehension perhaps, but also with some eagerness, to the time when you are a fully responsible professional teacher.

You are undertaking this training course because you wish to learn the skills of being a teacher.

But each time you learn a skill, you also learn that you need to make a judgement call. You need to make a decision whether to use a group or an individual process, or an active or theoretical style. You know that you will often not make the best decision, but things will take their course in any case.

You know you will start making better decisions with practise, and that the major skills of a teacher are those that come with practise.

These skills include the ability to know your students and identify their needs, being at the ready with a toolbox full of tricks, jokes, concerns, handkerchiefs, handy hints, chocolate bars and diagrams to meet any contingency.

Sometimes it is all too much, and you wish you could give it up. But then again, you have come so far!

At other times it is challenging when you are questioning yourself, the course and the world. These are the times when you are rethinking, reconceptualising and refocusing.

Am I right?

So the second part of this case study is you. You are using the material on the course as the ingredients in your grand experiment. What you are learning is personal, private, and completely different from everybody else.

You can easily learn what is on the course. You can pass all the tests. You know what is wanted.

You also know that you will not be a teacher after having passed the course. The course can teach you lots of skills, but to be a teacher you have to learn things the course cannot teach you.

Being a teacher depends on the real learning you are doing. The course is only a catalyst for your learning. And no test can show what you have learnt. Only you will know that, when, in five years time, you look back with some satisfaction on your accomplishments.

Don't forget, the most exciting parts of the course are not where you are told things, but where you are challenged, where you ask yourself questions, where, deep down inside, you are learning.

So here is another challenging colourful exercise, to see how you are doing.

As you work through it, question what dilemma this case study presents to people planning or developing a curriculum.

Try **Activity 5** on the next page.



Activity 5

So what have you learnt about yourself by doing this course? What is the learning you have done which was not required by the outcomes of the course? What are the questions, new understandings, inspirations, epiphanies, dreams, confidences and excitements you have had?

The key to answering this question is to trust your emotions. When you have felt excited or scared or jubilant — those are the times of your deep learning.

You can answer in the space below. Or you can write it on another large piece of paper and hang it on the wall in your room. But see if you can define at least six things you have learnt about yourself while doing this course, that will enable you to be a good teacher. You might get up to 20 on your list!

See the next page for my list!

And now:

What dilemma does this sort of learning pose for people planning the curriculum?

[illegible]



Activity 5 Answers

My answers are naturally not about this course. I think these are some of the things that define me as a teacher. They make me a good and a bad teacher. They both enable me and disable me.

1. I teach best when I am enthusiastic about my subject.
2. I am always nervous when I start off with a class — I need to plan that part well.
3. I am good with words. I am very persuasive when I get going.
4. I am hopeless at organisation. Why is it that my office is in such a mess all the time?
5. I have a clear idea of where I am going. I don't work well from other people's notes.
6. I loathe marking. I think that students should do their own marking. After all, they are the only ones who can define their learning.
7. I don't really have the patience to be a good teacher.
8. I don't think in a linear way. I grasp hold of something's complexity and shake it about, like a lion with a carcass. This puts some students off, especially if they like things in neat boxes.
9. I like students who argue and challenge and test me. I don't like students so much if they accept my word for things, or if they don't dare speak.
10. I think there should be more poetry and less sport in education.
11. I believe teaching is a cooperative venture, as life should be.
12. I hate competition in all its forms.

The dilemma for me?

I know all about education and training, but what makes me a good or bad teacher are the things I know about myself. And these are not to be found in any course.



The planning dilemma

So what did you get as your dilemma?

It can be expressed in a number of ways:

1. Teaching and learning are two different things.
2. Learning involves freedom of choice. Curriculum restricts choice.
3. You can lead a horse to water, but you can't make it drink.
4. Teaching needs to take into account the needs of learners.
5. You can't define what a learner will learn.
6. There are two types of learning:
 - Course-required learning
 - The wider learning that is done in the process of meeting the course requirements
7. "Teacher training" should really be called "teacher education" because it engages the mind of the trainees with new ideas, theories and critical perceptions.
8. All training requires education, and all education requires training.
9. Who has control of the learning — the teacher or the learner?

This dilemma — however it is put — is fundamental to curriculum development in the tech/voc area. It is fundamental because in this area, other people have a very good idea of what skills they want students to end up with. They try to define what trainees need to know to be good at the job. They take good control of the teaching so that they can assess that the trainee has the right skills and is competent to practise in the trade or profession.

Yet without the trainees "engaging" with the teaching, and making sense of it, then they are not likely to be good in the trade or profession. In other words, every course needs to be a mixture of training and education. The control of the technical standards and processes may be in the hands of the industry or the training institution. The control of the learning must remain with the learner.

What is learning?

This is an interesting question to ask here, especially since you have probably already answered the question several times during this course.

But, of course, the question is part of the dilemma. For any learning to take place, the learner must be engaged with head, heart and hands.

This reality means that any curriculum development cannot merely focus on the learning of skills (the hands), or on knowledge (the head), but also on the will and desire and rewards of learning (heart).

It is not merely enough to have courses that teach students how to do things. To enable students to learn, teachers must inspire, challenge, debate, engage, cajole, model, coach and support.

Curriculum development must not simply concentrate on meeting extrinsic outcomes and criteria, but more importantly, with meeting those outcomes internal to the learner.

Teasing out the problem

- Education is about developing the abilities of students. Primarily, TVET is about fulfilling the potential of students. If that is not done, then students are unhappy, unwilling to learn — the skills they learn are meaningless and wasted.
- There is a need for students to have some say in their own learning — how, when, where, why and how much.
- Teaching has to be more than simple skills training. It has to include understanding and motivation — that's the art of the teacher.
- Industries say that they want people who are creative, future-oriented, problem-solving, thinking beings; yet, their jobs often concentrate on specific, non-transferable skills.
- TVET teachers do not merely serve industries. They should also question and challenge, and give opportunities for their students to do so.
- There needs to be an emphasis on transferable skills and flexible qualification structures.
- But if the learning needs of each student are to be met, then there would be an overwhelming number of modules. There needs to be rationalisation.

Although students want to pursue their own interests, they also want qualifications that are recognized both within a country and internationally.

Qualifications need to meet standards that are appropriate and maintain the industry.

Programmes offered by different training providers need to be consistent in standard and course structure. Otherwise, there is no consistency about graduates, and about their ability to undertake the jobs for which they have been trained.

There is also a need to have some kind of external moderation and monitoring to ensure that standards are acceptable.



Summary

Section 3 examined various criteria to be taken into account when developing a curriculum.

First is the need to take care of student learning, rather than teaching.

If a teacher can't convert teaching (that is, the subject matter of the curriculum) into learning (that is, internal student processes), then the teaching is in vain.

Learning requires more than the practising of skills. It also requires the growth of theory and knowledge, and, most importantly, the desire of the student to engage with the subject and the learning process.

Therefore, teachers need to be motivators, coaches, challengers and supporters, as well as thoroughly knowing the subject and skills required.

Good courses need to come to grips with teaching and learning. They need to be flexible, modular, student-centred, competency-based and future oriented with commonly agreed standards. They need to provide students with a qualification that is recognized, and part of a qualification pathway.

Section 4



TVET Curriculum development in Jamaica

Many first world countries have seen a revolution in technical and vocational training processes over the last 10 years. Developing countries of the Caribbean such as Trinidad, Barbados and Jamaica have recognized the need to keep abreast with these changes to meet the challenges of global competition for the production of goods and services.

This revolution has been led by pressures from inside and outside the countries.

These pressures include:

- the experience of 'failure' that many students have at school, which promotes negative attitudes to education and training
- the increasing need for reskilling and upskilling as a result of changes in technology
- the need for training and qualifications to take into account new and changing conditions
- huge growth in the variety and extent of training needed
- a growing realisation that relatively few people take part in tertiary education and training
- the need to have qualifications that transfer from one job to another, and even from one field of work to another
- the need for qualifications to transfer across national boundaries.

Countries have responded by putting into place a training and qualifications framework which:

- meets the needs of current and future industries
- provides the opportunity for students to plan their own training pathway
- uses a variety of learning modes, such as face-to-face teaching, distance learning, or on-the-job training
- has common standards
- leads to qualifications recognised both within the country and internationally

In addition, the programmes encourage the concept of “flexible access” and “accumulated credit” This means that wherever, whatever and whenever they studied, students are able to count their study towards a qualification, providing that they meet the required standards in each module studied.

In Jamaica, a National Vocational Qualifications system of certification has been established and accreditation is given by the National Council on Technical and Vocational Education and Training (NCTVET), which was set up in 1994. The main functions of the (NCTVET) are to:

- approve and accredit technical and vocational programmes being offered in Jamaica
- approve and accredit institutions and organisations offering TVET programmes which meet the established national standards
- certify persons who have demonstrated mastery of specific competencies which are embodied in the approved occupational standards
- maintain a record of all awards, certificates, diplomas and instruments of accreditation

The National Vocational Qualifications of Jamaica (NVQ-J) is founded on three pillars:

- 1) Student-centred
- 2) Modular
- 3) Competency-based

Figure 4.1 on page 42 shows the basic philosophy of the National Vocational Qualification of Jamaica (NVQ - J)

Student-centred

Each student has the right to choose any subject or course, pursue it in a variety of ways and have it count towards a qualification.

A student may, for instance, study a modularized programme in Auto Mechanics at high school and be given credit for modules satisfactorily completed. Then, upon leaving school, s/he would have the opportunity to pursue additional modules to complete the programme at a vocational training centre and/or at an accredited motor vehicle garage and in the end, graduate with a National Certificate or a National Diploma, which is awarded by the NCTVET, depending on the level of study.

Or, a student may request to be certified for ***prior learning***, in which case, that student would have to present tangible proof of competence by doing a challenge test or any other mode of assessment as may be determined by NCTVET. However, prior learning is never used as the only basis for certifying a student's competence. Rather, it may be used to certify individual modules of a programme the student has pursued.

Students can make a great number of choices about their study programme. They can choose how, when and where they take the programme, its content and its level.

Modular

For such a choice to be available, the student's programme has to be in ***modular*** form.

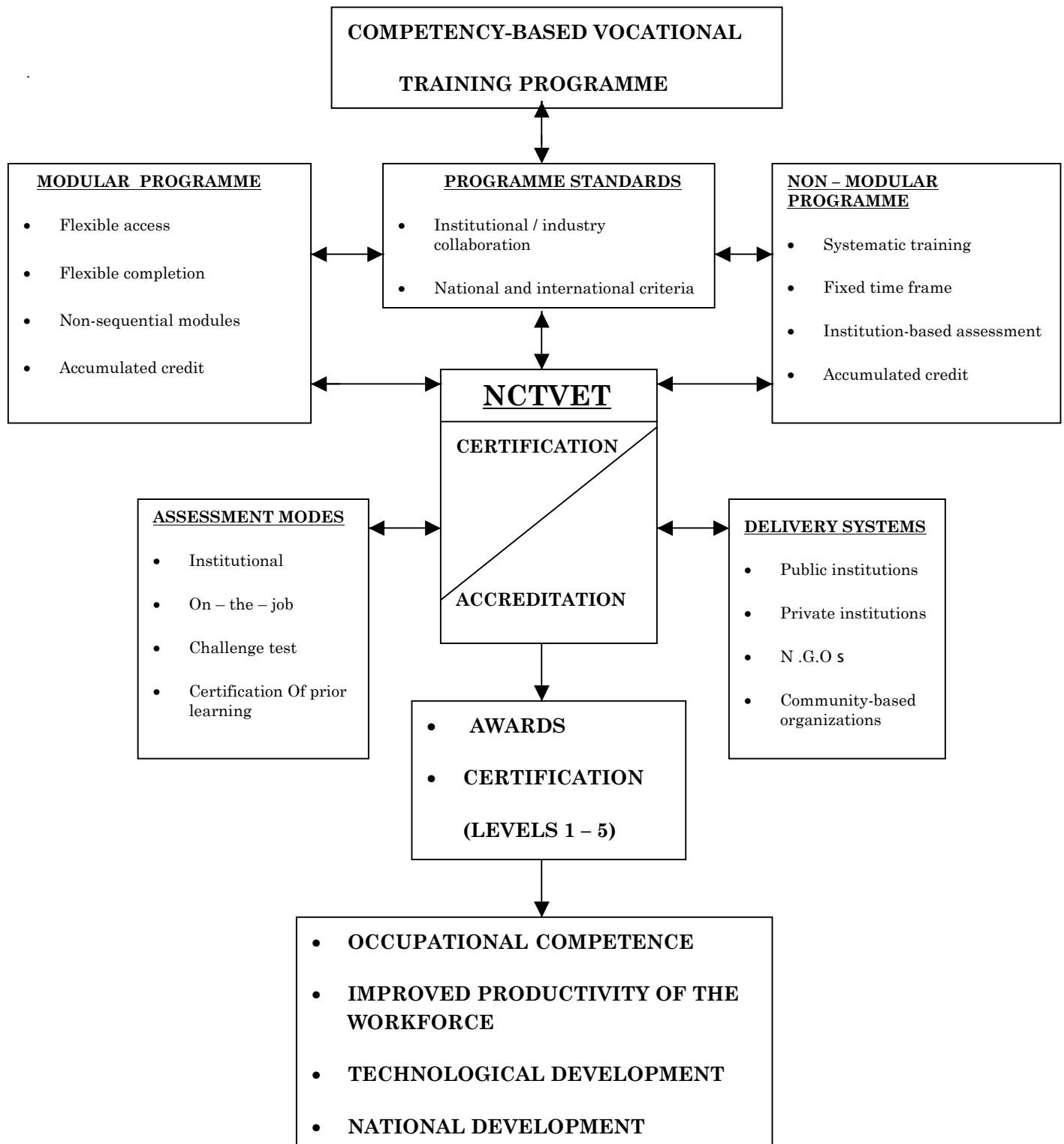
The modules are building blocks of courses, each of which stand alone, is assessed alone and can be taken independently. Students can often take the modules in any order and modular tests are administered quarterly.

Each module is assigned competence levels of 1 – 5, levels 3 – 5 being the acceptable levels of performance. Credits given to students are based on their level of performance.

Non-modular

There is also a '***Non-modular***' form of training. This approach is used for systematic training, where students follow to a time – table to cover all the modules in the entire programme within a given time frame. Students may be examined after completing 75% of the number of modules in a particular programme. If they have not achieved the minimum number of modules before leaving school, they are credited and given a transcript for those modules that they have successfully completed. This format is used in the high schools and technical schools. Non-modular assessment is administered once per year. It includes written and practical tests as well as Institution Based Assessment (IBA) which is conducted throughout the year.

Fig. 4.1. Philosophy of NVQ - J



The modular curriculum outline

The NVQ-J system of competency – based vocational training is built on curriculum outlines for each respective subject area, which are derived from an analysis of the duties and tasks of the occupation and are designed to meet the requirements of industry and the National Council for Technical and Vocational Education and Training (NCTVET). The programme aims to develop relevant knowledge, practical skills and attitudes in trainees that will allow them to carry out the duties of the occupation effectively. The curriculum outline contains the following information:

- Introduction which speaks to:
 - modularisation
 - course content
- module listing
- syllabus
- course format

Course format

The content of the syllabus is written in the form of behavioural objectives – terminal objectives and enabling objectives.

Terminal objectives describe that which the trainees must do to demonstrate competence in a task. They are made up of three essential components:

- Performance** - that which the trainee should be able to do on completion of designated training assignments
- Condition** - the given or denied conditions (equipment, tool, instruction etc.) under which the task is to be performed
- Criteria** - the minimum acceptable level and quality of performance outcome

Enabling objectives describe the subordinate skills that the trainees need to learn in order to perform the terminal task. These are made up of three essential components:

Knowledge - what the trainee must know – i.e., principles of operation, theories, related knowledge etc., which must be applied in the performance of the terminal task.

Practical skills - the subordinate skills which are essential pre-requisite steps for mastery of the terminal tasks

Attitudes - appropriate forms of behaviour which the trainee should exhibit in the performance of a particular task.

These objectives along with the terminal objectives form the basis for assessment.

Pre-requisites are tasks/modules highlighted at the beginning of some modules to represent those sections of the course which must be completed before the module in question is attempted.

Module Times: These are suggested times or contact hours (between instructors and trainees). Time allocations are made for :

Presentation - inclusive of instruction and demonstration

Practise - inclusive of lab work

The time allocations are estimates for average students to complete each module and it is therefore anticipated that course hours might be adjusted to meet the needs of individual learners

Media and method: In any one group, trainees will exhibit a range of skills/ competencies and attitudes and will proceed at varying speeds through the modules. Instructors are therefore required to assume the role of facilitator to allow trainees to proceed in a manner compatible with their individual learning patterns. The creative use of a variety of media and methods will allow the instructor more time to spend with those trainees who require individual attention.

References: References are suggested at the beginning of each module and these represent a sample of texts and audiovisual materials in which content has been found to be compatible with course requirements.

Assessment of trainees: Methods of assessment outlined inclusive of the two main ones:

i) Institutional- Based - Objectives/ tasks assessment .

Individual objectives or tasks listed in each module must be assessed by the instructor on an on – going basis. Trainee competence in individual tasks and completion of modules are recorded and signed off by both instructor and trainee.

Assessment includes both theoretical and practical assignments. Records must be presented to the NCTVET Testing and Measurement Unit on request, to be used in the certification process.

ii) External (Modules Sampling) Terminal Test

A set of test items which is developed by the NCTVET Testing and Measurement Unit to reflect a sampling of objectives (terminal and enabling) across a set of modules and /or comprehensively across the course. It is expected that only one such test will be conducted for a particular course especially where the **non- – modular** approach is applied, and may fall anytime after 75% coverage of the course.

Certification: A certificate of proficiency is awarded to trainees who have met the requirements for certification. The certificate reflects the following three (3) areas:

- Internal Continuous Assessment
- Practical Performance
- Written Assessment

A note to the Instructor: This speaks to guidelines for training and relates to instructor responsibility, observation of safety, maintenance of equipment, and the attitudes and habits that trainees should exhibit while pursuing training.

A note to Trainees: This speaks to the expectations of trainees and advice given them while they are undergoing their training.

Standards (Competency-Based)

The focus of the National Vocational Qualification system in Jamaica is occupational competence. Therefore, standards are, and must be, pre-requisite for training. It would be impossible to assess students to determine occupational competence using a system that compared their results with those of other students (norm referencing).

There may be students doing the modules at any time, from any place and with any background. Comparing the achievement of these trainees with each other will not address the standards necessary to do the task.

Furthermore, if the modules have to satisfy industry requirements for training people to a good standard, then the assessment must be against an externally set standard or criteria, which all students need to reach to achieve competence.

Therefore, each module has required outcomes, and criteria to assess whether or not they meet those outcomes.

There is also a moderation system in place for modules and programmes, so that there is a checking system to ensure that the standards are being met. NCTVET maintains a large and current database of individuals (external assessors and verifiers) from the various sectors in industry, who are required to examine and scrutinize all aspects of the training and assessment procedures to ensure compliance with the requirements of the standards.

Delivery systems

The Human Employment and Resource Training/ National Training Agency, which was established in 1982, has the responsibility to coordinate and support all vocational training programmes in the country. These competency-based programmes are delivered through the government's training institutes, vocational training centres, and other public institutions island wide. In addition, the National Training Agency co-ordinates in-plant work retraining for certification.

Training is also delivered through numerous Community-Based and Non-Governmental Organisations (N G Os) which adopt and conform to national standards. These organisations are those that are accredited by the NCTVET.

Proficiency / Performance levels

A student / trainee, in pursuing a competency-based programme, is expected to complete a module at an acceptable level before moving on to the next. The NVQ –J training system has declared **five (5) performance levels** at which a student/ trainee can be assessed on each module. Students performing at levels 3 to 5 are deemed to have achieved acceptable levels of competence. The following tables describe the levels:

Fig 4.2

	Theoretical		Practical
5	Demonstrates ability to design and develop cognitive strategies, creative methods and products with mastery of related technical language	5	Can perform the skill adeptly with initiative and adaptability to problem situations
4	Demonstrates ability to synthesise/ compose ideas and apply simple rules for problem solution, with correct related language usage	4	Can perform the skill satisfactorily without assistance and /or supervision
3	Demonstrates ability to follow procedures and use rules to explain processes and concepts, with minimum difficulty and with adequate use of the related language	3	Can perform the skill but requires periodic assistance and / or supervision
2	Demonstrates ability to define and classify concepts, using specific descriptions, with reasonable related language	2	Can perform some parts of the skill satisfactorily, but requires considerable assistance and / or supervision
1	Demonstrates ability to discriminate (same/difference recognition) among concrete, and use simple forms of related language	1	Can perform only limited parts of the skill and with difficulty

Theory	Ratings	Practical	Ratings
75 - 100	5	80 - 100	5
60 - 74	4	65 - 79	4
45 - 59	3	50 - 64	3
30 - 44	2	40 - 49	2
< 30	1	< 40	1

Assessment for credit and certification

NVQ –J certification can be obtained through various modes of assessment. The modes approved by the NCTVET are:

- Institutional Assessment
- On-the-Job Assessment
- Certification of Prior Learning
- Challenge Test

However, Institutional Assessment and On the Job Assessment are by far the most popular.

The assessment procedures seek to measure knowledge, attitudes and application of skills demonstrated within specific contexts. The assessment practises of the NCTVET allow for the evidence of competence to be derived from:

- (a) the observation of practical competence through performance tests, simulation or on the job assessment. The use of assessment instruments fashioned from the requirement of the National Standards is a key feature of this method of assessment. Both the process and the product are assessed.
- (b) the questioning of candidates in the oral or written format.
 - (i) The interview/ oral assessment serves as a means of capturing data to measure attitudes and candidates' ability to communicate ideas and interpret data
 - (ii) The written response may take a variety of forms. These may include:
 - multiple choice tests
 - short response questions
 - extended response questions
 - case studies

A training and assessment record on each candidate must be kept. This record will specify the candidates acquired competencies, training needs and performance during training. In the assessment of candidates, emphasis will be placed in particular, on the ***student competency profile record***, which is the evidence of the internal assessment done during the training period. The student competency profile record forms the basis for the ***Institutional- Based***

Assessment (I B A). These records assist both the trainers and the NCTVET in determining workers' competence and are subject to scrutiny by **External Verifiers** as part of the quality control procedures of the NCTVET.

Accumulating credits

The NVQ-J system of assessment allows students to accumulate credits in any of the vocational subject areas offered in both the **modular** and **non-modular** programmes. 'Credit' in the context of the NVQ J is not defined as in the traditional way. Traditionally, each **unit of learning** is defined in terms of a number of credits. A credit may be considered roughly 10 hours of learning time or its equivalent.

However, when we speak of credit in a system such as NVQ J, which defines occupational competence for certification, we speak of crediting a student with a module or modules that have been satisfactorily completed by that student until the additional modules in the entire programme are completed for certification. The **flexible access** approach whereby modules can be taken in any order and at different time and from different organisations and /or institutions, allows for this.

NCTVET certification levels

NCTVET awards the NVQ -J Certificate of Competence for successful completion of all competency-based programmes and modules. NVQ -J occupational certification is a statement of the assessed competency of an individual in both theoretical and practical applications in a particular technical and vocational subject area.

It uses as its criteria for competence, established standards framed by a group of experts (**lead group**) from the industrial sector, which outlines expected work performance in various work settings and establishes that the individual has achieved competency at one of five levels. These levels range from **levels I (Entry level worker/ Apprentice)** to **level V (Graduate / Professional level worker)**:

Level I - Apprentice, Entry Level (Semi- skilled)

Includes competencies and a knowledge base, which are foundational, routine, and form a basis for progression in the occupation. Workers at level I perform under close supervision of a competent worker.

Level II - “Journeyman”

Includes a broad base of knowledge and practical competence demanding greater involvement and competence than level I and allowing for some autonomy.

Level III - Supervisory “Technician”, Senior Worker

Includes a broad range of knowledge, skills and insights that are complex in nature, non – routine and in most cases, requiring problem – solving and supervisory skills; high degree of autonomy and responsibility for managing resources and for the output of others.

Level IV - Master Craftsman, Junior Professional

Involves vocational competence of a complex, technical nature including specialized tasks and managerial responsibilities such as designing, planning, and problem-solving. Significant pedagogical skills are included.

Level V - Managerial

Includes level IV competencies, plus additional professional skills and development studies to include pedagogical, technological and managerial training. Strong leadership skills are implied at this level.

FIG 4.3 on the next page shows the occupational certification hierarchy of the **NCTVET/ NVQJ** and corresponding levels of educational attainment.

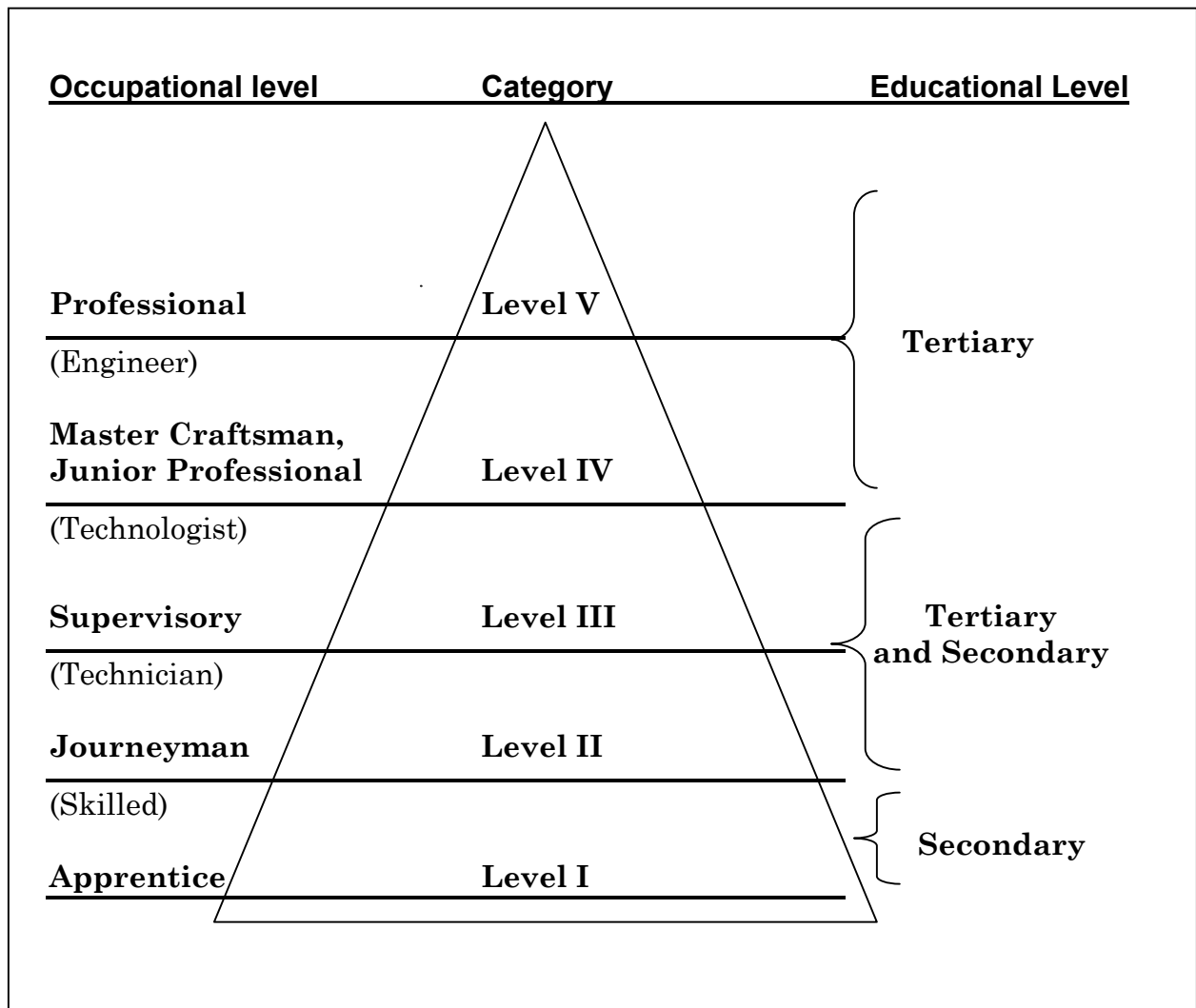


Fig. 4.3 NCTVET / NVQ-J Occupational Hierarchy



Activity 6

Using the information provided on **levels I to V** and the occupational hierarchy at **Figure 4.3**, indicate the level individuals doing the following jobs should have achieved:

1. Working alongside and assisting an auto technician
2. Following correct procedure to tune an engine
3. Teaching apprentices and secondary school students
4. Designing and constructing a public address system
5. Diagnosing a behavioural disorder.
6. Delegating responsibility to supervisors
7. Having responsibility for the operation of a TVET institution
8. Coordinating the design and development of a TVET programme
9. Designing a bridge.
10. Offering guidance occasionally to a skilled worker

Check your answers on the next page.



Activity 6 Answers

These are my classifications. Yours could be slightly different but should be close enough.

- | | |
|--|-----|
| 1. Working alongside and assisting an auto technician | 1-2 |
| 2. Following correct procedures in tuning an engine | 2-3 |
| 3. Teaching apprentices and secondary school students | 3 |
| 4. Designing and constructing a public address system | 4 |
| 5. Diagnosing a behavioural disorder | 5 |
| 6. Delegating responsibility to supervisors | 4 |
| 7. Having responsibility for the operation of a TVET institution | 5 |
| 8. Coordinating the design and development of a TVET programme | 5 |
| 9. Designing a bridge | 5 |
| 10. Offering guidance occasionally to a skilled worker | 3 |



Summary

- There has been a great deal of pressure for change to the way technical and vocational programmes are delivered.
- In first world countries as well as developing countries of the Caribbean, attempts have been made to get a framework, which includes all vocational and technical courses and qualifications.
- The National Vocational Qualifications of Jamaica (NVQ-J) system of training is based on three guiding principles: ***student-centred, modular, and competency or standards based.***
- Students are able to choose their own courses, and as far as possible how, when and where they pursue these courses
- The courses are ***modular***, and modules can be taken independently and at different times towards full certification
- Assessment is based on meeting set standards, rather than students being compared against each other.
- The NVQ-J system of training allows for students to accumulate credit in terms of modules successfully completed over a period of time.
- The National Training agency coordinates the delivery of TVET through government training institutes, vocational training centres as well as other community-based and other non-governmental organisations.
- If students can show they can reach the outcomes and standards, then they are able to gain the unit through recognition of prior learning.
- Institutional and on-the-job assessments as well as assessment of prior learning are modes used by NCTVET.

Section 5



The diploma in exotic tropical fish breeding

Tropical fish are any whose natural environment is in the Tropics, for example the waters of and around Africa, Southeast Asia, Central America and the Caribbean. However, it is the freshwater varieties that are of intrinsic interest to the breeders of tropical fish. Colourful, often exotically patterned, and generally small in size, such as the angelfish, the fancy tail and the ever-popular gold fish, they have been bred for centuries around the world.

The breeding of exotic tropical fish is a difficult art. There are many breeders around. They can be found in countries such as New Zealand, England, China, USA, and the Caribbean, but none have much in the way of training or qualifications.

There are courses on fish farming, on fishing, on biology and zoology. There are courses on animal hygiene and pet care. There are even courses on genetics and on how to breed thoroughbred horses, but there are none on exotic tropical fish breeding.

Is there an exotic tropical fish industry? There certainly is, but it appears to be informal, although the products are readily available on the market in most countries. Every pet shop has tanks of goldfish, ranging from the little short-finned runt to the most exotic veil-tails, shubunkins and moors. There are even aquarium societies whose members meet and show off their best fish.

There is also intense rivalry. Many breeders have homes like fortresses, with dogs and alarms to protect their favourite breeding pairs from others who want to put them out of business.

Traditionally, breeding of exotic tropical fish and in particular goldfish breeding has been a craft handed down from parent to child, with others becoming involved through a slow patient apprenticeship of hanging around as children, gradually undertaking tasks, building their own ponds, and learning the skills through observation and perseverance.

Now, of course, it has gone high-tech. Computers regulate water temperature and acidity. Where people once slipped dollars into furtive hands, it is now done by the book, with accounts and tax returns. Shops require instant delivery. Fish are even shipped out to the United States of America and Europe.

There is certainly the need for a training course. And who better to create one than you. You have been a fish breeder for years — you know the foods and the fishhooks. And, of course, by now you know all about developing and running technical and vocational training.

Needs analysis

So where would you start? I would start by finding out what other people think. I would consult the industry.

First, I would contact just one or two stakeholders. These are the people who would be most affected or interested in such a course.

Who would be the stakeholders? Well, I'd ask the owner of a well-established pet shop and the president of the Goldfish Association, bearing in mind that the considerations for breeding other species of exotic tropical fish are similar to those for the goldfish. I'd ask exotic tropical fish importers, pond makers and manufacturers of aquarium equipment. I would also ask the local polytechnic or university if they would like to run such a course.

They all seem pretty interested, don't you think? So it's time for a proper analysis. Let's send out a questionnaire through the Goldfish Association, pet shops and veterinarians. Let's ask for support and for suggestions as to the content of the course.

We should also check what else is available. It would be silly for us to run a course on “exotic tropical fish shop management” for example, when there is already one on small business management. Why not incorporate that module into our programme instead.

Industry Advisory Committee (Lead Group)

It looks as though we're in this thing together. But we need other people to consult with. We need experts in areas where we have no expertise. We need industry representatives to advise us on best practises. We need a representative from the polytechnic or university

So let's form a development group to look at the responses and map out where we should go from here.

Skill and knowledge analysis

What a great response! So let's analyse what needs to go into an exotic tropical fish breeding course. We'll brainstorm it together.

Figure 5.1 gives the results. There's quite a mixture, from sensible to nutty. Look at them and try Activity 7.



Activity 7

Different breeds	Importance in Chinese history	Exotic tropical fish and mysticism
What do they eat?	Angel fish	Black market tropical fish Security
What is an exotic tropical fish?	Creating a balanced ecology	Disease
	Anatomy of a Tropical fish	Environment
Tapping on the glass	Tropical fish accidents	Cannibalism
Sexing tropical fish	Tropical fish as parents	Tropical fish crèches
How to sell them	Building a pond	Building a tank
Pond weed	Companionship	Travelling tropical fish
Water temperature	Equipment	Goldfish stories
Changing colour	Breeding patterns	Genes
Life cycle	Setting up a business	Cats
Exhibition tropical fish	Choosing the right breeding pairs	Problems with carp
Predator	Selective breeding	Ponds
Clubs and societies	Fin care	Myths and legends
Caring for tropical fish	Computers and tropical fish	

Figure 5.1. Topic analysis

Look through the above topics and decide on four specialist modules we can offer to make up part of the Diploma in Exotic tropical fish Breeding.

Give a name to each module. Under each write the topics from the brainstorm that might be covered. Any topics that are left out, place in a separate list.

Remember that each module needs to stand on its own and might also attract people who would like to do it as an option for another course.

Suggested answers are on the next page.



Activity 7 Answers

These are four possibilities. I'm sure you have done it quite differently.

What is a Tropical fish?

Different species
History
Myths
Angelfish
Anatomy
Exhibition tropical fish
Problems with carp
Exotic tropical fish and mysticism
Goldfish stories
Cats
Tropical fish accidents

Tropical fish behaviour

Eating
Cannibalism
Parents
Need for crèches
Travelling
Changing colour
Breeding pattern
Life cycle
Pond or tank fish
Spawning
Companionship
Genes
Sexing tropical fish

Environment

Diseases
Water temperature
Building a pond
Building a tank
Equipment
Predators
Weed
Creating ecology
Caring for tropical fish
Fin care

Marketing

Black market
How to sell
Markets
Setting up
Choosing pairs
Costs
Clubs
Security
Selective breeds
Computers

Extra

Tropical fish recipes



Developing the modules

Let's look at our four proposed modules to see how we can create a qualification programme using them.

The course is likely to be at a diploma level. It requires fairly complex understanding of a range of ideas — history, ecology, animal health, and business principles — yet is also practical and vocational, which implies specific skills and techniques in breeding and rearing the fish.

But it can't be a diploma on its own because it is only four rather small modules, and diploma programmes are usually defined at around two years of full-time study.

So how do we work out where they fit into a diploma structure?

Examining the modules

Modules need to be able to stand-alone. They may be distinguished by subject matter, but also by teaching mode, the amount of equipment and other resources required, the amount of details and the level at which the modules are presented, and how well they fit with other modules.

Can our modules stand as distinct units of learning within a qualifications framework?

What is a tropical fish?

This area is distinct from the others because it can be studied separately, it does not need pond or equipment, and it could be taken in a single block or over time. It has value specifically for tropical fish breeders.

Tropical fish behaviour

This relates more to zoology or animal behaviour, so could be taken by people wanting a diploma in science or ecology. It needs basic biology as a prerequisite. It needs to be studied over a full year, rather than in a short burst, and requires considerable equipment.

Environment

This requires both practical skills and understanding of ecology. Some is specific to the tropical fish breeding course, but other parts may be interesting for people studying landscape gardening, architecture, ecology or conservation. It is preferable to study it over time.

Marketing

Marketing principles applying to tropical fish breeding also apply across a range of areas. This topic can be done at any time and does not need access to equipment.

From this analysis it is clear that we have **two** modules that have particular relevance to tropical fish breeding — ***What is a tropical fish? and Tropical fish behaviour.***

The Environment module may need to be broken into two smaller ones, one of general interest, and the other specific to the diploma. Let's call these ***Water ecology*** and ***Pond and aquarium maintenance.*** And, of course, for the diploma they will need to be taken together, or conjointly.

The ***Marketing*** module may be able to be taught as a special option within another marketing module.

Filling the diploma basket

Our diploma can now take shape. It has both compulsory and optional elements:

Compulsory

Communication skills	This course should be compulsory for all programmes at the polytechnic or university.
Basic biology	This is taken from the Diploma in Science. It is a prerequisite for tropical fish behaviour.
Tropical fish behaviour	Designed for this diploma, but could be taken as an option by science or ecology students.
What is a tropical fish?	Specific to this diploma.
Basic ecology	This is taken from the Diploma in Science. It is a prerequisite for Water ecology.
Water ecology	Designed for this diploma, but could be taken by science students. For Dip. T F B students this has to be taken with Pond and aquarium maintenance.

Business principles

A basic business course.

Marketing

A basic business course.

Of this compulsory core, many of the papers are taught as part of other qualifications. There is only one paper that is exclusive to the diploma.

The diploma is then defined according to the mix of papers undertaken by the student.

In addition to these compulsory papers, the student would be able to complete the diploma by choosing from a number of options from within the disciplines relating to the course.

These could include:

- Landscape gardening
- Small business management
- Veterinary practise
- Zoology
- Marketing.

Figure 5.2 shows a possible shape of a diploma, considering a three level course structure.

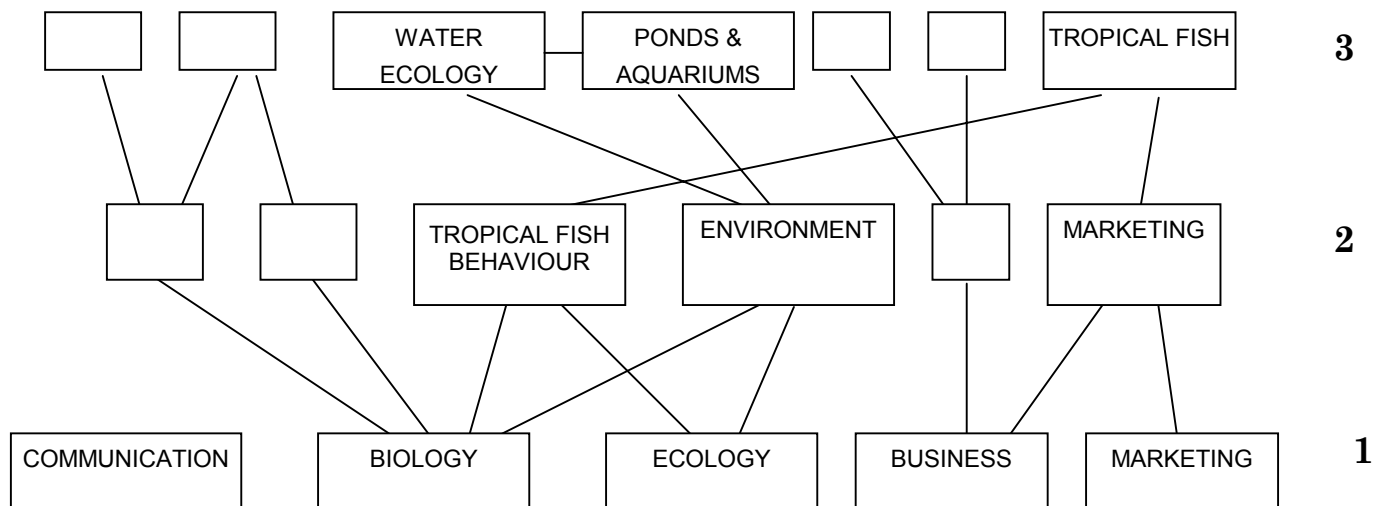


Figure 5.2: Structure of Diploma in Tropical fish Breeding

All named courses are compulsory. Lines show prerequisites and co-requisites.



Work-based programme

Of course the industry would not be satisfied with our diploma programme if students who left the programme could not care for exotic tropical fish, build ponds, or run a business.

There is always that danger when a course is run entirely at an institution and there is no opportunity for practical hands-on experiences.

So in this diploma they would naturally like to see a work-based component.

What way would you choose? Check out Activity 3 again.

Industry involvement

We have seen how industry and other stakeholders become involved in the formulation and development of curriculum.

That involvement often lasts for a long time, and can take a number of forms:

- representation on diploma committee or advisory board
- teaching
- financial support
- moderation of standards
- course review
- teaching work-based components
- lobbying government and other organisations
- provision of resources.



Summary

So how does one go about developing a curriculum?

We look at developing a programme for tropical fish breeders, leading to a Diploma of Tropical fish Breeding.

First we consult others and then undertake a more detailed needs analysis. From that we get data to form the basis of our course.

We work out four main areas for our programme, and start to work out how it fits together as a qualification. We have to mix our modules with those of other courses to build a unique combination suitable for our diploma.

The diploma consists of compulsory and optional modules at three different levels.

We then need to consider whether we include work-based components and recognition of prior learning.

We also need to consider the continuing involvement of industry in the course.

Section 6



The teachers' role

So what is your role as a teacher in the course development process?

The development process is sometimes seen as a power struggle between industry groups and education specialists.

On one extreme there are industries that prescribe exactly what is to be in their courses and also set their own examinations. While some of these programmes may be excellent, my experience has been that prescriptions tend to be restrictive and assessments inappropriate.

An example of this is a plumbing course that had as part of its prescription how to plumb using lead pipes, at a time when it was illegal to use lead pipes in plumbing. The examination for the course was based on short answer questions, without any testing of practical skills.

At the other extreme are teaching institutions that develop courses without consultation with the industry. These programmes can be general rather than specific and do not teach the main skills required in the industry.

An example of this is an institution that taught cookery classes designed for use in a different country. The ingredients and ways of cooking, and even the cooking terms used, were irrelevant to the industry.

The best courses are the result of a marriage between teaching professionals and the industry.

As a teacher, you will be involved in curriculum development. These are some of your roles:

- reformulate industry needs in educational terms
- plan a developmental learning process which teaches things in the right order
- introduce variety into the learning process
- develop valid and appropriate assessment strategies
- cater for different modes of learning, such as distance mode or individualized learning

- develop qualifications pathways which make use of other programmes and resources not specific to the industry
- provide an unbiased and objective critique of industry theory and practise
- teach students the skills of learning
- inspire and motivate students

The unit of learning description has two parts. One of those is what is registered on the framework, and is written by the industry in consultation with teaching institutions.

The other part is designed and written by the teaching institution itself.

That is your job!



Assignments No. 5.2–1 and 5.2-2

Unit 5.2 Characteristics of Tech/Voc Education

You are now required to do **Assignment, 5.2–1 and Assignment 5.2-2**, which will be found at the end of this unit or distributed by your tutor.

Glossary

Academic	Discussing theories and their application in practise, rather than working from practise to find theories.
Apprenticeship	An agreement for a learner of a craft or skill area to be bound to an employer for a certain term and during that time to be instructed by the employer.
Benchmark	A standard in one subject or skill area which provides a guide for standards in other subjects or skill areas.
Binary	A two-path system, that is academic or vocational education. The term implies that the two paths are without points in common.
Competency	A measure of a person's competence or ability in a specific skill.
Course	Any formal teaching or learning is usually called a course. Usually several courses make up a programme of study.
Curriculum	Usually refers to everything that is taught on a course or programme of study.
Education	Teaching learners through enabling them to think for themselves and make independent decisions.
Excellence	Meeting the highest possible standards.
Framework	A structure which provides for different sorts and sizes of modules to be fitted together into qualifications.
Industry	A branch of a trade or manufacture. It often refers to any group of employers in a common area, such as "the health industry".
Learning	The process of assimilation (taking knowledge on board) and accommodation (creating new knowledge). The process of interpreting and making sense of information.
Mode	In this unit "mode" means the vehicle for the teaching and learning process. For instance, it could be by lecture, discussion, study guide, Internet, or by observation and imitation.

Module	Any course of study which stands alone, having its own goals and assessment independent of other courses of study. Modules are components of programmes leading to qualifications.
Programme	A course of study leading to a qualification.
Recognition of prior learning	Assessment of the competence, achievement and learning of a student. In a standards-based system of teaching, learners should be able to claim a module if they can show they have reached the required standard.
Skill	Expertise. It now refers to a particular task requirement for a specific job or area of work. It is now not common to say that a person is “skilled”; instead we say a person “has the skills” to do something.
Standard	A set minimum requirement to do a job or task. It is usually expressed in terms of meeting criteria.
Student-centred	Where students are actively involved in making decisions about a course, including content, teaching methods, and assessment. A teaching programme based around the learning needs and abilities of the students.
Syllabus	An outline of a course or programme of study. A curriculum describes the programme, while a syllabus gives an outline.
Technical	To do with the skills and knowledge relating to a job area or career example, mechanical engineering.
Trainee	A person who is learning the specific skills and requirements for a job.
Training	Learning methodically how to do a job.
Unit	The same as a module. Also used for a small module, which is part of a larger module. “Unit of learning” or “unit of instruction” are names given to modules listed on national frameworks.
Vocational	To do with occupation and employment. Vocational skills are usually distinguished from technical skills by being those that are pursued for specific occupation or trade. For example, masonry.



Assignment Number 5.2 – 1

To be completed on the assignment sheet provided and returned to your tutor for assessment.

This is an open book assignment. You may refer to whatever references you have at your disposal.

Your self-assessment exercises will provide much of the information.

Name: _____ Due Date: _____

Design a diagram to illustrate the course development process. You should include the times when industry, educational institutions and other stakeholders provide input into the process.

Clearly show the relationship of the various parties to the process.

Use a sheet of paper of at least A3 size. You can use colour and illustrations if you wish.

Here are some terms you might like to include. However, only use those you find relevant and you may choose to add others of your own.

Stakeholders

Industry

Brainstorm

Developing modules

Provider

Needs analysis

Skills and knowledge analysis

Committee

Developing pathway

Writing modules

Research

Unit standard

Unit delivery

Government

Society

Teachers

Moderation

Review

Outcomes

Teaching methods

Work-based

Apprenticeship



Assignment Number 5.2-2

To be completed and returned to your tutor for assessment.

This is an open book short answer test. You may refer to whatever references you have at your disposal.

Name: _____ Due date: _____

Question 1

Beside each of the terms in the first list, put the letter of its meaning from the second list.

- | | |
|-----------------------|--|
| _____ 1. Vocational | a. starting from theory |
| _____ 2. Academic | b. learning how to do things the right way |
| _____ 3. Instrumental | c. developing creative thinking skills |
| _____ 4. Learning | d. required level of achievement |
| _____ 5. Skill | e. achieving at the highest level |
| _____ 6. Training | f. designed to meet social and industrial needs |
| _____ 7. Competency | g. adding to personal knowledge and skills |
| _____ 8. Standard | h. knowledge and skills relating to a specific trade |
| | i. achieving the standard |
| | j. the ability to do something |

Question 2

List five (5) characteristics of technical and vocational programmes that distinguish them from academic programmes.

Question 3

- 3.1 In one sentence, define a module.
- 3.2 List two module components that are part of the standard.
- 3.3 List two module components that are supplied by the teacher.
- 3.4 Give two advantages of modular programmes.

Question 4

- 4.1 List two advantages and two disadvantages of the old form of apprenticeship training.
- 4.2 List three (3) other work-based training options.

Question 5

Imagine you are developing a new curriculum in the manufacture of plastic mouldings.

- 5.1 Allocate three (3) roles to the industry representatives on your committee.
- 5.2 Give five (5) reasons why there should be teacher representatives on the committee.