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An episode in technology curriculum refinement: it's only another design brief ...

Steve Keirl
University of South Australia

Abstract

This paper describes aspects of the revision and refinement of Technology curriculum provision in one Australian state. Within the redesign of the whole Birth-Year 12 curriculum there were particular issues and challenges facing those responsible for the Technology Learning Area. The paper reports on differences between the existing and the proposed frameworks; competing educational interests in the field; process-content issues including the proposal for a new strand of 'critiquing'; an attempt to move away from a singular construct of design 'process' as a core methodology; the outline of technological literacy as a basis for Technology curriculum design; issues of cross-curricular relationships with other Learning Areas, and debates and proposals for a name change for the field. While the proposals are currently in the final stage of refinement and are not conclusive, the theoretical curriculum issues addressed in the paper will be applicable to many Technology Education revision processes.

Keywords: technology curriculum design, technological literacy, process-content issues, stakeholder interests

Introduction

This paper draws on 'work in progress' that began in 1999 concerning the design of a new curriculum (SACSA, 2000). The trialling (in schools) period was completed by June 2000 and the writing of the final draft began a month later. The fact that what is reported is work in progress, or is from one particular curriculum location, does not mean that the curriculum issues raised are not likely to be replicated or significant elsewhere. Indeed, some of the issues, while new to this curriculum, have been faced in other states and countries already. Conversely there are, it is believed, proposed solutions here that may well be construed as innovative. What matters is that the theoretical curriculum issues are common to all who engage in the design and redesign of Technology Education.

The paper begins with a brief contextual outline of the overall curriculum reform. It does not present the detail of the processes, debates or decisions that were made at the macro level. While these influenced the shaping of the Technology proposals and they offer fascinating study in themselves, space does not permit their inclusion here. Current

provision is outlined and then the issues, challenges and proposals are discussed.

The curriculum context

The project

The partners in the curriculum project are the State Department of Education, Training and Employment (DETE) and Catholic Education SA (CESA). The key development is the South Australian Curriculum Standards and Accountability (SACSA) Framework. The concept entails 'one coherent birth-to-year-12 document' articulating a framework for local curriculum decision making by schools and communities.

The new curriculum is organised into four bands: the early years (birth-year 2 (approx. age 7)); the primary years (years 3-5); the middle years (years 6-9); and, the senior years (years 10-12). These bands are matched with six 'levels' geared towards the ends of years 2,4,6,8,10 and 12 respectively. In accordance with nationally agreed goals (MCEETYA, 1999) there continue to be eight 'Learning Areas' (these are not subjects) one of which is Technology. A part of the SACSA design is the interweaving of five Essential Learnings:

Identity; Thinking; Interdependence; Futures; and, Communication. There are also cross-curricular perspectives such as multiculturalism, Aboriginal culture, vocational education, and education of students with disabilities.

The framework is a revision and refinement of current curriculum frameworks, Foundation Areas of Learning (birth to age 5) (DECS, 1995) and, in the case of Technology Education, the Statement and Profile (AEC, 1994a&b respectively).

As a part of the process a range of reference groups and expert working groups was established. One of these was the Technology Experts Working Group (TEWG) which comprised representatives of DETE, CESA, independent schools, professional associations (Agriculture, Business, Computing, Design, Home Economics, Media, Technology), university, and all levels of schooling.

Current provision

Technology Education is currently given specific representation in both the Foundation Areas of Learning (DECS, 1995) and in the Statement and Profile (AEC, 1994a&b). However, reference must be made to the organisation of the Statement and Profile as it is the adaptation of these which has formed the basis for the Technology curriculum innovation described below.

The twelve years of schooling are divided into eight 'levels'. Technology Education is organised round four 'strands' which run throughout these levels. In common with all other Learning Areas, these strands were described as 'process and/or conceptual understanding strands' or 'content strands'. Technology Education has a process strand of 'Designing, Making and Appraising' (DMA) and three content strands of 'Information', 'Materials' and 'Systems'. The strands are described as being interdependent. However:

All learning in technology involves the Designing, Making and Appraising strand. The relative emphasis on the Information, Materials and Systems strands varies according to the needs of the students and

the nature of the programs and activities. (AEC, 1994b:5)

Within the four strands are a total of ten 'strand organisers' (sometimes described as substrands) – four for DMA and two each for the others. Each strand organiser had a stated outcome for each of eight levels of schooling. Thus there are, potentially, 80 outcomes in the current provision that describe the learning a student might cover from age five to 18.

Some of the key considerations

It is not the purpose of this paper to describe the detail of the issues facing the TEWG, the writers who tendered to draft the framework or those who responded during the consultation and trialling stages. The following key considerations are relevant to Technology Education curriculum interests:

- The process was essentially one of revision and refinement. Revision was taken literally as looking again at progress and problems encountered during five to six years with the Statement and Profile. Refinement was twofold – in a qualitative sense to reduce complexity and build on established good practice, and quantitatively to reduce the numbers of strands and outcomes.
- The process was about developing a framework which allowed for local curriculum interpretation and construction, which embodied the Essential Learnings and the cross-curricular perspectives, and which demonstrated progression across the years and bands.
- 'Design and Technology' in Early Childhood and 'Technology' in Primary Schools had been broadly accepted with curriculum documentation for these areas seen as user-friendly. There is mixed acceptance in the secondary sector where subject-based teachers have taken to DMA anything from wholeheartedly to not at all.
- In the secondary sector, the wide range of subjects within the Learning Area seem, to some, to be incompatible whether for the subjects' differing content, for reasons of infrastructure requirements or for historical reasons – traditional subjects alongside 'new' ones such as computing and media.
- Change should not be so radical as to burden and stress the profession.

Issues, challenges and proposals

Competing interests...

The journey of any curriculum reform that gives practitioners the chance of involvement and engagement is necessarily a rich one. This particular process brought together, for many days, a full spectrum of technology educators within one State. However, this is not to say that there was agreement on all matters. There was full and lengthy debate on many issues but concerns continue in the secondary sector where representation of 'subjects' is seen as important. How was refinement to occur if agriculture, viticulture, electronics, hospitality, technology studies, engineering, home economics, graphics, computing (to name a few from the Learning Area) were all to have their place in the new curriculum? The issue, of course, centred on two assumptions - first, that such 'subjectification' was premised on *content* difference and therefore incompatibility was a reality and, second, that subjects must have their (named) place in the framework.

The recognition (at a most simplistic level) that this is essentially a *doing* field provided the vehicle for a number of key developments not least that these varied subjects could affirm their home in Technology Education under common *process* while still maintaining their content integrity. Whether or not matters will remain this way or whether this indicates potential for further generalisation of the secondary curriculum remains to be seen.

Technological literacy

It was felt that the goal of technological literacy for all students was highly desirable but this begged the important question of what might constitute technological literacy. Knowing that many understandings exist, and that these include the vague as well as the instrumental or technician, an explanation of the term as it is used to frame the curriculum design is embodied in the proposed document:

Technological literacy can be viewed as having three dimensions, all of which are equally valid and important. All students benefit from all dimensions of technological literacy and must not be constrained in their learning to one aspect

alone. The three dimensions are:

- the operational, through which students develop skills and competencies at a technical level to use materials and equipment in order to make products and systems (they learn to use and do);
- the cultural, through which students contextualise their learning in the world of designed and made products, processes and systems. They recognise the interdependence of technologies with people...and they apply their technical learning in practical ways to realise designs and solve practical problems (they learn through technology); and,
- the critical, through which students are empowered to take a full and critical role as autonomous citizens in technological societies. They are able to make refined judgements about the worth of the intentions and consequences of technological products, processes and systems on themselves and others...(they learn about, and to be with, technology).

(SACSA, 1999)

Reducing the number of strands

Debates over how strand reduction would occur concerned matters of identity within the total curriculum, for example, that the field is concerned with far more than just Information Technology, that it is not applied science nor is it exclusive of design (there is an established 'art and design' culture in the State's curriculum). There are also (internal and external) perceptions that the field has a particular role in vocational education and training (VET).

Since there was a clear call to reduce the strands from four to three, one pathway was to 'blend' DMA with each of Information, Materials and Systems – a model adopted elsewhere. This option might have favoured some secondary sector subjects or Information Technology across the sectors. For a field constantly in danger of narrow instrumental definition, for example, as one concerned with *products*, to suppress process is problematic.

Another possibility was to dispose of the 'content' strands and establish Designing and Making and Appraising as three separate strands. This moves towards the valorisation of *process* but is in turn problematic for those who seek to establish the field in terms of propositional knowledge – the stuff of which we should *know* before we can *do*.

Refinement of the strands

Those involved with this curriculum process valued highly any technology curriculum refinement that embraced ethical and futures perspectives. Design, particularly in its senses as 'choice' and as 'intention', was confirmed as a powerful vehicle for this. Design is seen as central to technological activity. Further, 'making', although somewhat stereotyped towards certain types of manufacturing activity, is a valued fundamental of the field.

The argument was also considered that the juxtaposition and order of the words 'design, make and appraise' and of the DMA strand organisers ('investigate, devise, produce, evaluate') had become yet another lockstep sequence to be followed as a (singular) design process – and to the exclusion of other design activity. Having served a valid purpose in supporting teachers in getting under way with design activity they were now perhaps detrimentally embedded in one linear approach. It might be advantageous to break this sequencing.

It was also recognised that there was much valuable design and technology activity and learning to be gained from the deconstruction, physical and metaphorical, of designed and made products processes and systems. Students have much to gain from finding new ways to question, and make new meanings about, the built world around them. These considerations, along with those concerning technological literacy, brought about the formulation of a new strand entitled 'critiquing'.

The proposed arrangement of the three process strands is 'Critiquing, Designing, and Making' (CDM), that is, as three verbs and better avoiding an implied, sequenced design process. There is no perfect solution to the

positioning of these names. First impressions can suggest that critiquing is merely a substitute for appraising. However, the term is believed to go further than appraising in its embodiment of criticism and critical judgement of the design and technological activity of both self and others.

Refinement of the outcomes

The three new strands were proposed with a particular distribution of outcomes across them. While concepts such as strand organisers or substrands are not used, there are some key ideas that emerged. Critiquing stands alone as a key idea without further breakdown. Designing is articulated both as design technique, with emphasis on students learning multiple thinking and design strategies, and as design communication. Making is developed in three ways as technique, resources and responsible management. It is important to understand not only the strands, but also the key ideas, as being interdependent. They are developed separately as the basis of their very function, to present a curriculum *framework*, but it is their inter-relationship that symbolises the important and necessary holism of quality Technology Education. So there are fewer outcomes, with only six for each of six levels, giving 36 compared with 80 in the current Technology Profile.

The naming of the learning area

Discussions were also broad ranging over the naming of the Learning Area. The question is contentious and the debates addressed matters of currency, definition, semantics, politics of meaning, public perception and image. Emotion and research-based argument had their place and citation of what was happening elsewhere was rarely helpful. There were three main contenders.

The first was to maintain the status quo. The Learning Area has held the name Technology for six years but it is, nevertheless, often thought of as concerning Information Technology alone. 'Technology' appeals to some who do not want to see Design valorised as descriptive of the field.

The arguments for the inclusion of Design in the name included:

- it strengthens the field by reflecting its breadth
- it establishes the centrality of design methodology to technological activity
- it helps distinguish the field from ICT
- it helps weaken the stereotype of technology as 'things' or products
- conversely, it legitimises some of the values aspects of the field
- it has been used successfully by Early Years colleagues for some years
- it helps avoid the continued use of 'Tech Studies' to imply, not Technology Studies, but Technical Studies.

The other name contenders were 'Design Technology' or 'Design and Technology'. As the first of these implies a particular *type* of technology (e.g. Information Technology, Gene Technology) it may be misunderstood not as a Learning Area but perhaps a subject. Thus, 'Design and Technology' is the proposed name for the Learning Area.

Technology curriculum development with the essential learnings

The requirement to incorporate the Essential Learnings of Identity; Thinking; Interdependence; Futures; and, Communication was welcomed by the TEWG and the writers. There is strong correlation between these and best Design and Technology practice and there is ready compatibility.

Three aspects of Communication are Literacy, Numeracy and Information and Communications Technology (ICT) Literacy and these have been respectively placed in the English, Mathematics and Design and Technology Learning Areas with, in the case of the last, a fourth strand having been created. This proposed strand is included as a reference point for the teaching and assessment of ICT literacy for teachers of all Learning Areas. It is currently presented using the CDM strand organisation.

Conclusion

There are many complex issues facing Technology Education today (Keirl, 1999). The possible proposals outlined here are neither conclusive nor any guarantee of success.

However, key issues have been addressed: competing (secondary sector) interests; the challenge of appropriate naming for the field; the grounding of Technology curriculum in a rich understanding of technological literacy; the challenging of singular design methodologies; the articulation of the Learning Area through three verbs; the recognition of design as the 'intention' aspect of the field; and, the development of critiquing as a legitimate strand to articulate deconstruction and critical judgement.

Whenever we revise and refine the Design and Technology curriculum we have the perfect opportunity to practise what we preach. The competing issues and variables are numerous and complex but their resolution does only amount to being just another design brief.

References

- Australian Education Council (1994a), *A statement on technology for Australian schools*, Curriculum Corporation, Carlton.
- Australian Education Council (1994b), *Technology - a curriculum profile for Australian schools*, Curriculum Corporation, Carlton.
- Department for Education and Children's Services (1995), *Foundation areas of learning - a curriculum framework for early childhood settings*, DECS, Adelaide.
- Department of Education Training and Employment (DETE) (1999), *Curriculum SA Bulletin*, Issue 1, June 1999.
- Keirl, S. (1999) 'Determining technology education: knowing the orthodox, the interests, and the potential'. In Johnson, B. and Reid, A.(eds) *Contesting the curriculum*, Social Science Press, Sydney.
- Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (1999), *National goals for schooling in the twenty-first century*, <http://www.curriculum.edu.au/mceetya>
- South Australian Curriculum Standards and Accountability Framework (SACSA) (2000), <http://www.sacsa.nexus.edu.au>