

## **Technology: flogging a dead horse or beating the odds?**

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### **Introduction**

This paper discusses the development of technical and technology education within New Zealand since 1900. The process of curriculum change is complex and involves the intermingling of a wide range of influences. Account must be taken of ideological, political, social, philosophical, economic, and other concerns and viewpoints present at the time of the change (McGee, 1995). The importance of each of these individual influences will vary from time to time, but with regard to the development of technical/technology curricula in the twentieth century it would appear that the political agenda of the government of the time was the prime motivation behind all the changes in this century. It is suggested that the curriculum innovations prior to 1990 were not in tune with the desires of students, parents, or employers and that as a result they did not achieve the expected results. Finally, it is argued that although the technology curriculum introduced by the National government in the 1990's represents a new vision of technology education, it too appears to have insufficient backing both within the teaching profession and the general public at large to ensure a secure and lasting place within the New Zealand school system.

Indeed it can be argued that state schooling has served to both reproduce and legitimate existing social structures. (Shuker & Harker, 1986)

### **Technical Education 1900-1990**

Although the national schooling system had been established in 1877, it was not until the Manual and Technical Instruction Act of 1900 that the first specific provision for technical education was introduced.

This Act set up manual training centres for the last two years of primary schooling. Metalwork and woodwork were to be offered for boys and cooking, needlework and/or laundry work for girls. One of the aims of the introduction of manual training

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centres at the primary level was to add some reality and practical experience to a curriculum which was inherently bookish (McKenzie 1992). In the words of the Manual and Technical Instruction Act itself, it was intended to achieve "a natural co-ordination of all the subjects of the (school) course with life" and give students an opportunity to "discover aptitude".

The 1903 Secondary Schools Act facilitated a major increase in the numbers of children going on to secondary education. It soon became apparent, however, that the increased secondary school intake was not being retained because the secondary schools had not adapted their curriculum to accommodate the different social and class experiences of the new students. The reaction of the Liberal Government, under George Hogben's guidance, was to create separate Technical High Schools. The first was opened in 1905 and by 1910 these had been established in all the main centres.

It is argued that these developments were introduced as part of the political agenda of the Liberal Government and not as a result of social or educational pressures (McKenzie, 1992; O'Neill & Jolley, 1996/97; Simon, 1994). As the government aims in introducing technical subjects into the curriculum flew in the face of public desires the intended outcomes were not realised.

From its inception the New Zealand primary school system, as a matter of deliberate policy and at considerable cost had been made widely available. In rural areas the need for childrens' labour at certain times of the year worked against this policy in the years after 1870. In the absence of a strong manufacturing/industrial sector the education system came to be seen as the avenue for upward social mobility. Ambitious young people were reluctant to become involved in technical education as they feared that this would limit the vocational opportunities open to them (McKenzie, 1992). Questions that we have to ask here are: if the students, their parents, and potential employers who preferred the traditional apprenticeship system, did not want technical education, who did?, and why did their wishes prevail?

For economic reasons, the Liberal Government was concerned to maintain a strong agricultural sector . There were also increasing pressures on it from the influential middle and upper classes who saw their privileged social status threatened by the upward social mobility created by the existing education system (Simon, 1994). There was also a clearly articulated policy of the Department of Education to maintain Maori as a rural, lowly skilled group within New Zealand (Barrington, 1992). The introduction for technical education for girls can be interpreted as concern about the

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challenges presented to male dominance in society by the "new women" who had emerged out of the suffrage and temperance movements of the late nineteenth century. The male perception was given respectability by the emergence of ideas of biological determinism, most clearly evident in the writings and speeches of Truby King. This determination to put the "new women" in their place found its expression in the establishment of technical high schools, the introduction of domestic science at tertiary level, and the formulation of the "Cult of Domesticity" (O'Neill & Jolley, 1996/97; Olssen, 1981). The gender differentiated nature of technical education has continued to be a feature of schooling until the present day. Three main factors are involved in this process, the perception of "womens' jobs" by female students and their parents, the deliberate fostering by institutions of courses in these areas, and the inherently conservative nature of technical education itself (Day, 1992)

Therefore, it is possible to see that after 1900 technical education fulfilled the function of providing a social filter to channel mainly working class children into manual and trade type education and to protect the economic and social position of the middle and upper classes. The consumers of this new technical education did not easily give up their social pretensions. Despite the governments desire for an emphasis on agricultural and domestic education the new technical high schools soon began to focus on commercial education. However, the long term result was to see technical education firmly established in the public mind as second class education.

The second major development of technical education took place under the first Labour Government (1935-49). The government position on the role of education was most clearly articulated by the then Minister of Education, Peter Fraser in 1939. His declared aim to give free education of the kind that students were best fitted for and to allow for their development to the fullest extent of their powers was also consistent with the aims of the Department of Education for comprehensive secondary education. Again the political agenda prevailed, it was to be the government who would decide what "best fitted" meant, and the existing social order was not to be seriously challenged. The abolition of the Proficiency Examination in 1937 had markedly increased the numbers of children attending secondary school, but it was not until after 1945 when some of the recommendations of the Thomas Report (Thomas, 1942) were actioned, that real curriculum change occurred. With regard to technical education, a common core of subjects was introduced at the third and fourth form level which included elements of metal and woodwork for boys and cooking and sewing for girls. Thus gender stereotyping continued to be maintained and the almost universal adoption of streaming in the 1950's served to reinforce existing class

divisions (McKenzie 1992, Day 1992). As had been the case at the beginning of the century the public desire for upward social mobility through education continued to be the most powerful influence on the curriculum and technical subjects continued to be seen as second class and non academic.

The phasing out of Technical High Schools in the next twenty years was due more to changes in the apprenticeship system and the development of technical programmes in the tertiary sector, than to a change in public perception about the place of technology education. The newly re-named schools found it hard to shrug off their ex-technical high school and so struggled to achieve academic respectability in the eyes of the wider community.

Prior to 1970, therefore, it is clear that the prevailing model or process of curriculum change can be seen to fall into the pattern of the centre-periphery model (McGee, 1997; Ross, 1976). The curriculum innovations outlined above were initiated at the centre, normally by the Department of Education and transmitted to the schools for implementation. The move away from this approach can be traced to the recommendation of the Currie Commission in 1962 (Department of Education, 1962) that a Curriculum Development Unit be set up within the Department of Education. The outcome of this development was a move from a top-down to a consultative/consensus model of curriculum development. New curricula were planned and initiated by widely representative committees. This new direction of seeking and valuing greater public input may be related to growing public consciousness and assertiveness arising from the new social permissiveness of the 1960's and opposition to the Vietnam war and rugby tours to South Africa.

A seminal event in the process of wider public consultation was the Educational Development Conference held in August 1972 at Lopdell House. A number of important publications emerged from the conference (Educational Development Conference 1973a, Educational Development Conference 1973b, New Zealand Department of Education 1973). This led to the emergence of a new Form 1-4 Workshop Craft curriculum in 1975 and a Form 5 Workshop Technology curriculum two years later. These curriculums differed quite markedly in approach from those they replaced. The former fifth form content driven, exam oriented curriculum was replaced by one which had a design focus, covered a range of materials and was fully internally assessed within the framework of a national moderation system. The focus was still on the product and its take home value, but design and related studies now made up fifty percent of the final mark. The antecedents of the Technology and

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Society strand of the present curriculum may be seen here, as the related studies encouraged students to look beyond the making of their product.

A great deal of care was taken to ensure the general acceptance of the new curriculum by the teaching profession. Well-resourced professional development was carried out on a long term basis with full implementation spread over ten years. Notwithstanding the initial widespread consultation and the managed implementation process, anecdotal evidence from teachers who went through it, suggests that a significant minority of workshop teachers never fully embraced these new curriculum.

Another significant development in the 1970's, which has parallels with the 1995 curriculum, was a move in some situations to reduce the gender differentiation of technical subjects by having girls take metalwork and woodwork and the boys take cooking and sewing at intermediate schools and manual training centres. Many secondary schools also incorporated this approach in their form three programmes. This trend, however, has had little impact in the senior school where technical subjects still continue to be highly gender specific.

The move to curriculum development based on a democratic consensus was given further impetus by Russell Marshall, Minister of Education 1984-87. A curriculum review was undertaken in which the views of the general public were sought (Department of Education, 1986). However, a major philosophical change within the governing Labour Party itself meant that the published results of the Curriculum Review were never acted upon. Instead a move back to a strongly centre-periphery model of curriculum development took place.

### **The emergence of Technology 1985-95**

Any discussion of the curriculum developments which led to the introduction of the new Technology curriculum in 1995 must be located within an examination of the New Right economic policies introduced by the Labour government in 1987, and continued by the National government after its election victory in 1990 (Codd, 1990; Lauder, 1990, Shuker, 1990).

The re-appraisal of education from this economic perspective, inaugurated by the Picot report (Lange, 1988), has resulted in major, fundamental changes, one being the imposition of technology education into the curriculum. The National Curriculum can be viewed as a socio-cultural construction, reflecting the presuppositions underlying

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the notions of enterprise culture and competition. It focuses on areas of learning and "skills" and tends to ignore questions about the nature and structure of knowledge (Peters & Marshall, 1996).

It has been claimed that since 1984 New Zealand has had imposed on it one of the most rigorous programmes of economic rationalisation or structural reorganisation to be embarked upon anywhere in the world (O'Neill, 1996). The New Right economic ideology can be seen to be made up of two main elements (Peters, Marshall, & Massey, 1994). The first is a neo-liberal element that is committed to the free market and the substitution of market-forces for government regulation. The second is a neo-conservative element which is committed to fundamentalism and conservative moral values. Proponents of this philosophy saw education in New Zealand before 1990 as a form of welfare. The social-democratic consensus which had underpinned the developments in the 1970's and 1980's was seen as placing too much emphasis on social and cultural objectives (Shuker, 1990). These beliefs played a substantial role in the development of the New Zealand Curriculum Framework (Ministry of Education, 1993), which saw Technology identified as an essential learning area.

Technology Education as a separate and identifiable subject go back to 1985 when William Renwick, the Director of Education, called for a paper on technology education. The Beattie Report (1986) recommended greater funding in science and technology and stressed the economic and technological ends of education and in 1988-89 a number of exploratory projects were developed in technology education. However, the move to technology education only really took off when Lockwood Smith became Minister of Education.

Two important players in the process which led to Lockwood Smith's seminal 1991 Budget statement were the Treasury, and the authors of the Porter Report on the New Zealand economy (Crocombe, Enright, & Porter, 1991). The conclusion of the Porter report, that New Zealand must become more innovation driven, struck a sympathetic chord with the Minister, and reinforced the economic policies being promoted to him by Treasury. In his July, 1991 statement, Smith expounded

"... a clear policy to enhance educational achievement and skill development to meet the needs of a highly competitive, modern international economy ..." and a commitment "for the modern, competitive world"

(Smith, 1991, pp1-2)

The aims of the government were encapsulated in the 1991 Ministry of Education discussion document (Ministry of Education, 1991) which saw the purpose of the new curriculum as enabling:

"... students to take their full place in society and to succeed in the new competitive economy"

(p1)

and to

"participate effectively and productively as responsible and informed citizens of New Zealand's democratic society and economy"

(p.19)

While this echoes the aims of education predicated in the Thomas Report (Department of Education, 1959), the priorities have been reversed and the economic imperative has become paramount. The education system was now seen by the government as being an important vehicle in the permanent establishment of its economic, civic and political ideologies.

The consultation process on *The national curriculum of New Zealand: a discussion document* did not result in any major changes of direction in the final document which was published in 1993. The New Zealand Curriculum Framework (Ministry of Education, 1993) had firmly embedded within it the National Government's goal to create an enterprise culture. The emphasis was now on perpetual training as a response to perpetual economic change. An integral part of this move was the concept of a national qualifications framework which would create a seamless education system and dissolve the traditional boundaries between education and training.

A logical corollary of the need to develop a technologically literate New Zealand society in order to survive economically in the modern world was the decision to make technology one of the seven essential learning areas in the New Zealand Curriculum Framework. This represents the most determined effort by a New Zealand government in the twentieth century to impose technology education in the face of parental, employer and teacher indifference.

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The 1995 Technology Curriculum therefore can clearly be seen to represent another example of an imposed curriculum which has grown out of government policy and not as a result of consumer demand. The final statement produced in 1995 (Ministry of Education, 1995) moderated the strong economic arguments for the introduction of the compulsory Technology curriculum which had been such a salient feature of the scoping papers produced for the Ministry by Don Fergusson. These provided the basis for the series of policy papers produced for the Ministry in 1993 by the Centre for Science, Mathematics and Technology Research at the University of Waikato (Jones & Carr, 1993). However, the economic motive still strongly underlay the decision to introduce the curriculum, and it appeared strongly in the Know How 1 video series produced in 1994 as part of the implementation process.

The curriculum is much more ambitious than early technical education curriculum. Not only does it encompass the first ten years of schooling rather than beginning at year seven, it has considerably widened the meaning of technology far beyond the pre-1990 technical ambit. This is evident not only in the greater range of technological areas, such as biotechnology and electronics and control, but also in the emphasis placed on the social context of technology. It also explicitly attempts to change both the second class status and the cultural and gender differentiation of previous efforts in this field.

The crucial importance of the active involvement of schools in curriculum development if it is to be successful is well documented (Silbeck 1985, Print, 1993, McGee 1997). Much curriculum change reflects societal change, and a key element is the recognition and acceptance of the need for curriculum change by a substantial majority of those involved (Print, 1993). In this case both the economically engineered societal change, and the drive for a new curriculum came from the government. The Draft Technology curriculum was written over a period of three months (June-August 1993). Despite the limited time, and the lack of a culture of technology education there was an effort to get wide participation. Eighty five writers were used, and over three hundred people took part in the process (Jones 1995, France 1997). However, there was little real demand for, or participation by schools in, the development of the Technology curriculum or the feedback process on the draft (Visser & Bennie, 1995).

The differences that occur between the intended curriculum and the implemented curriculum are well recognized (Print 1993, McGee 1997, Dale 1989) and there are already ominous signs that the implemented Technology curriculum will be a pale shadow of the official curriculum statement's intentions. The impact of teachers' prior



constructs on their teaching of technology, and the difficulty of changing these are well documented (Aubusson & Webb, 1992; Jones & Carr, 1992; Jones, Mather, & Carr, 1994; Mather & Jones, 1995; Paechter, 1995, Symington, 1987). Already it appears likely that the resistance within schools by skills-focussed technical staff will have the same negative impact on the introduction of the new process-oriented curriculum as was the case with the Form 1-4 Workshop Craft curriculum after 1975 (Mawson, 1997).

Although the Ministry has funded a substantial number of professional developments contracts over the last four years there does not appear to be the impact on classroom practice that one would expect. Anecdotal evidence from students returning from practicum, informal discussions with technology advisors and facilitators, and personal observations in schools would seem to suggest that the majority of units being trialled as "technology" do not fit the concept and practice of technology embedded in the curriculum statement.

The resistance to change, and problems caused by teachers' lack of understanding of technological practice was also an important thread of the National Workshop of Technology Facilitators, Lecturers, and Advisers (Auckland, July 14-17, 1998).

It has been argued that the history of technical and technology education in New Zealand since 1900 follows a pattern of ideologically driven governments seeking to impose their own social and economic policies on a disinterested public of parents, students, and employers. The reforms of the 1900's, 1940's, and 1970's did not achieve the desired results of the governments of the time. Given that record, the absence of strong community and educational demand for a new curriculum, and the lack of involvement of teachers in the development process, it seems unlikely that this latest effort will be any more successful in achieving its aims. The challenge facing technology educators is to breath life into the dead horse, overcome the odds, and win the race.

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