



CHAPTER 4

THE CURRICULUM

Keith Dunbar

INTRODUCTION

A journey to the centre of the process for developing curriculum should find the learner. This has not consistently been the case in academic programme areas, but it has always been common sense and practice in technical and vocational education and training (TVET). Being learner centred or student centred is a natural orientation in vocational programme development, and since vocational programming has always stressed the process of “doing,” expressing content in experiential learning terms is a predictable approach.

Institutions use a variety of methods to bring learners together in formal and non-formal settings. The traditional method of face-to-face instruction in a classroom and laboratory should allow a curriculum to imitate the workplace, although often this is not the case. The method of open and distance learning (ODL) should not follow or repeat this error. Instead the method of ODL should mirror the working world and not drastically alter the process of TVET curriculum development.

If we accept that the end product of TVET is employment for learners, and if we accept industry’s role in approving the skills that are needed, then we should use caution in changing the curriculum to meet any method of instruction. It should be clear that this applies to situations where learners are self-employed or where they work for someone else. Care must be taken to identify and sequence occupational competencies needed in the employment world, whether that world is a large company with many employees or a self-employed individual. When industry needs a tradesperson who is skilled in welding two plates of metal together, it should not matter if the training for that skill is conducted at a distance. For training at a distance, however, there are dramatic evolutions in the process of instructional design. Using modern technologies, the educator must carefully choose instructional techniques that will fulfil the curriculum and design an environment where learners can safely learn and practice.

Curriculum development can be described as the process of defining, organising, combining and co-ordinating content so that it leads learners to the acquisition of knowledge, skills and attitudes. For purposes of this discussion, curriculum development is “what” the student will learn, not “how” the learning will be accomplished. (The latter can be illuminated through discussion on instructional design and delivery processes.)

PHILOSOPHICAL APPROACHES

A personal set of values is a major prerequisite that faces each and every educator. From these values the educator must establish and use a personal, philosophical framework, such as behaviourism or humanism, that will guide the process of curriculum development. Selecting this framework is a critical step since it is a reflection of the educator's educational philosophy. In many cases, however, it may be the government or an institution that selects the framework, not the practising educator. Regardless, the framework is derived from learning theories which are linked closely to psychological philosophies. Learning theories are used as a means to explain how learning occurs.

It is very difficult for educators to completely agree on learning theories or to build an indestructible case for only choosing one. Educational learning theories in the 20th century evolved as new theorists adapted and renamed basic concepts. And how do educators "see" learning theory? For most practical issues, they can only see the results of an applied response to learning theory.

There appears to be at least two main schools of learning theories that are extensively used in TVET: constructivism and outcomes-based approach. The former is emerging while the latter predominates.

Constructivism

Since we live as individuals first before being connected to other individuals, it can be argued that individual learners must construct knowledge for themselves. Some would argue that there is no knowledge outside of that which we gain through our experiences. Constructivism holds that learning is the process of applying prior knowledge and experience to a new situation and integrating the new knowledge.

Many educators share the view that constructivism calls for the elimination of a standardised curriculum. Rather, it promotes customised curricula and hands-on problem solving. In developing nations, cultural influences and practices can be integrated easily through a constructivist approach. The challenge to curriculum developers becomes how to determine consistency and a common set of standards when each individual is responsible for his or her own knowledge construction. Also, with vocational and technical education, care must be taken to ensure learners are able to do what is desired by employers. Given this dilemma, some might argue that constructivism is better suited to instructional design, as it is more of a process to assist learners to get to the place of knowledge, skills and attitudes than one that defines what is needed. This is especially true when industry specifies what it needs as the end product of education or training.

Outcomes-based approach

The second group of learning theories and practices are those expressed in terms of outputs rather than inputs. Grouping them under a generic title, they can be considered outcomes-based. All outcomes-based approaches describe learner performance in observable and measurable terms. Included under an outcomes-based approach is the learning theory known as behaviourism. The outcomes-based approach guides

Participatory curriculum development for transferring knowledge technology to woman farmers

A Commonwealth of Learning (COL) initiated project was undertaken by the Bangladesh Open University in collaboration with the Department of Agricultural Extension (DAE) of the Bangladesh government and a local non-governmental organisation (NGO) to find an efficient and effective uptake method for transferring knowledge technologies to woman farmers in Bangladesh. The project conducted a needs assessment and feasibility study to design an action-learning environment for the woman farmers who are mainly involved in the production of rice. The target learners for the non-formal educational programme were identified as young woman farmers, with some primary educational background, from resource-poor households. The needs assessment and feasibility study found that there was a significant need for intervention for extending knowledge technologies to the identified group, especially in areas like land and seed, rice production

and management and post harvest.

Curriculum was designed to implement an experiential learning model for a group of up to 20 farmers in community and field settings being supervised by a DAE or NGO extension worker over a crop season. To design and help learning to take place, a trainer handbook, self-instructional modules, illustrations, posters, flip charts, handouts and an instructional video programme were also planned.

The participatory curriculum development was particularly useful in identifying practical needs and designing training method, duration, period and support structure. Some of the components, such as emergency preparedness, production planning, costing and management, diversifying and marketing rice products were included for the first time in such curriculum, which could easily be overlooked if the curriculum were developed otherwise.

curriculum by setting goals for learners to accomplish. Descriptions of knowledge, skills and attitudes are expressed in terms of what the learner will be able to do. Objectives, such as instructional, behavioural, terminal and performance objectives, are assumed under this approach. Since competence is a critical component of work in business and industry, expressing performance through competencies has emerged to replace objectives. With its practice firmly set in worker performance, TVET programme development is a natural fit for an outcomes-based approach to curriculum development.

Competency-based vocational education (CBVE)

A specific example of an outcomes-based approach to curriculum development, CBVE focuses on the occupational competencies (skills) learners are expected to achieve, and the performance of those competencies. The following components are usually essential in classifying CBVE:

- The occupational competencies to be achieved by the learner are determined through an analysis of the occupation.
- Learners are aware of the learning outcomes and the methods of assessment.
- Learners are assessed on the competencies by observing

their performance in conditions similar to that of the occupations.

There is less agreement on other elements to include in CBVE, such as self-pacing, use of prescribed modules or learning guides, performance checklists and the absolute criteria of mastery. Related knowledge and attitudes should not be separated from the learning of the occupational competencies. In many cases, CBVE is less concerned with how the competencies are to be learned, and it is possible to use many methods of teaching such as traditional classroom-based, self-paced and distance education.

HOW DOES CURRICULUM DEVELOP?

The processes of developing TVET curriculum has not radically changed, even with technological advances. Individual or group processes are two ways of looking at developing curriculum. A single subject matter expert (SME) can take his or her experiences and put them on paper in an organised display of content. The SME will rely on past experience and knowledge to achieve this result. A small group of subject matter experts could also perform the same task. Working together they may be able to identify areas that might be missed by an expert working alone. An individual or a small group of individuals could also use an interview process to identify the knowledge, skills and attitudes required of the subject matter. Working with subject experts and using a prescribed process of interrogation, a final result can be achieved. Finally, a larger group process, led by a facilitator, can chart the knowledge, skills and attitudes needed to fully describe a curriculum. The results from any or all these processes could be validated by using other experts in the field to substantiate the data.

Need for skilled training in the leather industry of India

The Government of India identified the need to upgrade skills in tannery workers to propel the Indian leather industry into the 21st century. The formal education system was unable to meet this need for many reasons: the target group was in the workforce, the numbers to be trained were very large (1.4 million), the areas to be trained were not covered by formal systems, learners were distributed geographically through various tanneries, each tannery had needs specific to local requirements, the educational background of learners varied drastically from graduate to illiterate and tanneries found it difficult to spare workers for training.

The Indira Gandhi National Open University (IGNOU) developed a course which was competency- and workplace-based and which used ODL methodologies. Strong partnerships were established between experts both in ODL and in the leather industry to develop and implement the programme. To cater for the range of varied educational backgrounds and languages, the entire course was produced in both print and on audiotape.

The delivery system provided support through work demonstration-based training at the worker's tannery, supplementary support through study centres and assistance through partnering institutes located in the community.

STANDARDS

A natural product of a well-developed curriculum is a set of standards set by a government or government-appointed regulatory body. Although representatives from industry and education can participate in the standards-setting process, it is important to ensure that they do not exercise a completely self-serving position.

Occupational standards describe the knowledge, skills and attitudes needed to perform competently in the workplace. They help business, industry, educators and learners identify the skills needed to succeed. Properly developed, stated and implemented, they will enhance the TVET environment with the following benefits:

- Developing and maintaining a skilled workforce
- Providing an equitable set of benchmarks for accreditation and certification
- Facilitating employee mobility
- Providing assessment and evaluation guidelines
- Providing a means for human resource planning and performance assessment

DACUM: A Canadian example

To meet change and expansion of the employment and vocational training environments in the early 1960s, Canada looked to a systematic process to analyse trades and jobs.

DACUM, short for "developing a curriculum," was a Canadian modification of a single-page visual presentation of a curriculum being used by the military in the United States.

Experienced workers, led by a skilled facilitator, analyse their occupation by identifying general and specific skills needed to successfully perform their job.

Taken from active work sites to form a panel, these expert workers are the best people to describe their occupation.

Although a supervisor may also be on the panel, teachers, trainers or other educators are usually accepted only as observers. Using brainstorming techniques, the occupation is initially analysed into two levels and the results are posted on cards on a wall. The first level of analysis is identifying the general areas of competence (GACs), which describe major responsibilities or functions of the occupation. The second level

is identifying the skills that make up the GACs. All the cards become a graphic chart of the duties and tasks performed by successful workers in the occupation. The chart can be used for curriculum development, instructional design, test development, job descriptions, performance evaluation, organisational development and other purposes such as a blueprint for the development of instructional resources.

Although not always practised, sending the chart to a wider audience of workers can validate the results of a DACUM session. Guidelines for changing or adding to the analysis are distributed and the original panel may be consulted or reconvened to integrate the changes into the final version of the chart.

DACUM has been used around the world as a dependable tool in curriculum development and TVET. As a group process using systematic analysis, other programme areas have also used the technique to assist in defining their curriculum and sequencing their instruction.

ESSENTIAL SKILLS

Regardless of the philosophical approach used to develop curriculum, employers have increasingly stressed the need for essential skills, also known as employability skills, in the TVET curriculum. These skills must be woven into the curriculum in an integrated fashion. They are important elements in helping people adapt to workplace changes and provide them with a foundation to learn other skills. They are not technical skills, but rather the skills people use to carry out a wide variety of everyday life and occupational tasks. For example, workers in many occupations are required to use writing skills.

National standards in three countries

In Canada, *occupational standards* are developed by employers and employees working together through a standards development committee supported by Human Resources Development Canada (HRDC). This committee selects small groups of practitioners to develop draft occupational analyses. Before acceptance, each draft is validated nationally. It is important to note that the analysis becomes an occupational standard when it is endorsed by industry.

In the United Kingdom, *national occupational standards* are statements of performance standards which describe what competent people in a particular occupation are expected to be able to do. They cover all the main aspects of an occupation, including current best practice, the ability to adapt to future requirements and the knowledge and understanding which underpins competent

performance. They are developed by standards-setting bodies, mainly employer-led national training organisations (NOS).

In Australia, a *training package* is a consistent and reliable set of nationally endorsed standards and qualifications for recognising and assessing peoples' skills. A training package describes what skills and knowledge a person needs to perform effectively in the workplace without prescribing *how* that person should be trained. Training packages are developed by industry through national industry training advisory bodies (ITABs), recognised bodies or by enterprises to meet the identified training needs of specific industries or industry sectors. To gain national endorsement, developers must provide evidence of extensive consultation and support within the industry area or enterprise.

However, depending on the occupation, the skills will range from filling out simple forms to preparing complex reports. Some workers fill out simple forms every day, while others write daily or monthly reports. Improving essential skills enhances a worker's employability. Many different groupings have been designed by various government and industry bodies, but the main ones can be generalised to include the following:

- Computer (information technology)
- Critical thinking
- Lifelong learning (including learning how to learn)
- Numerical (math)
- Planning
- Reading and writing
- Speaking (oral) and listening
- Teamwork

LEARNING RESOURCES

A well-designed curriculum will lead naturally to the acquisition or development of appropriate learning resources. These may be textbooks that closely match the skills identified. If existing texts do not meet the stated curriculum, specific learning guides or handouts can be prepared. If DACUM or another outcomes-based approach has been used in developing the curriculum, these learning guides, also referred to as modules or learning packages, can be linked specifically to the stated outcomes. With new publishing technologies, modules developed in this form can be mixed, matched and combined to produce a resource that meets specific design requirements of the curriculum. Computers and new technologies are presenting opportunities to modify the traditional print-based objects into digital components. These components, such as digital audio and video clips, provide alternative strategies for teaching skills at a distance.

Learning objects

Technology has introduced a concept of modules or learning packages called learning objects. The IEEE (Institute of Electrical and Electronics Engineers), a non-profit, technical professional association of more than 350,000 individual members in 150 countries, has a Learning Technology Standards Committee which has defined learning objects as "any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning." These learning objects may be self-contained items or may be combined or sequenced to form longer educational interactions. In order to use

learning objects, they must be tagged or labelled so that the contents are properly known to all the potential users. Learning objects are reusable. For example, a learning object that defines the basic principles of hydraulics could be used by courses for auto mechanics, construction workers and millwrights. Many countries are researching the use of learning objects, especially in the preparation of materials used in distance education. It is clear to see how curriculum designed through an outcomes-based process will be able to make use of learning objects.

PROFESSIONAL CONTINUING EDUCATION

Professional development is the ongoing process of increasing an individual's competence. For faculty this includes technical expertise in their field as well as the knowledge and skills to support student learning. Technological changes in the way work is done means that similar changes will be needed in learning how to do the work. Although approaches to curriculum development have not been greatly altered by technology, the skills of teaching have been significantly impacted by it. The need for

in-service training has never been greater. Although the learning environment may no longer be a teacher-centred process, teaching skills need to be addressed. Facilitation skills need to be added to the portfolio of techniques. Switching from a face-to-face synchronous environment to a remote asynchronous environment carries a major shift in the approaches needed by faculty. In the end, the need for professional continuing education increases proportionally with the changes in technology that support education.

CONCLUSION

Access has become one of the most important variables for learners who wish to participate in educational activities. The need for just-in-time training opportunities has propelled ODL as a major tool in providing access to learners in TVET who might otherwise be unable to participate. In many cases, changes to ODL have been responsible for an increase in the demand for education and training opportunities. Although many developing nations lack a sophisticated infrastructure, the pace of technological change in delivering education at a distance is having a positive impact. The technological tools, however, cannot replace sound principles of educational planning and design. This has even greater significance in TVET where safety and demonstrated learning are benchmarks of success. The challenge of replicating the workplace in distance education is less daunting when sound principles of curriculum development are used to analyse the requirements. These principles are aided by a close working partnership of learners, educators, government and employers who support each other to meet all the learning needs. After all, this collaboration merely reflects one of the essential skills required of learners in TVET — teamwork.

