TECHNOLOGY EDUCATION IN AUSTRALIA: TWENTY YEARS IN RETROSPECT

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Introduction

The last 20 years of developments in Technology Education in Australia have arguably been the most significant period in its history. Prior to these 20 years, the genesis of technology education can be found in the institutions established in the early colonial centres to combat child delinquency, petty crime and to provide a trained workforce in the trades and in housekeeping. This early focus on skill development still remains in many schools. The transition from vocational to general education occurred partly after World War II through major curriculum revisions. Developmental focus on the technical curriculum seemed to correspond with periods of economic downturn, when the expectation became obvious that the technical curriculum was part of the solution to poor economic performance (A.Williams, 1993). These periods occurred in the 1890's, the 1950's and the 1980's. This latter period represents the beginning of this 20 year retrospect.

The year 1987 was key in the development of Technology Education in Australia. It was in this year that the Australian Education Council (AEC) began a series of initiatives that led to the publication in 1994 of nationally agreed curriculum statements and profiles related to eight compulsory learning areas, one of which was technology. In 1990 the *K-12 Technology Curriculum Map* (Australian Education Council) revealed a shift in emphasis in many schools toward broader conceptions of technology, gender equality, flexible outcomes and a variety of teaching and assessment strategies. The 1994 documents extended this trend.

The Australian states and territories are educationally and politically independent, so this period of cooperation to produce nationally agreed curriculum documents was remarkable, and the political climate has not been conducive to enable it to be repeated since. In fact soon after the publication of the curriculum statement in 1994, the political climate changed to the extent that the material that was developed was not adopted in all states.

The declaration of technology as a core learning area had profound implications. Firstly, up until this time, all subject areas in secondary schooling from which technology education developed were located within the elective areas of the curriculum. The implication had been that these subjects provided learning experiences relevant only for specific groups of students with particular interests or career destinations in mind. Indeed, some of these subjects were regarded by students and the community as relevant only to a particular gender. Secondly, in the case of primary education, technology had not generally been part of school programs, and primary teachers had little experience to draw on to develop programs. The challenge for technology education was to determine the learning experiences that are essential for all students, and are unique to technology education or best undertaken within the learning area.

The most significant rationales for the development of technology as a discrete learning area were related to the technological nature of society and equity of opportunity for students. Australian culture was rapidly becoming highly technological, and all students needed to have the opportunities to develop, experience and critique a range of technologies as part of their core education. This rationale aligned with concerns for gender equity in technology education, with more flexible, open ended and collaborative approaches to delivery, and with a range of key competencies for all students.

A Statement on Technology for Australian Schools (Australian Education Council, 1994) set out what was regarded as the technology learning area. This included the place of technology in society, the need for all students to experience technology education and the form in which it should appear in the school curriculum. It outlined four strands for learning in technology education. These comprised Designing, Making and Appraising; Information; Materials; and Systems. These were regarded as interdependent and were intended to be developed sequentially through stages or levels in the compulsory years of schooling. This organization and its detail were significantly influenced by curriculum developments in the UK (Williams, 1994).

Prior to the 1990's, school curricula addressed technology in a very limited way. In the main, technology was referred to in elective or optional syllabuses. Most often students' perceptions of technology were developed from a very restricted range of learning experiences, for example, students might learn about the tools and machines used to work with timber. Invariably learning focused on an established body of technical 'know-how'. In some courses students learnt about designs that characterised past eras.

The current technology classroom activities have developed out of these traditions. At the primary school level technology education practices tend to have developed out of art and craft and science. Technology and Science still tend to be bracketed together for primary education as illustrated by government reports (ASTEC, 1997) and some learning area documentation.

At the secondary school level, technology education has tended to develop out of vocational studies such as Home Economics, Industrial Arts, Agriculture, and Business Education as well as other technical studies such as Computing, Information Technology, Media and Control Technology.

However, through the past decade curriculum have been introduced that address 'technology' in a more systematic or comprehensive way, and are grounded in a more general than vocational philosophy of education. These curriculum integrate the use of technology processes and encourage students to make value judgements and to be creative and innovative, thought few describe an accompanying body of knowledge . From entry to year 12, students are required to develop projects, practice management skills and engage in independent and group learning. These studies aim to develop students' qualities of flexibility, adaptability and enterprise.

Probably the most significant aspect of the change to technology education is the concept that as a learning area it contributes to all students' general education and therefore should be studied by all students in the compulsory years of schooling.

Since the publication of *A Statement on Technology for Australian Schools* (AEC, 1994) all the states and territories have established technology learning areas through the development of frameworks, curriculum and support material. Various titles have been adopted in different states (Technology Education, Technological and Applied Studies, Technology and Enterprise) but they contain similar elements. There is a significant degree of consistency in the definitions of technology used by education systems in Australia. Technology is defined broadly, and key common elements of the definitions include 'the application of knowledge and resources' and that it is used 'to extend human capabilities'. There is strong general agreement that technology involves a process, that is, there is an identifiable method used in the development of technology. This process is most commonly referred to as design, but it is not defined or described in detail. Similarly the relationship between the concepts or knowledge of technology and the processes of technology is not explored.

In the titles ascribed to subjects, technology is commonly linked with other concepts, for example 'materials, design and technology', 'science and technology', 'technology and enterprise'. This may suggest that existing notions or definitions of technology are inadequate to describe the scope of the intended learning, and this is an emerging area of the curriculum still in the process of definition.

While states have or are establishing clearer directions for technology education through curriculum frameworks, its implementation has been problematic. This is partly because there is a conflict between the curriculum, which is quite revolutionary in nature, and its implementation, which cannot be revolutionary but is developmental and must build on past practice. Teachers have to develop their understandings of technology education and implement new strategies over time. But the technology education curriculum does not incrementally develop from what has existed in schools in the past, it is revolutionary in both knowledge and associated pedagogy.

To some extent this problem has been exacerbated by the introduction of entry-level vocational education and training in the senior secondary years. Some teachers consider the introduction of industry-accredited vocational courses as justification for the maintenance of traditional vocationally oriented methodology and content in the compulsory years.

The Status of Technology Education

Many factors contribute to the status of technology education in schools. Links with other learning areas, its usefulness as a path to university study, vocational education and training, information technology, perceptions of influential groups and school priorities all influence the status of technology education. These factors do not clearly indicate high or low status. This section will examine the range of factors which contribute to the status of technology education.

The curricular position of technology education as equivalent with the other seven learning areas indicates an improved status in the 1990's. The 1989 *Hobart Declaration on Schooling* first established this curriculum sense of equivalence, later supported by the development of *A Statement on Technology for Australian Schools* and *Technology – A Curriculum Profile for Australian Schools* (Australian Education Council, 1994). Since then all states and territories have developed technology learning area frameworks and support material which are in various stages of implementation or revision.

Technology education was traditionally an 'elective' area in secondary schools and is a 'new' area in primary schools. Because of this it is often perceived as a less important learning area, and this perception has been slow to change. In addition there is little status in study in technology education for university, despite some encouraging trends which are discussed later in this paper.

Some differences seem to exist in schools regarding teachers perceptions of the place of technology education in the core curriculum. In a 2000 study (Williams, 2001) only 55% of technology teachers agreed that 'Technology is generally regarded by teachers in my school as an essential component of a student's general education', but 87% of school administrators and 84% of other teachers agreed with the statement. This difference in attitude also exists in perceptions of the status of technology education, with teachers of technology education rating the status of technology in their school much lower than other teachers and administrators. Parental support for core studies in technology is strong, with 91% believing that technology should be a compulsory area of study for both primary and secondary students as a component of their general education.

As discussed earlier, curriculum documents tend not to specify the development of a conceptual understanding of technology. This contrasts with areas such as science and the humanities, where this conceptual understanding is of prime importance. It can be argued that conceptual or higher order understanding is necessary if students are to transfer learning to new or unfamiliar contexts. In descriptions provided by education systems, the term technology is used as a convenient umbrella rather than a representation of a body of conceptual knowledge and understanding.

For secondary schools there is no clear definition or requirement for student technological literacy, and in primary schools it is accorded a lower status compared with the central importance of numeracy and language literacy. In their 1997 report, ASTEC proposed a broadening of the notion of literacy from a narrow focus on language literacy, to encompass other aspects such as technological literacy in the development of a broad concept of 'life functional literacy'. The current narrow focus on language literacy and numeracy in schools, reinforced by compulsory national testing, indicates that this notion has not gained general currency.

While there are few system level initiatives to develop the status of technology education, substantial numbers of schools have implemented their own initiatives. Leading school sites in technology education were selected throughout Australia (Williams, 2001) on the basis of the high status accorded to technology education at those sites. In many of the leading sites technology education was given a high status through one or more of the following:

1. Technology education had been set as a priority area in the school's strategic plan. For example, in one school it had been set as one of three priority areas for the past four years. As a result a substantial amount of equipment had been purchased and a considerable amount of professional development had been organised.

2. The Principal and other senior staff had a specific interest in technology education. For example, in some schools the Principal considered technology education of prime relevance to students and saw it as a medium for promoting outcomes-based education and integrating all the learning areas. The technology education leader supported these conceptions and took an active role in the strategic initiatives of the school.

3. The learning area had a supported technology leader with a paid allowance and a specific budget. For example, the allocation of an allowance and budget to a co-ordinator of technology education had allowed some schools resources to be expanded, professional development to be co-ordinated and an active implementation committee to be formed.

Technology Education in Primary Schools

The organized incorporation of technology education in the primary years of schooling is a recent phenomena in Australia and would not have existed 20 years ago.

In 1997 the Australian Science and Technology Council (ASTEC) reported on the teaching of science and technology in Australian primary schools. In that report, ASTEC noted a number of findings that it considered were likely to have a positive impact on technology education programs. These included the implementation of the new technology curricula, an increased level of interest in technology education by teachers, evidence that technology education can facilitate the general education of children, and recognition of the potential for science and technology education to be brought together in a complementary way.

ASTEC also noted concerns about the development of technology education in primary schools related to the quality of primary technology (and science) education. In terms of professional development, ASTEC noted that some good programs had been developed and that it was critical these professional development programs be sustained. The Prime Minister's Science, Engineering and Innovation Council (1999) also found that many primary teachers have outdated or insufficient technology teaching qualifications.

Despite the fact that technology is still a new area of study for many primary teachers, in 2000 90% of schools indicated that they taught technology in all grades (Williams, 2001). The emphasis of much of this technology was Information Technology, embedded in a range of subjects, rather than relating to broad technology education. School based decision making and curriculum planning mean that there is a variety of technology education occurring at a classroom level. Often the curriculum programs in this area are determined by individual interests and enthusiasm of the teachers and principals, and the educational priorities in particular schools.

In 1996 a limited evaluation of the NSW *Science and Technology K-6* syllabus was undertaken, finding that teachers allocated between 60 and 120 minutes per week to technology. However the majority of teachers were at the lower end of this range. The evaluation also found that:

- That the technology component of the Science and Technology Syllabus was not fully understood by teachers;
- Class programs tended to favour content relating to natural and physical science;
- Science and Technology is considered by the majority of teachers to have "mid-range" status in their school curriculum;
- Supply, storage and maintenance of consumable goods (batteries, corks etc) is considered a barrier to the full implementation of the syllabus;
- Four major factors appear to determine the selection of units of study and the extent of Science and Technology teaching: teacher understanding and confidence, student interest, the availability of resources, and content being taught in other Key Learning Areas.

In primary schools, technology education is generally delivered through an integrated approach with other learning areas, though there are some discrete technology programs. Few primary schools have specialist teaching facilities for areas of technology dealing with hard and soft materials, and as they purchase resources, tools and equipment, and students produce significant products, the facilities appear even more inadequate. The Australian Academy of Technological Sciences and Engineering study (Watts, 1998) concluded that the physical facilities for the teaching of technology were inadequate in primary schools, and the 1997 ASTEC study also concluded that resources were inadequate for teaching.

Many primary teachers are still coming to grips with the notion of technology education generally, and together with inadequate experience and training, lacked confidence and competence in teaching technology, as well as using basic hand and power tools with materials such as wood, metals, electronics and plastics. This is supported by the *Science and Technology in Primary Schools* report (ASTEC, 1997). As schools purchase such equipment there is a danger it will be underutilized and used either inefficiently or unsafely unless teachers are educated in its use.

The relationship between technology education generally and the area of Information Technology and computer studies is not clear, and the terminology tends to be interchangeable. In many primary schools there is a focus on computers but not on other areas of technology education.

Technology Education in Secondary Schools

Technology Education is delivered through a range of technology related subjects in the secondary school including Home Economics, Technical Studies, Computing, Information Technology, Media, Industrial Arts, Design and Technology, Agriculture and Business Studies. In all states and territories, it is either a centrally mandated part of the junior secondary curriculum, or the majority of schools ensure students study some technology.

The pattern is generally that technology is compulsory in early secondary, and becomes an elective in later years. These elective subjects may work together, for example through a school organized technology learning area, to achieve the outcomes for technology education, or they may operate as independent subjects and share a line within the school timetable and so compete with each other for students. Such decisions are school based, and the trend is for individual technology subjects to cooperate more as a learning area. In no state or territory are technology subjects compulsory in years 11 and 12.

Because technology education, as it is taught in the classroom, has developed from the content and skills drawn from traditional subject areas such as Home Economics and Industrial Arts, in some schools it retains many of those characteristics. This is emphasised by the teachers of technology who still focus on the technical skills needed in a particular context (wood skills, textile skills etc) and do not always support a broader understanding of the innovative processes and design approach needed for students to understand how technological solutions are developed within society. So the type of technology education experienced by students in some schools is quite traditional and does not mirror the current definitions of technology education.

Since the adoption of technology as a learning area schools have slowly moved toward an organizational pattern that reflects the curriculum learning areas. In the case of technology this means one technology department at schools rather than, say, separate industrial arts and home economics departments. By 2001, 84% of schools coordinated technology education subjects as a learning area, and 16% coordinated the technology education subjects independently of each other. Conversely, the majority of schools (75%) assess student achievement in technology by individual subject, and 19% of schools assess achievement as a learning area. Putting this data together, the majority of schools (61%) coordinated technology education as a learning area and assess student achievement by individual subject.

There is some validity to this inconsistency in that schools tend to coordinate technology as a learning area, but assess individual subjects. Even though all the technology subjects may be working toward the same outcomes, student performance is contextual, and by measuring performance in a range of contexts, a more realistic picture of overall performance is possible.

An increasing number of schools are beginning to report to parents using state and territory based outcomes frameworks adapted from the nationally developed statement and profile in technology. This reporting information is not systematically collected, and not only do the broad outcomes and standards vary from state to state, but the specific outcomes used in reporting achievement vary both between systems and between schools. This is supported by the *Reporting on Student and School Achievement* report (Cuttance and Stokes, 2000). As state systems which have in the past used the national statement and profile develop their own state frameworks, the current diversity within technology will continue to expand. This represents a reversal of the trend which occurred around the mid 1990's, as the effect of the national statement and profile was to bring the states closer together in their conception of the area of technology.

Vocational Education and Training

'One of the most significant developments in Australian senior secondary education over the last few years has been the dramatic increase in the number of students involved in VET in schools' (MCEETYA, 1998, 31). The overall increase in the number of schools offering VET programs between 1997 and 1998 was 29%, by 2000 involving over 90% of all secondary schools in Australia (MCEETYA, 2000).

This rapid increase of vocational technology programs in the post compulsory years began with the introduction of various vocational education initiatives by the Commonwealth and state governments (Carmichael, 1992, Mayer, 1992), and also came about in response to school based initiatives to develop curriculum to meet the needs of the increasingly diverse post-compulsory student population. Many of these initiatives emerged from the technology area. The results were to introduce accredited vocational subjects from the National Modules scheme into the senior years of schooling, and to identify and include specific vocational competencies into existing senior school subjects. These initiatives have been coordinated through national organizations and through the implementation of National Training Modules, Registered Training Organizations and the Australian Qualifications Framework. This trend toward national consistency in VET offerings is continuing.

In contrast to this national consistency, the general technology offerings by schools up to year 10 are becoming more nationally diverse. The declaration of technology education as one of the eight learning areas in 1989 was accompanied by a rationale placing technology education firmly in the camp of general education; that is, it provided benefits to all students, not just those who were going to pursue a related technical vocation. The 1994 publication of the national *Statement on Technology for Australian Schools* consolidated this rationale. For a short period after then, the states became more similar in their technology curriculum and frameworks. But the more recent reviews of state frameworks and the documents have resulted in more diversity. So there is an increasingly diverse compulsory technology education feeding into an increasingly centralized post compulsory vocational education. This will create difficulties in mapping progression and achievement for students in technology up to year 12.

The *MCEETYA Taskforce on Vocational Education and Training* (2000) recognized this potential barrier between compulsory and post-compulsory in calling for a re-conceptualization of vocational education in schools so it ‘encompasses a broader range of initiatives and elements including expanded roles for community partnerships, the centrality of lifelong learning and generic skills (such as Key Competencies and enterprise skills and attributes), integrated career information and guidance services’ (p. 4).

Many subject areas that are now included in the technology learning area at the secondary level have had a vocational orientation in the past, such as industrial arts, home economics and agriculture. These subjects tended to have a quasi-vocational status in that while they were seen as providing an orientation to various vocations, there was no explicit connection with industry, and no industrial accreditation.

The balance between vocational and general educational aims tends to be mirrored in the balance between the product and the process of technology, vocational aims being associated with concentration on the development of skills through a high quality outcome. The balance between these two sets of aims has implications for the range of technologies made available and the type and quality of equipment and materials provided in secondary schools. Vocational aims require students more access to a narrower range of more expensive ‘industry standard’ technology. General educational aims require students to experience a broader range of technologies but these do not have to be 'industry standard', and in many instances they can 'simulate' the technology.

Williams (1998) argued that vocational education was increasingly emphasising the importance of generic skills, such as teamwork and problem-solving (Mayer, 1992) as well as specific competencies for particular industries. At the same time that these changes were occurring, technology education was developing with an emphasis on remarkably similar goals in terms of generic skills. Williams argued that this apparent "confluence" of the goals of technology education and vocational education is problematic for technology education, given that technology education is intended to contribute to the general education of all students as a component of a liberal education. The problematic nature of the confluence is that there appears to be an increasing push for the specific industry competencies to be embedded within technology education programs. This is seen as likely to be antipathetic to the general educational goals of the area.

This confusion and tension between vocational and general technology education at post compulsory levels of secondary schooling was also recognized by Petrina (1999). The popular inclusion of vocational technology options at post compulsory levels of schooling, particularly when attempts have been made to offer the two approaches simultaneously, have necessitated a rationale for technology education as vocational education. The tension arises because of the elements of incompatibility in philosophy, pedagogy, processes and assessment between the two approaches.

Some technology teachers continue to use vocational rationales for their general technology teaching. In some instances this has been an impediment to moving toward new approaches to technology education which are more designerly and student centred.

The vocational component of technology education is strong, and the rapid growth of vocational technology programs has had a significant impact on schools, and this will continue. The links between the compulsory and post compulsory years of schooling, the general and vocational approach to technology education, are not strong, but there are some indications that these links are developing to focus both aspects on important generic skills. Vocational education is growing in importance as an educational route for an increasing number of students.

Technology Teacher Training

Up until 1988, primary and secondary teachers for Australian schools were trained at Colleges of Advanced Education. In this year the process of amalgamating these institutions began, some colleges combining and becoming new universities, others merging with existing universities.

The rationale for the training of teachers of technology education to become part of universities' responsibilities when this amalgamation took place was that those in the university technological faculties (Industrial Design, Engineering, etc.) could strengthen the content base of technology teacher education courses. The effective integration of teacher training into universities has only succeeded to a very limited extent as there seems to be a reticence on the part of university faculties to assume responsibility for the content of technology teacher education.

A survey of technology teacher education programs in Australia in 1996 (Williams) indicated that of the 38 universities in Australia, nine were identified as offering undergraduate technology teacher education programs. All these institutions offered a four year Bachelor of Education degree in technology education.

Since this survey was conducted in 1996, many institutions have moved away from this pattern, for example to a double degree structure or to graduate entry pre-service training courses. An additional development has been the demise of secondary undergraduate technology teacher education courses in four states, and an increase in post-graduate technology courses for both secondary and primary teacher trainees in all states except one. There is an increasing range of entry and exit points to training programs, developing links between universities and technical training institutions, and a number of courses have been designed for specific client groups.

A consideration for the introduction of post-graduate courses is that first degree students are suitably qualified, that is they have undertaken an initial degree relevant to the needs of technology education. This remains an issue for all states offering teacher training at the post-graduate levels, largely because of the breadth of technology offered in schools and the relative specialization of most initial degrees.

Four year undergraduate programs offer a range of specializations including design and technology, food technology, home economics, textile technology, engineering science, computing studies, business and technics. The study of content, curriculum and education is concurrent throughout all four years.

A more recent approach to training technology teachers, stimulated by the shortage of teachers, is the design of programs to suit specific groups of clients, sponsored by the state government as a way of ensuring and adequate supply of teachers. These courses vary from 1-2 years in length and include significant components of school based practice.

Another increasingly common trend is for university technology teacher training programs to make links with technical colleges for the provision of the skills-based machine and production oriented aspects of the course. The logic is that this is what the technical colleges specialize in for the training of apprentices and trades people, and as it is expensive to update and maintain equipment, this represents a sensible consolidation. A philosophical difference arises however as the technical college approach is competency based and generally teacher oriented, contrasted to the technology education approach which is generally outcomes based and student centered through a designerly approach to making. Some universities have rejected this liaison after trialing it for a number of years, others continue with a significant technical college component to their course.

For a number of reasons, technology teacher training programs are problematic for universities. Gibson and Barlow (2000) outlined the problems facing universities when they endeavour to provide a range of degree programs. Universities allocate Equivalent Full Time Student Units

(EFTSUs) to their various programs based on the institution's academic profile negotiated annually with the federal government. This in turn determines the total Australian government funding that each university receives. Recently this source of funding has decreased over a number of years. As a result, universities are increasingly relying on non-government income sources, including financial endowments from private persons and industry, commercial enterprises, as well as an increasing willingness to enroll full fee paying students (local and international) to alleviate their budgetary constraints. Gibson and Barlow claimed that technology teacher education programs are not attractive to university administrators: they have suffered from low intake, they are perceived to be expensive, they provide limited opportunities for economies of scale through large lectures and they are less likely to attract fee-paying students than other courses.

There are still some primary teacher training programs at universities in Australia which do not provide any instruction in technology education, despite the establishment of technology as one of the core learning areas since 1989. However, the majority of training programs offer at least one compulsory unit in technology education, and a number allow for specialization in the technology area by taking additional elective units. These specialized graduates often become technology resource teachers in a school or a region.

Teacher shortage

The shortage of technology teachers in Australia occurs in a context of low appeal of a career in teaching. 'Those with technological competence recognise better career prospects elsewhere. Graduates entering schools have available only limited term contracts and no clear career prospects. These realities compound and contribute to teacher discontent and a lack of public support' (Watts, 1998, p13).

While there is a current shortage of technology teachers available to meet this continuing demand, a number of state government employers have responded by actively investing in strategies aimed at alleviating the problem through specially developed Diplomas of Education, targeted retraining programs, student sponsorships, promotion of technology teaching in schools and recruiting from other states and overseas.

Post-Compulsory Education

Schooling is compulsory to age 15 (Year 10), so the last two years of secondary school are considered post-compulsory, despite an increasing emphasis and trend to keep people in school to Year 12. Traditionally Years 11-12 were only for those students who wanted to continue to university and so focussed on academic studies. One way of retaining students was to make the Year 11-12 studies more general, and a diverse range of vocational studies have been introduced into these years of schooling. Emphasis has been placed upon the provision of a range of pathways, not just leading to university but to further technical education and employment entry. Course design has been such that the pathways are flexible, in order to delay the determination of specific career paths for as long as possible.

A parallel recent development has been the broadening of those subjects that can be counted toward university entrance. All states have a system whereby specified subjects are examined in Year 12 and then the scores are combined to provide a ranking which is used for access into university courses. Popular and high status courses such as law and medicine have a high rank for minimum entry, and lower status courses such as teacher education have a lower rank. Very few technology related school subjects have traditionally been available for university entrance, even for technological university courses such as engineering, architecture or industrial design. This has changed over the past 10 years, and in some states as recently as 2005.

It is now generally the case that school technology subjects such as Engineering, Materials Design and Technology, Design and Technology and Information Systems can be used as university entrance subjects. For schools this means that students who perform well in technology during the compulsory years of schooling can continue with their technology studies, whereas in the past they would have left technology and focussed more on say, maths and science. It also means that universities can specify a broader range of prerequisites for specific courses. For example, rather than architecture relying on maths and physics prerequisites, it may be more appropriate to specify design and materials technology types of subjects.

Professional Associations

Because technology education in schools has developed from a number of previously independent subjects, teachers professional associations are still organized along the lines of these subjects. For example, at the national level, organizations supporting technology teachers are Home Economics Institute of Australia, Australian Council for Education through Technology, Design in Education Council Australia, Australian Council for Computers in Education, Council of Australasian Media Education Organizations, Business Educators of Australia and National Association of Agricultural Educators. These organizations have traditionally supported secondary teachers, and while some are developing support for primary teachers, this is not their main focus. This national structure is reflected by the organizations in the states and territories. There is no support for both primary and secondary teachers which covers the breadth of the technology learning area.

This is an impediment for a number of reasons. Australia is a small country to have seven different educational systems (five states and two territories), and so there is a lot of repetition in the development of curriculum support materials and professional development. A single professional organization could develop significant economies of scale in these areas. In addition, the absence of such on organization effectively means there is no advocacy and representation for all technology teachers at the federal government and national organization level. There are no indications that this situation will change in the future.

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