MAKING SENSE OF IT ALL

Can National Curriculum by anything more than a model?

A Case Study

ACTRAC National Laboratory Science Technician Curriculum Project (SCITECH)

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Background

There are many examples of national competency based curricula which are prescriptive. They are based on an external vision, imposed or delivered by "experts", and guarantee consistency through inflexibility. Naturally, their implementation has met resistance from teachers and trainers since they represent more work and interfere with existing programs. Where the perceived benefit is not clear, the status quo seems more attractive.

In contrast, descriptive curricula are developed through wide consultation, where participants add value to the vision or model through their contributions. It is this "value adding" that leads to ownership.

Descriptive curricula which provide models of good practice should:

• have outcomes which relate to what people are actually doing in the workplace, or need to be able to do in order to enter it
• suggest examples of successful on and off the job teaching strategies which will enable translation of CBT rhetoric into the classroom. That is, there is sufficient documentation for the curriculum to be delivered, rather than just accredited
• allow teachers and trainers to retain and maintain their personal informed professional judgment. That is, they still have the freedom and capacity to address the real needs that confront them in their own settings.

The SCITECH Project represents a case study of descriptive curricula and our experience may be useful to others.
There have been many difficulties. For example, in the beginning we were confronted with the problem that there is no single science “industry” in the NTB sense. Consequently, there is no single ITAB and there are no standards. The goal was a national Curriculum for all major types of science technician in the band ASF3-5. The project is now in its 3rd year, on time and under budget and nearing the end of the production phase and soon to move into nationwide implementation.

A number of models have emerged:

- a model of competence for science technicians
- a curriculum model, or framework
- a model, or template, for module descriptors and assessment packages and a quality assurance system
- a model for implementation involving action learning.

The appendices contain several papers which will provide some background details of these, together with a number of module descriptors and assessment packages.

In the remaining time I will endeavour to discuss how these models may apply to curriculum development in general and raise some issues for discussion.

**A model of competence for science technicians**

It is essential for all curriculum to be based on quality research of the industry or client group it is aimed at. To avoid the “expert” tag there needs to be an extensive skills analysis undertaken which involves the relevant workers rather than their representatives.

We have developed a wide ranging research base involving 400 participants from 120 organisations in all states and territories at manager, supervisor and technical level. A 256 item task inventory emerged which was a computing nightmare! To avoid the reductionist trap this was augmented by an analysis of successful technicians using critical incident techniques.

The model which emerged is similar to that developed for the professions by Gonczi et al. In addition to technical and task and contingency management skills, the competency statements incorporate knowledge, functional values and attitudes. Furthermore, the acquisition and maintenance of contemporary knowledge and skills through continuous learning is seen as an integral factor in sustained competence and is therefore represented by a unit of competence in its own right. One important feature of this model is that it focuses on the occupational group as a whole. Consequently, we have been able to identify a subset of generic competencies rather than being restricted to a narrow course, or professional association, driven view of the occupation.
**A curriculum model, or framework**

The identification of generic and specialist technical competencies leads naturally to the concept of a set of core modules with an optional core for each specialist stream and further elective modules to allow for individual, or enterprise based, customisation. There is no rigid course structure. Instead, the framework allows individual states, territories and institutions to design their own courses by building specialist modules onto the generic core to meet local needs. Furthermore, when a future training need in the service technical field emerges and the relevant technical competencies have been identified, a new stream can be easily accommodated. (eg; biotechnology was not identified as a major stream initially, but a package for this stream has now been constructed).

A major feature of the suggested core of any program is the sequence of modules involving work culture: *Science Industry Orientation (AAA600), Work Placement (AAA601), Laboratory Operations (AAA602), Occupational Health & Safety (AAA603), and the Practical Project (AAA604).* All these modules seek to integrate the learning of the rest of the program and relate this to real, or simulated work situations. For example, the latter module requires the learner to apply their knowledge and skills in an unfamiliar situation through the design, execution and documentation of a measurement based project.

**A model, or template, for module descriptors and assessment packages and a quality assurance system**

The major problem here was how to ensure that the 150 module descriptor and assessment packages covering six discipline areas would be of acceptable quality. Our approach is to have a team leader for each specialisation who provides first line editorial advice to the writer and two editors of each module under their control. The writer and editors may be from industry or TAFE and work together to produce the package. That is, the role of editors is to ensure relevance and quality and not merely check for typographical errors. Modules which are relevant to a number of streams are circulated to the relevant team leaders. Overall consistency and editorial control is provided by the project manager (at one module package per day this represents 150 days work!!)

Three prototype module descriptor and assessment packages were widely distributed, discussed, and amended. These, together with the papers contained in the Appendices, were provided to the 100 or so personnel involved in writing workshops were held in all states and territories to discuss the project. This process of “value adding” through the contributions of participants has been successful in that there is widespread support for the SCITECH curriculum throughout Australia.

All documentation is deliberately aimed at teachers and trainers, rather than accreditation agencies alone. For each module the delivery statement goes beyond the typical statement “on or off-the job” to a discussion of possible constraints on optimal
delivery. The assessment package expands the few sentences in the module descriptor concerning assessment to something that is immediately useful. The suggested assessment strategy is designed to validly collect sufficient evidence of the achievement of learning outcomes to determine a module result. A balance of formative and summative assessment is advocated. Mechanisms for self assessment are provided in order to encourage learners to take reasonable responsibility for their own learning and because it is such an important meta-competency for science technicians (as it underpins all quality assurance). No complete tests are given as this could be interpreted as prescriptive. Instead, examples of assessment items are given to assist the teacher/trainer to design their own assessment events. Finally, report forms which relate module outcomes to the competency statements, information sheets for learners, and a fax sheet for evaluation purposes are also included.

By setting out the assessment package in such detail, it is hoped that teachers/trainers will have a credible and defensible basis for their professional judgment as a replacement for the use of norm referenced marks when determining a module result. For selected modules, criteria for the award of merit are also included as a guide for those institutions or providers who wish to adopt graded competency-based assessment.

**A model for implementation**

The major problem here is how to introduce a new curriculum to teachers and trainers who have not been directly involved in its development. It is important that this group is not alienated by a consultative process which attempts to sell the new program. If the first consultative step is sharply critical of existing programs, teachers in particular will react by defending their current curricula and practices. What is required is a reflective step. They need to consider what has succeeded in the past from their point of view, and that of their learners, past graduates and industry advisers. Changes as a result of policy, changes in the workforce, and new learner and employer expectations will need to be explained. In other words before any reform there needs to be a “personal adjustment and acceptance” stage.

Action learning provides an effective model by which this reflective teaching can occur. Consequently, the prescriptive model of a staff development workshop, delivered by “experts”, has been avoided. Instead, we propose to run 10 action learning groups involving approximately 100 people throughout Australia during the first half of 1995. Group leaders will be trained in action learning principles and facilitating skills, and be required clarify their own vision of the new national curriculum. Initially, participants will focus on the adjustment and acceptance stage described above. Groups will then discuss and document their experiences of implementing the new curriculum for the length of the program. In addition, each group will be asked to focus on a single, key issue so that all major implementation issues can be canvassed in detail. The project manager will then combine all responses into a manual which sets out the key issues and how they were addressed. Following distribution later in the year, we anticipate that the manual could be used for teachers and trainers to design their own implementation strategies. Furthermore, the 100 people involved will represent an effective resource and network to enhance implementation of the new curriculum.
APPENDICES

Papers:


Examples of Module Descriptors and Assessment Packages:

(AAA604) Practical Project
(AAA603) Laboratory Operations