Metal and Engineering CBT Staff Development Project

DESIGNING A FLEXIBLE CBT PROGRAM

Resource Pack

ACTRAC
AUSTRALIAN COMMITTEE FOR TRAINING CURRICULUM
Metal and Engineering CBT Staff Development Project

DESIGNING

A FLEXIBLE

CBT PROGRAM

Resource Pack
Developed and produced by the Centre for Applied Learning Systems

This module was written by Terry Tooth.

Printed 1993 (500)

331.2592 Tooth, T.M. (Terence Michael)
T672 ACTRAC Metal and Engineering CBT Staff Development
Mod. 5 Project. Module 5, Designing a flexible CBT program/

2 v. : ill. ; 30 cm.
ISBN 07308 3776 9

1. Competency-based training.
I. Australian Committee on Training Curriculum.
   Metal and Engineering CBT Staff Development Project.
II. Title.

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SECTION 1: Preliminary information

SECTION 1A: Background issues

These issues need to be considered at the preliminary stages of the planning process. They are intended to raise your awareness of the implications of a change from traditional classroom-based instruction to a flexible CBT training strategy. The material which follows is grouped under the following headings.

Educational issues
- Concepts
- Changing roles for teaching staff
- Changing learning practices
- Learner profile and learning needs

Learning environment issues
- Where and when learning will occur
- Physical and educational resources
- Human resources

EDUCATIONAL ISSUES

Concepts

As you begin to think about developing competency-based strategies for your training program you should consider the possibilities which they offer for the development of flexible learning modes.

CBT in itself does not imply any radical change of teaching/learning methodology. It does, however, offer the opportunity to move away from traditional classroom/workshop-based instruction, which is often rigid in terms of things like the time and place of study, the rate at which learners work through a program, and the kinds of assessment processes which are used.

When you introduce flexibility into an educational program you will break some of these practices.
You can think of the process like this. We all use resources in teaching our programs—things like textbooks, videotapes, handouts and reference materials. If we undertake the systematic transfer of parts of a program into print, audio or video form, then we have the basis for a flexible learning program in which learners are able to gain access to key parts of the program with greatly reduced teacher input.

If we add to these resources some form of guide to their use and to other elements of the learning process, such as practical activities and practice exercises, we have created a body of material which learners can work through with a degree of independence. When learners can carry out a substantial part of their program by using such resources, then they can also progress at their own pace. Self-paced learning implies that learners can work at a pace to suit themselves, as they progressively gain the skills and knowledge which are required to reach specified levels of competence.

Given the kind of flexibility we have suggested, you, as a teacher, are able to provide a degree of guidance, support and encouragement to individual learners which is often impossible in a traditional instruction mode. You also have the option of retaining a direct teaching role if this is required as part of your CBT strategy.

The practices which we have described are leading towards resource-based, flexible learning modes. These are simple and logical concepts which have a strong appeal to teachers who have spent years struggling to meet the demands of mixed ability groups.

Many of us have often wished that we were able to point our learners in the direction of appropriate resources which would provide the core content material of the program and release us from the duty to repeat the same teaching sessions semester after semester. How much more effective we could be if we had more time to attend to the individual needs of our learners.

These are some of the practical implications of the concepts of resource-based, flexible learning modes. You need to be familiar with them before you begin to plan the most appropriate CBT strategy for your training establishment and program.
Changing roles for teaching staff

You will have begun to think about the roles which teachers might assume in a program delivered in a resource-based, flexible learning mode.

What sorts of new roles does the introduction of flexible CBT strategies create for staff?

First of all the traditional role of the teacher in the classroom or workshop will change. This role changes when, as a result of the development of resources, learners are able to gain access to much of the content of the program in other forms. Where teachers previously explained and demonstrated to their learners, they now step back from some of the immediate business of direct presentation of material and allow the learners to carry out more of the work themselves.

The teacher is a central resource in this process, however, and is available in a different role to guide, assist and support the learners. This role is sometimes described as facilitating learning. You will find that this change will be difficult for some teachers, who will find it hard to give up their direct role in the teaching process.

As you become more involved in the world of CBT you’ll notice that the word teaching occurs less frequently than the word learning. This is because a greater emphasis is being placed on the concept of learners being more responsible for their learning and their own progress, which becomes possible when resource-based learning strategies are used.

This doesn’t mean, however, that teaching no longer has a role in modern education and training. Your teaching skills and experience are going to be more highly valued in a resource-based, flexible learning mode because resources have to be of a high standard and the educational practice which is developed has to be the best practice that can be identified.

Only experienced teachers can ensure that this happens. They will need to evaluate critically the educational structures and processes which are used in their teaching programs, and keep abreast of changing educational thinking and practice.

Teachers will also have to assume a leading role in the identification, selection, planning and creation of the learning resources which will form the basis of their course structure. They will be required to use their subject knowledge and experience to plan an educational strategy which will enable learners to develop the skills and experiences which are required in the program.
When you are considering the implications of flexible teaching methodology for your training establishment or program, make sure that you discuss the resource development role which your staff will have to assume, the changed emphasis from teaching to learning in the overall educational process, and the implications of a facilitator’s role for teachers.

Resource-based, flexible methodology will require learners to approach their learning in different ways and to accept more responsibility for their progress than is usually required in traditional teaching modes.

Some learners will initially find this change difficult to cope with, so that you will have to plan a comprehensive and supportive induction program to enable them to make the transition to more independent learning practices.

Most learners entering education and training programs now and in the immediate future will have had little or no experience with resource-based, flexible learning. Their experience in schools and in tertiary study programs will have accustomed them to having substantial amounts of a program presented directly by a teacher. This direct presentation gives the teacher a powerful control over the educational processes involved in the program and leads learners to expect a considerable degree of direction in all aspects of their learning practices.

What happens when that direct contact between learners and teacher is removed? Learners find that their progress is now dependent upon their being able to read instructions and carry out a series of tasks independently, even testing themselves in order to check on their progress and their understanding of the processes being learned. Obviously, some learners will flounder and lose confidence, direction and motivation unless you are aware of the dangers and have prepared some strategies to overcome them.

There are other issues which flexible learning modes will raise for your learners. The first thing which they are likely to notice is the isolation from the group. Working in a group provides much reassurance for the less confident learners and is a means by which they can seek support and exchange ideas. When you remove that environment, partially or fully, you are placing a heavier responsibility on each individual which, in turn, places a responsibility on you to provide support for those who are going to need it.
The other immediate change which learners will notice is that they receive less direct support from the teacher than they have been used to. Flexible learning modes require learners to have study skills which will enable them to read, comprehend, analyse, seek information, organise their time and structure their work sessions. These are things which, in traditional practice, are often directed by a teacher. You'll need to identify very quickly those learners who are having difficulties and provide help for them as part of your learning strategy.

Finally, flexible learning modes raise interesting possibilities in accommodating different learning styles. The inclusion in a resource-based, flexible learning package of a variety of activities, such as reading, listening, watching, doing, reflecting, planning and hypothesising allows learners to use a range of senses, aptitudes and abilities to develop the knowledge, skills and experiences which your program requires.

For a good introduction to the subject of differing learning styles, look at the articles on learning styles and the brain in the periodical, Educational Leadership., Volume 48, No 2, October 1990.

Before you begin to plan your learning strategy you should have a clear picture of who your learners will be and what educational needs they are likely to have. A learner profile will provide you with essential information which will help to determine a number of elements of your learning strategy. (You may have a diverse group of learners and be unable to carry out the process described here, but it is important to think about this issue.)

A learner profile is a means of identifying things like who your learners are, where they are located, what access they have to facilities and what educational background they have—issues which are important in any learning program.

The age of your learners will tell you something about the level at which you should present your program, in the light of the kinds of life experiences which they are likely to have. For example, learners straight from school will require a different approach from that which you would use for a group of mature people who have been employed for several years. On the other hand, people returning to study after several years may require more support and encouragement.
As a result of identifying the educational needs of learners you will find that many lack the ability to carry out research on their own, or lack the confidence to cope effectively with independent learning modes. You may need to develop supplementary programs for learners of non-English speaking backgrounds. You may have to give special consideration to disabled people and to the designated disadvantaged groups. States may have different policies on these matters, but whatever the policy in your state, you need to devise strategies to help learners with particular learning needs.

If your program is to be based in a training establishment, the location of your learners is of less importance than if you intend to reach a new client group which is at a distance from you. If your program is intended to have an off-campus component then the location of your learners may be very significant in terms of access to a range of facilities.

Access to facilities may be an important component in your program if, for example, learners need access to workplace training or to specialised equipment or are required to carry out research activities.

You should also know what kinds of educational skills, knowledge and experience your learners are likely to bring to their learning program, and what skills, knowledge, and experience you expect them to have in order to be able to cope with the learning demands. You will then be able to provide assistance for learners who are lacking in any of the basic study skills or who can't carry out some necessary operation.

This issue is tied up with that of the prerequisites which you establish for your program.

**LEARNING ENVIRONMENT ISSUES**

**Where and when learning will occur**

Look at the component parts of your existing program in terms of the tasks which your learners have to do and where they carry out those tasks. You may have group sessions for theory components, practical sessions which take place in workshops or laboratories, individual study sessions, activities which take place off-campus or on-job training components.

- Which of these components are essential to the program and can't be modified or removed?
- Which of them could be handled in another way or in another place?
- Could any of them be omitted or combined with others?
These questions are critical because they will indicate to you how much flexibility you have in changing existing learning practices.

If the major part of your program is workshop-based you may have no option but to conduct it on-campus, with your learners having flexibility in the pace of their learning progress but not in the place of learning.

If the major part of your program is theory-based and is currently conducted in a classroom, you may have the flexibility to open it up with a significant amount of off-campus learning, with the use of appropriate resources.

If your program has an on-job component the flexibility which you can create may depend on the requirements of the employer.

An important stage in planning a flexible learning strategy is to make decisions about your limitations and your opportunities. Once you have agreed upon those components which all learners must carry out in a clearly designated place or using specific equipment or resources, you can begin to investigate the possibilities for opening up the structure and making it more responsive to the needs of individual learners.

Here is your chance to be creative and to seize opportunities. You may find that your existing resources, managed in a different way, can provide you with the opportunity to do things differently—for example:

- to use multiple copies of resources in a more flexible way
- to provide learner access to equipment on a rostered basis
- to create a learning centre where reference materials can be made available
- to change the opening hours of the library or learning resource centre to suit learners’ needs.

You may even be able to allow learners to have some choice as to when they begin and complete their learning programs.

As you begin to think closely about the kinds of options which can be offered through flexible learning modes, you’ll realise that where and when learners learn is limited only by the facilities which are available to you in planning and implementing your CBT strategy.
An analysis of the current delivery of your program will indicate the essential physical resources which are required in order to conduct it. This issue is linked to that of where and when learning will occur, in that you are looking at the necessary and the inflexible requirements of your program, around which you will build your resource-based strategy.

What do you currently need to run your program? Your list may include:

- textbooks, manuals, handouts or notes
- computers, video machines
- machines, equipment, tools
- classroom, workshop, laboratory, study areas, resource centre
- off-campus facilities.

What physical resources might you require in order to create a resource-based format for your program?

You might include multiple copies of resources and more equipment, such as computers or machines, according to the requirements of the kind of learning strategy you select. You may require a larger area for individual study—a learning centre. This is a designated area in which learners can gain access to resources and carry out specific learning tasks. The layout and design of such a centre needs careful consideration in order to create the most effective learning environment for your learners.

To convert traditional training programs you will need to plan and design your resources and educational strategies. You should also consider what production facilities you may require in order to produce new learning resources, and whether you’ll need the assistance of outside services. These issues will lead you to look carefully at the economics of change, which may well have a strong influence on the kinds of changes you are able to make.

Don’t assume, however, that new learning strategies necessarily require masses of new and expensive resources. You may be able to develop the basis of a well-structured program by using your existing resources, if you manage them well. You should look at this option first, before you embark on a major redevelopment program.
This exercise may well be hypothetical at the moment, if you have not yet developed a plan for a flexible program which you might be able to use in your own training situation. It is very useful, however, to be clear about what you have now in the way of physical resources and to begin to consider what more flexible study modes might mean for you.

You’ll need to consider all of these issues in order to be able to carry out the next stages in the process of developing your own flexible learning format.

The introduction of resource-based methodology in a training establishment means changes in the way in which many things are done, and the need for new roles. You’ll find that the main task is to re-direct the roles of existing staff towards the duties which are required in order to serve your learners as effectively as possible.

This is not intended to intimidate you. You’ll be able to find many of the skills you require in your establishment already, and most of the new roles can be assumed by your existing staff. The main thing is to be aware of what is going to be required when you make your change to a resource-based, flexible strategy.

We’ve already drawn attention to the changing role for teachers, but there is much more to the whole picture. Resources have to be identified, selected and created, which means roles for:

- library or learning resource centre staff in tracing likely resources
- subject specialists in evaluating them
- teachers in planning and developing new resources.

In order to create resources you’ll need subject specialists/writers, instructional designers and people to carry out various production processes, including:

- typing and proofreading
- editing
- illustration
- desktop publishing
- printing.

Similar specialist roles are required for the planning and production of non-print resources such as videos and computer-based training components.
The resources which are to be used in a flexible program have to be looked after by someone and maintained. The provision of these resources to learners at the appropriate time has to be controlled and monitored.

Facilities will have to be organised and maintained in a manner which makes them available to learners when they are needed.

The learner induction and support systems will require staff who can provide assistance, guidance and support at levels beyond those normally associated with the role of a teacher.

The identification and evaluation of existing resources is a lengthy business. The planning and development of new resources is demanding in terms of specialist staff, production processes, time and expense. You'll hear more of this issue later in the module.

Finally, you need someone to coordinate all of this activity. The overall management of the processes of resource planning and development and of redirecting your educational strategies is essential if the results are to be worth the time and effort which you will put into them.

You will find these references a useful introduction to a range of CBT issues:

**Australian Training Review**—a quarterly journal

**Getting to grips with ...**—series of handbooks on aspects of CBT methodology, published by the National Centre for Vocational Education Research.

SECTION 1B: Determine prerequisites for learners studying the program

This process will be more important in some programs than in others, but you should consider it carefully before proceeding to the next stage.

Prerequisite, in this context, means the skills, knowledge and experience which you are assuming that learners possess before they begin their learning program. Many curriculum documents state that there are no prerequisites for this subject. What does this mean?

It usually means that there are no formal prerequisites, such as previously studied subjects in that program area. In many cases, however, prerequisites are set up as entry requirements to the program. If prospective learners don’t meet these requirements then entry to the program is closed. This is a good example of a restriction which limits the flexibility of a learning program.

As well as the formal prerequisites which are commonly specified for entry into TAFE programs, there are others which you need to consider. Obviously, for any program there are some prerequisites. For example, learners are assumed to be able to read and write to an appropriate level. These are implied prerequisites. Often, ‘implied’ becomes ‘assumed’ and learners are not informed about the broad skills which the program requires. The result may be that they will encounter difficulties as they work through the program.

An implied prerequisite can be as important as a specific prerequisite, if it requires skills, knowledge and experience which a learner doesn’t have.

What does all this mean for you, as a designer of a flexible learning program? It means that you need to identify the skills, knowledge and experience which your program requires, remembering that prerequisites may be:

- **formal** in terms of previously acquired qualifications
- **implied** in terms of assumed abilities or experiences.

If your program is to be flexible in terms of providing the maximum opportunity for learner success, you need to identify prerequisites, provide your learners with as much guidance as possible, and build support structures into your learning materials to assist those who experience difficulties. Let’s see how this can be done.
First of all, think carefully about your program and ask yourself what you expect of learners when they enrol.

- What do they need to know?
- What skills do they need?
- What experiences must they have had?

Don’t assume that anyone with a reasonable education could handle the material. For example:

- if there are calculations to be done, identify the skills necessary to carry them out

- if there is reading to be done, assess the reading level of the material (there is no need to be too formal about this, but you need to have some understanding of how difficult this process might be for your learners)

- if there are tools or equipment to be handled, identify the basic physical aptitudes necessary to use them.

The ‘implied’ prerequisites issue has been addressed by the Australian Traineeship Program. A Skills Entry Profile, has been developed by the Traineeship Unit at Adelaide College and the South Australian DETAFE Curriculum Services Division.

The profile package lists a range of prerequisite skills and personal attributes for a particular traineeship program, and provides a self-assessment process by which prospective trainees can evaluate their own suitability for the program.

The package consists of:

- a skills entry profile
- a trainee self-assessment booklet
- a trainee self-assessment answer sheet
- a list of answers.

This profile is intended to provide prospective trainees with a clear idea of the levels of achievement which are required if they are to participate effectively in the traineeship program.
The skills assessment section of the entry profile contains five parts:

1. **Literacy/Numeracy**
   A. Reading and researching
   B. Writing
   C. Speaking and listening
   D. Business calculations

2. **Personal attributes**

   This section deals with an area often overlooked in the trainee counselling procedure.

   The whole document is too large to reproduce here, but an example will show you how the procedure works. This is the skills profile for the Reading and Researching section.

**Reading and Researching**

The intending trainee should be able to:

**Reading**
- use, for example, the index, contents page and headings of a textbook to find information
- skim a text for main ideas
- skim a text to locate specific information.

**Comprehension**
- understand the main ideas in a text
- distinguish main ideas from supporting and secondary ideas
- follow detailed, clearly written instructions.

**Vocabulary**
- use dictionary and thesaurus when necessary to select appropriate words
- predict meanings of unfamiliar words from contextual clues in written texts.

**Library skills**
- use a catalogue to locate texts and resources
- access information from a variety of print media available in resource centres (eg journals, newsletters, pamphlets).

**Other**
- access information from, ie 'read', film and video 'texts'.
Here is one of the test questions for this section.

Reading
How well do you understand what you read? To test yourself you need to read this memorandum, then answer the questions which follow.

MEMORANDUM
To: Construction site workers
From: Angela Bongiorno
Subject: Occupational Health and Safety
Date: July 7, 1991

When ladders are used for any purpose whatsoever, special precautions should be taken to avoid accidents. Please read the following rules carefully.

Never use a ladder which has broken or missing rungs, broken or split side rails or shows other signs of wear and tear. When ladders with defects are discovered, take them out of service immediately, and place them on the company repair truck.

Before using metal ladders, check the interiors of the open-ended hollow rungs for possible corrosion. Should corrosion be present, and even if there is only slight evidence of this, take the ladder out of service.

Portable ladders must be tied and/or blocked securely to prevent displacement while in use.

When either ascending or descending a ladder (and only one person at a time should use it), be sure to face it. Both hands must be free. Materials must be transported using the hoist or elevator.

By following these simple rules, employee safety while using ladders will be ensured.

A Bongiorno
Occupational Health and Safety Officer

The questions
1. Which statement below violates the rules for using ladders?
   a. Turn around to face the ladder before climbing down.
   b. Carry everything in one hand, so the other hand is free.
   c. To use a portable ladder, block it or tie it.
   d. If a ladder is placed in a driveway, protect it with a barricade.
2. If an employee discovers that a ladder is badly worn, what should the employee do?
   a. Have someone hold the ladder so that it will be safer to use.
   b. Be especially careful when using it.
   c. Use it only if protected by a barricade.
   d. Do not use it, and send it for repairs.

3. Which title best describes the main idea of this bulletin?
   a. Checking ladders for possible defects.
   b. The basic rules for climbing a ladder.
   c. Safe practices in the use of ladders.
   d. Why metal ladders are dangerous.

The answers
1 b, 2 d, 3 c

Finally, the trainee who identifies some problem areas in the course of the self-assessment is offered the assistance of a counsellor, and is given this advice.

*A poor showing in any area does not mean that you would not be able to be successful in the Traineeship. You may need to do some bridging studies and/or ensure that support services are available in the off-job component of your training.*

The approach here is a good indication of the value of identifying the prerequisites of a learning program, and the intention and methodology are very much in the spirit of independent learning.

A similar aid to the trainee selection process is the pre-test, which is often used to establish the levels of learner competence before enrolment takes place.

In summary, the most important reason for you to determine prerequisites for your program is so that you can offer assistance to any learner who has difficulty in reaching or maintaining the course standards. This helps to make your program more accessible by making it as easy as possible for learners to get into it and to achieve the objectives which have been set.
SECTION 1C: Identify the practical constraints of the program

Here we are looking for those components of your teaching program which learners must carry out in a designated place, at a designated time, or for which they must use specific equipment or resources.

Every component which you specify as having to be carried out at a designated time and place will limit the flexibility of your program—in other words, it will be a constraint in a logistical sense.

Educationally, however, such components may well be part of a very flexible teaching and learning strategy. The provision of workplace experience in a training program is an example of this.

Your task now is to look at your learning outcomes and assessment criteria and ask yourself what processes the learners will have to carry out in order to complete the program.

You'll try to devise learning strategies which provide the maximum flexibility for learners. In other words, you'll try to avoid hard and fast requirements that compel learners to do specific things at specific times in specific places. It may be impossible to do so completely, and some components will become a constraint on your freedom of choice in planning your flexible learning program.

Determining learning processes

In order to achieve the program's learning outcomes, learners will have to carry out certain tasks or processes. For example, they may need:

- access to certain facilities and equipment, such as a workshop/laboratory, or a computer
- access to workplace facilities
- reference materials which are difficult to obtain
- to work with other learners on some aspects of the program
- to attend practical sessions/tutorials
- to complete practical activities
- to undertake assessment activities both on and off-job.
In general, you’ll find that the theory component of a teaching program is the one which can be opened-up most readily, through the use of print, audio/video or computer-based materials.

Group work or tutorials can be provided for off-campus learners by using communications technology such as teleconferencing or videoconferencing.

The practical components are often the most difficult to open-up, especially if your program requires learners to use specialised equipment. Some aspects of practical training may be done more effectively in the workplace. This may lead to a more collaborative learning relationship between the training centre and the workplace.

Metal and engineering programs often have tightly prescribed assessment procedures, which may limit your opportunities to introduce flexible strategies.

Whatever your specific situation, think of the guiding principles of flexible learning and try to overcome the problems of rigid programing and inflexible study requirements.
SECTION 2: Learning guides and resources

SECTION 2A: Resource-based learning packages

There are basically three approaches to the structuring of resource-based learning packages, which we can call:

- integrated
- separated
- combination.

You can begin to consider which of these categories is likely to be most appropriate for your own program.

The integrated approach

You can combine all of the learning material which learners will require in your learning program into one package—usually a book or binder—which contains the content of the learning module and the instructions which guide them through the processes of developing the required skills and knowledge.

Distance education programs are often presented in this way, which helps learners who might otherwise find it difficult to gain access to particular resources.

The separated approach

In this approach you separate the resources—which will include the content for your program—from the instructions on how to use them. This has obvious advantages.

For the learner, it means handling a smaller and more manageable package—usually a comparatively slender document.

For the teacher it means the flexibility of being able to use a wide range of resources, such as specialised equipment and computers, and of being able to make changes to parts of those resources without having to revise the whole package.
The combination approach

Obviously, learning packages need not necessarily fall into either of the two categories above. You may choose to combine the two strategies and produce a package which is largely integrated but which makes some use of other resources.

This module is an example of the separated approach. We have separated the instructional component—the learning guide—from the content material—the resource pack—as a demonstration of the way in which learners can be directed to other resources. In many CBT programs, of course, the range of resources available to learners will be wider than those which you will use in this module.

The approach which you choose for your own program will depend upon your circumstances and on the degree of flexibility which you are able to create for your learners. Your main concern will be to ensure that they are able to achieve the learning outcomes of your particular program as effectively as possible.
SECTION 2B: The learning guide

THE PURPOSE OF THE LEARNING GUIDE

The basic approach to the development of strategies for flexible learning modes applies whether you are developing materials from scratch or relying extensively on existing resources.

In the first case, you have to create both the information content of the learning package and the teaching/learning strategy.

In the second case, a significant proportion of the information content is in the form of existing resources, and you have to provide the teaching/learning strategy to enable your learners to use that information effectively.

The first approach is often unnecessary. There is usually something already available to help you, even if it is only the trusty textbook—the stock learning material base of many a program. However, textbooks, like many other educational resources, such as guides and handbooks, are designed as references, rather than as parts of an integrated learning program.

What you will probably need to do, therefore, is to provide the means to help your learners to learn from all of these resources as effectively as possible. This means providing guidance for them in the form of an educational structure to follow as they work through the learning program.

Consider this procedure:

• Gather together all of the materials which you use to support your teaching of a program.

• Look at it in terms of how effectively it covers the program content which needs to be presented to your learners.

• If there are any gaps, look for other sources of content material, or write it yourself.

• Make a list of all of the particular requirements of the learning program, such as learner activities, assessment processes, practical work, research tasks and industry visits. Include any elements of the program which will need direct teacher input.

• Now make a map of the whole course—what has to be done, by when and how.
Finally, write this plan into a structured whole, so that learners will be able to follow the whole process by being:

- told what to do
- shown how to do it
- given plenty of practise at the skills required
- given opportunities to test themselves on their understanding of the material
- tested frequently on skills and knowledge.

When you have carried out these processes you will have created a learning guide format for your learning program.

The learning guide approach to independent learning materials not only has a practical logic, it also has an educational logic in that it encourages the development of a range of broad skills which are essential to effective workplace performance, for example:

- identifying and solving problems
- accessing and using information
- taking initiative and being self-directive in time and work management
- communicating in verbal and written form
- adapting to change
- making decisions and accepting responsibility for them.

(Those familiar with the work of Finn and Mayer will recognise these as thinly disguised key competencies.)

What this means is that learners have to work at their learning—it doesn’t just fall like a mantle around their shoulders. By working at their learning, they do it more effectively, they develop a greater sense of independence and they value their own achievements more highly.

This illustration is taken from How to find and adapt materials and select media, by Roger Lewis and Nigel Paine. It is one of the Open Learning Guides, listed under References and resources.

This shows how conventional classroom practice can be translated for use in a learning guide. (It’s not very imaginative methodology, but it does illustrate the point.) The left-hand side represents the classroom dialogue, the right-hand side the equivalent feature in a learning guide.
This text uses different terminology from that used in CBT processes, but the elements are essentially the same. We are calling the study guide a **learning guide**, and are expressing **aims and objectives** as **learning outcomes**. The term **routeing** means providing directions. The term **unpacking** means explaining.

<table>
<thead>
<tr>
<th>Conventional class</th>
<th>Study guide equivalent feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Now this next part of the course examines the main features of the banking system in the UK.</td>
<td>Aims and objectives</td>
</tr>
<tr>
<td>The set text by Foster and Preston makes the points clearly and concisely in Ch 14.</td>
<td>Signposting</td>
</tr>
<tr>
<td>Could you turn to that chapter then (it starts on page 206). Read it quickly. Ignore the final page as it contains information we are going to cover next week. Now you will come across the concept of 'negative credit'. This means...</td>
<td>Routeing</td>
</tr>
<tr>
<td>When you have finished that I want you to have a brief discussion covering the main points, then you can attempt these worksheet questions.</td>
<td>Unpacking</td>
</tr>
<tr>
<td>At the end of the class I’ll give you a handout covering the main points. Any questions? ... Good, if there are no problems, then turn to page 206 of Preston and Foster. You’ll find it quite straightforward.</td>
<td>Summary and assessment</td>
</tr>
<tr>
<td></td>
<td>Review</td>
</tr>
<tr>
<td></td>
<td>Anticipating problem areas</td>
</tr>
<tr>
<td></td>
<td>Encouragement</td>
</tr>
</tbody>
</table>

You’ll find that you will get essentially the same ideas and advice on learning guides and resources whether you read Australian, American or European material. All advice on developing learning materials follows fundamentally the same pattern.
SECTION 3: Identifying existing resources

SECTION 3A: Investigating resources

Why conduct a learning materials search? The primary purpose is to try to track down resources which already exist which you may be able to use in your own teaching program, either directly or with some adaptation. When you begin to develop flexible, resource-based strategies you are faced with the prospect of investing considerable time, effort and financial resources into the preparation of learning materials. If you can reduce any of these components by using existing materials, you'll make your task a lot easier.

A learning resources search can identify whatever you specify—for example, up-to-date textbooks, current articles in specialist publications or independent learning materials. If you find appropriate resources you can incorporate them into your own resource development program, but the key word here is 'appropriate'. What you find may be inappropriate on the basis of availability, cost, relevance to your flexible learning strategy or many other factors.

The decision to search or not to search, and what to search for, will depend on your own circumstances. These are issues to be discussed with your colleagues. If you decide to search you'll need to identify key topics in your program as a starting point.

The most important part of the materials search process is the specific definition of what you are looking for. This is done by the use of key words, which specify the areas of interest on which you want to focus.

When developing lists of key words it is important to make the terms quite specific. If they are too broad you'll get too much material. To minimise this problem, use more specialised terms.

You should also specify the kind of information you are after, such as learning packages or teaching materials, or recently published materials, in order to limit the field of your search.
SECTION 3B: Making a search

The first place to check is the catalogue of your own library or learning resource centre. This will list the materials which are most readily available to you.

Next you might ask library staff to check catalogues of other libraries or national services such as the Australian Bibliographic Network which contains records from most of the major Australian libraries. Other electronic databases list different types of resources such as magazine and newspaper articles as well as books and audiovisual materials.

Publishers’ catalogues, film and video library catalogues and course directories for educational institutions are other sources of information.

Inter-library loans can be arranged for resources held by the network so that you can look them over and decide if they are what you need for your project.

Another helpful service is provided through OLIMCH—the Open Learning Information and Materials Clearing House—which is located in the CALS Learning Resource Centre at Adelaide Institute of Vocational Education. OLIMCH services are available to all states on a fee-for-service basis. Through this service the United Kingdom database of training programs (MARISNET) can be checked along with the Australian VOCED (Vocational Education and Training) database. Both databases provide information about courses, training packages and related research and the availability of learning resources from those programs.

Other services that may be useful

Booksellers and suppliers of other learning resources can supply you with catalogues of their products and materials to preview. Check with that helpful librarian again for recent promotional materials.

Once you have located the materials, try to actually look at as many as possible to see how they have been designed, what they cover and the ways in which those authors or producers have approached their subjects. This will give you plenty of food for thought in designing your own materials and may even save you valuable time and effort.
A caution

Before you proceed you need to be aware of the likely results of the materials search process. It needs to be focussed very sharply, because you will end up with a long list of resources, from Australia and other countries, if you extend the search that far, which are often identified only by name.

- What will you do with this list?
- How will you decide which items are worth examining?
- How long will it take to obtain preview copies, and how much will this cost?
- And when you find something useful, what about the copyright issue? Have you money available to pay for this?

The investigation of resources process involves time, and the use of what you find may cost money. Once a search is begun you may find that costs grow dramatically, especially if you seek permission to copy parts of resources for your own program. Be prepared!

On the other hand, consider the potential value of this exercise. You may find that what you want has already been produced and can be used as it is, or with little modification. You may find valuable reference material which you can incorporate into your own learning materials. If this happens, you will feel fully justified in having made the effort to search.

This is a judgement which you will have to make for yourself. The place to begin is with other subject specialists within your teaching area. As a group you are more likely than anyone else to be aware of the kinds of educational materials which are readily available in a particular subject area, and to have an idea of the kinds of learning materials which are most needed.

How it can work for you

Here are some examples of successful searches which have been conducted in South Australia.

In the Office Practice course, typing programs were required which would teach correct habits to new keyboard users. After contacting teachers in other institutions staff tried searching suppliers’ catalogues and found an IBM and Mac-compatible program which stressed correct keying and ergonomics, rather than speed. In addition to satisfying the content needs of the program, it was also available as a site licence very cheaply.
When the Clothing and Textiles teachers wanted videos on sewing techniques, they were able to consult the catalogue of materials produced by TAFE colleges in NSW and found some of the materials which they required. This also saved time and effort which could be devoted to developing learning materials in other areas of the program.

The Panel Beating program at Croydon Park College decided to introduce self-paced learning strategies. Investigation showed that Richmond College in Victoria was already operating a panel beating program in a resource-based CBT format. Croydon Park purchased the whole package and modified it to meet the requirements of the state’s panel beating program.

Learning resource centre staff were able to locate a series of videos, held by the TAFE National Resource Centre, that covered many of the basic units of the Digital Electronics course—again allowing effort to be focussed on areas where materials did not exist.

Staff of Kingston College of TAFE were looking for learning materials for use in the Heavy Vehicle program. Batman College in Victoria was identified as having a flexible Heavy Vehicle program and was able to provide a range of print, video and computer-based resources which were modified to suit the College’s program.
SECTION 3C: Evaluating resources

When you have made some preliminary decisions about materials which may be useful for your program, you will need to examine them closely in order to make sure that they are going to meet your needs.

Let's suppose you are considering using a particular piece of material in your program—anything from a professional video to a simple audio tape or some print material. Ask yourself the following questions. By the time you get to the end of the checklist you should be able to make up your mind as to its usefulness in your program.

**What learning outcomes does it cover?**

Make sure that the material relates closely to the learning outcomes, as it is all too easy to get carried away and stray on to matters which aren't in the program. When you write your learning guide make sure that your learners know what this resource is helping them to achieve, and what specific sections they should study.

**Why will it be useful to your learners?**

There should be good reasons for using it. For example, video can be justified when learners need to see things moving, when processes need to be demonstrated or to show a level of competence. Photographs can be as effective as videos in some situations.

**Will it be easy for the learner to use?**

With audio tape, for example, you can safely assume that just about every learner has easy access to some form of playback facility and this is becoming equally true for video tapes. With computers this may not be so easy. You will need to consider the situation of your learners. You must be able to ensure that they have access to the facilities and the materials which they will need.

**Is it good value for money?**

It is easy to spend a lot of money purchasing video packages from commercial companies, but will this be the best choice? Will copies need to be provided to all of your learners? Would a simpler video of a local industry situation be more realistic and still achieve your learning outcomes?
Is it up-to-date and accurate?

How recently was the material produced? (Check the copyright date on the back of the title page or look for a production date on videos or other audio/visual materials.) Do the facts and figures in the material reflect current conditions? (They are often considerably older than the date when materials were published.)

It is also important that materials reflect gender balance and ethnic diversity as well as occupational health and safety issues. In some otherwise excellent videos which were recently previewed for a Hospitality programme all of the chefs were male while the only female participants were the kitchen hands. The people developing the learning materials decided that they needed to feature female chefs in almost all of their materials to provide a more balanced view of the industry.

Is it available?

Especially with resource packages, have you allowed enough time to obtain the correct number of copies? Overseas materials can take up to six months to arrive in Australia and if materials are being reprinted or have gone out of print they may be unobtainable within your time frame. Remember those research skills (or learning resource centre staff) and check out Books in Print.

Copyright

Finally, if you locate some materials which seem to be close to what you want, but you feel that some modifications are needed, you will need to contact the original author or publisher to make arrangements for using the materials. Authors or publishers retain the right to make copies of their work—copyright, in fact—whether this is stated on the materials or not. If you make copies without their permission you may be breaking the law and can face heavy penalties.
SECTION 4A: Using media in CBT programs

In this section we'll look at the options which you have in selecting media for learning materials requirements, in readiness for the next section of the module.

First of all we need to define the term media, in the context of flexible learning methodology. It is used to describe the range of communication processes which can be used to convey various elements of the teaching/learning process to the learners and to create links between learners and teachers.

In the classroom the principal medium of communication is the teacher. Teachers will use other forms of media to assist in the educational process—text material, visual material (slides, photos, videos) and computers, for example.

In flexible learning methodology we are working to replace much of the direct contact between teacher and learners by some other form of media. Written material which provides examples and explanations and video material which shows the teacher demonstrating a skill, are two obvious ways in which this can be done.

Because these forms of media are used to deliver the educational content of a program to the learners, the term delivery method is sometimes used to describe the many different media components which can be used in flexible learning strategies.

It is in this sense that telephone and video links between learners and teachers are described as delivery methods. They are ways of setting up a communication component within a learning program.

Selecting appropriate forms of media for your program is a complex matter, and our suggestions here amount to an overview of the issues involved. You should seek the assistance of an instructional designer when you carry out this process.
In an ideal world you might be free to develop all of the resources which you need, and plan the very best learning strategies to meet the precise and specific needs of you and your learners. In practice, you’ll probably have to put together the most effective combination of materials and strategies that are possible within your given constraints.

The selection of appropriate forms of media for learning outcomes is central to the whole process of developing flexible learning strategies for your program.

First let’s look at the kinds of resources which instructors typically use in their teaching programs:

- print materials
- locally produced video demonstrations
- audio tapes
- charts/maps
- tape/slide packages
- models—static or working
- photographs
- computer-based courseware
- professional films/videos
- telephone/videoconference links.

You will have used some of these resource materials in your own teaching programs. You will have selected them because they are helpful in conveying to your learners some aspect of your program, or as part of some practical work which they are required to carry out.

In making the selection of these resources, you will have considered the kind of learning task for which each might be appropriate. Appropriateness is a very important consideration in the selection of learning resources, because an inappropriate resource may not enable the learner to develop the specified skill.

For example, one would never assume that a handbook on road rules and a car owners manual would enable a person to learn to drive a car. A simulator, such as is used to train pilots, might be very useful here, but the task could never be thoroughly mastered until that person actually drove a vehicle on the road.
On the other hand, one can learn to operate a washing machine or a stereo unit by reading a manual and carrying out the instructions.

So, when you are selecting resources for a teaching program, you need to select those which suit the kind of information and skills which your learners need to acquire.
SECTION 4B: Reviewing your decisions

We are going to address three key questions:

1. What materials and strategies do you have already?
2. What have you identified as being necessary course components?
3. What materials or strategies are you going to have to produce?

Begin by reviewing the information you need in order to develop an effective CBT package. You need to have in front of you:

- the learning outcomes and the assessment criteria
- the standards to which learners will have to perform those learning outcomes
- the assessment procedures which will be used
- the program prerequisites
- the practical constraints of the program
- the existing resources which can be used.

Of these, the most important for creating a learning package are:

- assessment procedures
- practical constraints
- existing resources.

This review process will prepare you to make judgements and decisions of your own about the kinds of learning resources which your particular learning strategy will require. Managers may be interested in a new project listed in the publication, Flexible Delivery—A National Framework for Implementation in TAFE, from the Flexible Delivery Working Party, 1992. This is a software package which will develop a model which can be used to compare the costs of various delivery methods under varying conditions.
This is an awareness-raising exercise. The issues involved are so inextricably bound up with the prevailing circumstances of individual training establishments that we will settle for identifying the central issues and leave you to work them through for yourself. The information contained here concerns the development of new learning resources and learning guides which will direct your learners through the whole learning process.

Practical experience says that the first piece of information which you are likely to receive about a project is when it has to be completed. This means that any plan which you develop must be capable of being brought to a satisfactory conclusion by a certain date, which, in turn, will probably determine what you can achieve within that time.

In order to carry out the learning materials development process, you need to identify:

- the subject specialists and writers who will prepare the drafts of the learning resources
- a range of people to verify the content material and the educational structure of the materials
- a range of people to carry out the production of materials.

The timeline issue is difficult to discuss without reference to specific circumstances. The task of your team is to identify the most likely possibilities so that you don’t bite off more than you can chew. Most people do just that, mainly as a result of inexperience. You won’t avoid the problem entirely—no-one ever does—but at least you can try to anticipate the problems which you will encounter.

A word of advice: projects like these have a way of going off-course as a result of unforeseen circumstances. If you are working to a close deadline, as most of you will be, you would be well advised to have a contingency plan in your bottom drawer which will enable you to meet the kinds of deadlines which inevitably confront you.
SECTION 5B: Roles in the learning materials development process

The development of learning materials involves a number of specialist roles. The importance of these roles will vary according to the kinds of materials you require and the standard to which you choose to produce them. You'll probably find that the most effective approach is to create a project team to ensure that the development process moves along efficiently and on schedule.

The following list of roles has been divided into core and desirable categories. In many cases one person can fill more than one role in the process—but not all of them! For example, the co-writer may also be the content checker or assist with instructional design, and the writer may also be the typist.

The important thing, of course, is that you clearly identify the roles which your project will require, and make sure that every role which you need is provided for.

You will also have to establish clear timelines for carrying out each stage of the process.

Core roles

- **Writer**: the person who assumes the responsibility for producing the final draft of the materials, whether a manuscript for print production or a script for video production

- **Content checker**: a person who is a specialist in the subject being developed, who can offer another perspective on the writing process and check its accuracy and relevance

- **Instructional designer**: someone to work with the writer to establish the educational structure and content of the materials

- **Typist**: someone to key-in the text material on an appropriate word processing package

- **Desktop publishing specialist**: someone who can typeset the text into a form ready for printing

- **Manager of the whole process**: a person who thoroughly understands the principles of competency-based training and is responsible for the smooth operation of the entire process, including the meeting of deadlines.
Desirable roles

- **Co-writer**: a support person for the main writer—perhaps sharing the writing duties

- **Art work specialist**: someone who can prepare photographs and other illustrative material for production

- **Manuscript checker**: someone who will be responsible for checking the manuscript at several stages of preparation, from the initial proofreading to the final typesetting stage—a big job

- **Production assistant**: someone to be responsible for the printing process and the preparation of the finished materials, ready for the learners.

**Audio/video production**

If the team is going to develop audio/visual materials, some other skills may be needed. The video production process may require only a videotape dubbing service. For more complex procedures, such as editing, you may require specialist assistance.

**Computer-based materials**

If your learning package includes locally produced computer-based courseware or assessment material, you may need access to specialist skills and equipment.

**The production process**

The print production process is easiest if carried out in-house using a desktop publishing facility. If you have a skilled person to use this facility, you can produce laser-printed master copies of your materials which can be photocopied to produce finished materials. This is a lot quicker and cheaper than using conventional printing processes, and has the added advantage of enabling the materials to be easily modified when they are revised or updated.
SECTION 5C: Planning your learning materials

The main considerations

The processes of designing and producing learning materials are very demanding of time, effort and enthusiasm. They can’t be carried out in a couple of weeks, by stringing together a collection of handouts which you and others may have used over a period of time in teaching your program.

To destroy another common misconception, learning materials are not to be seen as simply a list of things for learners to do. In spite of the fact that you are probably going to have to get used to being called a ‘facilitator of learning’, you will still be expected to know how to teach your learners. They won’t learn effectively by being handed a bundle of books to read and videos to watch, and an invitation to ask if they need help. You have to be able to communicate your own knowledge, skills and understanding to others in a way which helps them to learn as effectively as possible.

Think about the process like this. You are attempting to create an educational process which will, in part, supplant the conventional classroom mode of educational delivery. In other words, you won’t always be there to say and do all of the things which your learners have depended on in the past.

The things which you, as an experienced teacher, do to teach and support your learners will have to be re-thought and some will have to be translated into another context.

This means the teaching which you do, including explanations, examples, illustrations, and the extra component which any experienced teacher provides in the form of professional advice, comment and encouragement.

It means the work which your learners do, including their reading, their research, the discussions which they have together and all of the practical activities which the course requires.

It also means the assessment procedures which you use, all of which will need to be reviewed, and some of which may need to be changed to meet the needs of a CBT program.
You should begin by reviewing Section 4, in which you made decisions about the kinds of media options which will be appropriate for your program. The selection of media options and the selection of teaching/learning strategies should now come together at this stage of your planning.

The major part of the teaching component of your materials is the approach which you take in designing and writing them. It’s what will make your materials superior to a ‘teach yourself’ manual. You are expected to be able to provide specialised help based on your knowledge of:

- how learners learn
- the difficulties they are likely to experience
- how to overcome those difficulties
- when and how to provide support
- how to use activities to reinforce the learning process
- how to assess the progress made.

The basic process

In essence, the educational methodology involved in learning materials development can be summarised like this:

1. Define the topic: explanations/definitions
2. Identify the skills/tasks: demonstrations/examples
3. Practise the skills/tasks: activities with suggested answers
4. Create a feedback loop: strategies for identifying and overcoming problems
5. Summarise the key points: checklist for processes

The list is represented diagramatically on the page 44. Here is the process in more detail.

1. Define the topic
   The topic needs to be explained in clear, direct language. You should explain and define any specialised terms. If you are using resources for explanations, direct the learners to them and tell them what to look for.
2. **Identify the skills/tasks**

You now provide the learner with a demonstration of the skills or tasks which are involved in the topic. If you are using resources for this purpose, direct the learners to them and provide any qualification, addition, advice or guidance which may be necessary to make everything as clear as possible. You may also be able to direct your learners to an industry source for these demonstrations.

3. **Practise the skills/tasks**

The learner is now invited to carry out the process which has been illustrated. Usually it is the practice which is missing from information resources. You must supply opportunities for this in good measure. The effectiveness of the learning process depends heavily on the amount of practice which you can provide for the learner.

4. **Create a feedback loop**

What happens if learners don’t obtain satisfactory answers to their activity or self-testing exercises? What happens if they either need or want more practice on the skills which they are learning?

If learners haven’t handled the activity or self-testing exercise very well, then more help may be required in this area. They may be sitting there, looking at a set of suggested responses or answers which don’t compare very well with what they have produced. You need to direct them to re-work the earlier part of the material, or specify further reading on the issue, or suggest some other way in which they can obtain help. And don’t forget the value of reassurance—it’s very important in this mode of study.

5. **Summarise the key points**

Each section of work—and sometimes processes within a section—should be summarised using a checklist or something similar.

Checklists can be used for revision purposes, to provide a procedure for learners to follow, or as a check on the performance of a particular skill.
THE METHODOLOGICAL PROCESS. This diagram represents each stage in the process as ranging over the same ground as the one before, but always building towards the final objective of success at the assessment stage. The feedback loop serves a kind of 'snakes and ladders' purpose within the whole process.
6. **Provide assessment procedures**

In the absence of continuous learner/teacher interaction, you need to build into your materials the means by which your learners can evaluate their own understanding of what they are learning. You may also need to include a means of assessing their level of performance in relation to the learning outcomes.
SECTION 5D: The writing process

As you have worked through this module you will have become familiar with some of the characteristics of the learning guide. Here we will review the main aspects of the writing process under two headings—style and appearance.

Again, these processes need far more attention than we can provide here, and you should turn to a specialised training package for more detailed treatment.

Style

It is extremely important, when you are writing learning materials, to establish an easy and friendly relationship with the learner. After all, the written materials may provide much of the personal contact which the learner would normally expect to receive in the classroom.

For this reason you should use a conversational tone—try to write as if you were talking to the learners. By doing this, not only will you make them feel more welcome and at ease, but you will find that you are led naturally into explaining things in simpler terms—leaving out a lot of the jargon and making the materials much easier to understand.

The style should be direct, personal and friendly, using *I, we and you* rather than *the student or the learner*.

Short sentences are preferable to long ones. Research into readability shows that clear type and short lines of text make information both easier to read and easier to understand—it’s almost as if we can concentrate better on the information if we don’t have to work so hard to read it.

*(If you are interested in this aspect of designing learning materials you might like to read Colin Weildon’s book, *Communicating or just making pretty shapes*, published by the Newspaper Advertising Bureau of Australia, North Sydney, 1990.)*

Excessively long sentences should be broken down into several short sentences, or made into a list of points.

Above all, good learning materials should be interesting and satisfying to use.
Appearance

Good learning materials contain relatively large amounts of white space—the text is well spread out and there is room for learners to make notes, write in their own comments or add further information.

It should be easy to find particular information through the use of headings, contents lists, page and section numbers to identify each part of the text. Headings, boxes drawn round some parts of the text and indenting all help to break the text down into manageable chunks. Headings may be in bold type or a different style to make them more noticeable.

A new topic—or main section within a topic—usually begins on new page. This helps to signal to the reader that something different is coming and makes the learning task easier.

Good learning materials may use icons to highlight particular sections of the text or activities which the learner needs to complete.

Where there are a number of points to be made these are often displayed in a list, indented or placed in a box to make them stand out from the remainder of the text.

Illustrations, in the form of cartoons, sketches, diagrams, maps, tables, charts or graphs may be used wherever something can be made clearer by their use.

Learning materials often adopt a certain house style with particular icons, print styles, page layouts, headings or other features which give the materials a standard appearance. This helps learners develop a familiarity with the way in which different parts of the topic are presented and can therefore help them to learn more efficiently.
Code of practice

This material comes from Ensuring Quality in Open Learning—A Handbook for Action, published by the Manpower Services Commission.

The Code itself consists of a number of general principles—some aimed at producers, some at deliverers, some at both. The action guides are from Part 1 of the Code—for producers. They indicate the universality of interest in flexible learning methodology throughout the world, and the broad agreement which exists over approaches to the development of learning materials.

ACTION GUIDES FOR PRODUCERS

1. Make every effort to find out and pay constant regard to the learning needs of your intended learners and to the expectations of any sponsors.

2. Employ the most appropriate learning media (e.g., print, audio, video) in terms of what is cost effective for your learners and their sponsors, and most suited to the subject matter and learning objectives.

3. Bear in mind the range of learners who may wish to use your materials for different purposes, and build in features that will enable them to exercise maximum choice.

4. Make your open learning materials totally self-explanatory—so that, at any point within them, learners always understand what they are supposed to be doing, and how and why they should be doing it.

5. Design your materials so that learners must interact with them—actively using the ideas being presented rather than merely being told about them.

6. Build in frequent opportunities for learners to obtain feedback that will enable them to assess their progress.

7. Before releasing your materials for general use, pilot them—and improve them in the light of the resulting feedback.

8. In publishing your materials, provide full printed information stating exactly what they aim to achieve with what kinds of learners, and what demands are likely to be made both on the learners themselves and on the support services.
9. Provide training where appropriate, whether in recorded form or face-to-face, for deliverers and anyone else who may be involved in supporting your intended learners and operating the open learning program.