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# Interplay in curriculum implementation - seeking a theoretical position

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## Abstract

*The implementation of a National Technology Curriculum Statement and Profiles for schools follows closely on changes in curriculum at the State level which have seen previous areas of Home Economics, Industrial Arts, Agriculture and Computer education combined. The subject Design and Technology represents the mandatory secondary school study in the Technology area.*

*The presentation of this subject in the secondary school is through design projects. This requires changed teaching style from a teacher centred, technical, practical skills approach to one which focuses on cooperative/ team endeavours in solving open ended design briefs. The nature and focus of the brief can vary across a range of ten context areas. Decisions about which context area and material to use are made at school level.*

*Whilst curriculum as provided by the education authorities is usually modified at the school level, the relative power of players in the decision making process is important to the nature of the school experience of students.*

*This paper will pose tentative ways of explaining how such decisions are made from a critical perspective, with reference to Habermas' theory of communicative action and Foucault's concepts of power and resistance.*

## National Curriculum development

The Australian Constitution gives the responsibility for education to individual states who have well established bureaucracies to handle the development and implementation of curriculum. Federal government responsibility has generally resided in providing funding for special programs, the implementation of which remained the state's decision. The last six years have seen a major change since the National Goals for Schooling, known as The Hobart Declaration (1989) were agreed upon by the Australian Education Council, a committee of Ministers of Education representing each state.

The outcomes of the decision resulted in the establishment of eight identified areas of curriculum - Mathematics, Science, Technology, English, Society and Environment, Arts, Health, and Languages other than English (LOTE). The expressed aims of National curriculum included to facilitate the transfer of students between schools and states, to improve teacher training, to maximise investment in education, and to improve equity by ensuring that each Australian received a broad education encompassing the eight curriculum areas.

A program of mapping of the existing content of curriculum across all states was commenced as a prelude to the formation of a National Statement

for each curriculum area which would guide the formulation and delivery of curriculum. In addition, a set of Profiles of learning have been developed whose broad aim is to direct outcomes through a common approach to assessment across the nation. The Federal government has thus managed to capture the curriculum agenda by stating both the starting point of curriculum development, the Statement, and the end points of learning across K-12 through Profiles.

This process of development has just concluded and schools across Australia received their copies of Statements and Profiles in March. Statements impact directly on curriculum developers at the system level whilst Profiles are targeted at individual schools who are expected to apply them to selected students in 1994.

## State curriculum development.

A change in government in New South Wales in 1988 was accompanied by a massive revision of curriculum including a wide ranging review known as The Carrick Report. A document, Excellence and Equity (1989, Preface) expressed the aims of State education in terms of "a balanced education with opportunities to develop technological and vocational skills within the context of a broad education for life". Community unease with the quality and focus of education was stated as

justification for change alongside social, economic and technological change demanding different skills of school leavers.

New South Wales curriculum was packaged into eight Key Learning Areas paralleling those being developed for the National Statements. Each Key Learning Area was to have a number of mandated hours of study. Schools retained the freedom to adjust these hours upward and to provide structures whereby students were allowed to select further study in an area through elective subjects. Technological and Applied Studies was the name chosen for the area which was to ensure students acquired knowledge about technology and design processes, practical skills in design and making, and a general capacity for problem solving and analysis (Excellence and Equity, 1989, 56).

Four previous areas of secondary school study, all taught by teachers from different knowledge bases and teacher preparation were combined into the mandatory 200 hours of study in Technological and Applied Studies. These teachers were trained in Home Economics, Industrial Arts, Agriculture or Computers. The mandatory study is through a course known as Design and Technology, syllabuses for which have been developed to build on students' experiences in K-6 Science and Technology and allow for sequential study of Design and Technology from Years 7-12.

The development of Design and Technology as a syllabus was influenced by the background of existing teachers, the demands of the workplace, and the desire for an integrated course which avoided previous gender stereotyping. Ten contexts of study were proposed for Years 7-10 - Manufacturing, Food, Clothing and Accessories, Agriculture, The Built Environment, Health and Welfare, Leisure, Communication, Engineered Systems, and Transport and Distribution. Specific context knowledge previously claimed by any one discipline areas was de-emphasised at the expense of process. The syllabus was based on the design process as fundamental to student's acquiring knowledge and skills relevant and necessary to meet the demands of a particular design situation or brief.

Teachers, particularly those in traditional Industrial Arts and Home Economics education had experienced teacher preparation and continued practice based on teacher directed learning, albeit in a practical classroom situation. Home Science lessons focussed on teacher demonstration of practical skills associated with the preparation of a food product followed by pupil imitation in an attempt to replicate the teacher's output. Textiles

and Design classes similarly made stereotyped articles where the teacher had chosen the outcome within a particular range to achieve the acquisition of specific skills such as the setting in of a zipper within a skirt. Industrial Arts lesson often consisted of students following a job sheet, a recipe by another name, with each student making a common product - dustpans, coffee mug stands and pencil cases being common examples.

The new curriculum statements called for increased emphasis on the development of higher order thinking skills. Technology for Australian Schools (1994) emphasises the National Goals of developing skills of analysis and problem solving, and of information processing to allow students to become flexible and adaptable in their future employment. The Design and Technology Syllabus for Years 7-10 (1991,4) aimed to create students empowered to create, shape, select and use technology for the improvement of quality of life. Specific skills objectives include those of designing, making, evaluating, using computers, communicating, marketing and managing. In the syllabus prepared for the last two years of secondary schooling, Preliminary and Higher School Certificate, skills desired are similar with increased emphasis on researching and the deletion of using computers and marketing. Specific outcomes include the abilities to plan, to interpret, to apply findings, to assess impacts of design decisions and to respond to design and technology through acceptance of responsibility for the consequences of decisions, to appreciate the value of individual thought and to develop critical judgments about the impact of creativity, enterprise and innovation on society.

### School level implementation

Individual schools have the freedom to make some choices in regard to the technology curriculum they offer. Such choices include:

- where to offer the mandatory 200 hours in Years 7-10.
- who will be timetabled to teach the mandatory course
- how the courses will be delivered - by one individual teacher, by teams or by rotation of classes
- which Context areas to use as the basis of design projects
- whether to offer Design and Technology beyond the mandatory 200 hours or to revert to offering students elective choice in specific subjects such as Food Technology, Technics, Computer Studies, Agriculture.
- how the course offered in the last two years of secondary education is delivered in terms of

teacher expertise directed to the course and materials in which students are allowed to design major projects.

Several overt factors can be seen to impact on individual school decisions - the current staffing balance of Home Economics, Industrial Arts, Agriculture and Computing teachers; the amount of retraining staff members may have undergone to facilitate a change of practice; familiarity of school decision makers with the aims of the new syllabuses; availability of rooms/facilities for classes. In addition, a number of covert factors are influencing curriculum implementation. These include: the background discipline of the Head teacher of Technological and Applied Studies; the actions of professional organisations supportive or resistant to the changes; the lack of confidence with a changed teacher role from information giver to facilitator; the supposed nature and ability of students in any one class, year or school; the gender mix of classes and teachers.

Secondary school numbers reached a peak in the early nineties due to increased retention rates in the last two years of secondary education. In NSW, retention rates for post-compulsory education climbed from 32.9% in 1980 to 70.6% in 1993 (ABS, 1993). At the same time, numbers of students approaching secondary schools have declined. Teacher positions are currently difficult to obtain and the decisions of Principals as to whom to retain and whom to transfer is often based on a rule of divide and conquer as faculties compete for student numbers.

Staff retraining for Design and Technology has been widely available throughout 1991-1993 with the State school system offering a comprehensive package known as DATTA - Design and Technology Training Agents - which was intended to progressively retrain a group of teachers at State level, involve them in subsequent retraining of peers at Regional level, thus to establish teachers as catalysts in individual schools or cluster of schools in the third year, 1993. The package had two goals - to upgrade teacher expertise in terms of teaching method desired and computer skills, and to multi skill teachers so they could present design projects in a wider range of context areas. Involvement with the retraining program has done much to assist the implementation of Design and Technology in a manner consistent with desired outcomes. However, the initial reluctance of teachers to attend these programs, the perceived threat of forced transfer/redundancy and forces of resistance encountered from peers within schools who chose not to retrain did much to weaken the success of the program.

Consciousness raising about the curriculum change was not initially targeted at school administrators who have been found to be influenced by the perspectives of those with the strongest voice in the school often that of the Head teacher of Technological and Applied Studies. As curriculum change has coalesced four previous discipline areas into one potential school faculty, so has the battle for Head Teacher positions raged. It is a fact that, due to gender biased history of promotions in NSW, few teachers from a Home Economics background have achieved the status of Principal of a secondary school. Relatively more teachers with an Industrial Arts background are currently Principals or Deputy Principals. Union monitoring of head teacher positions reveals that some thirty two Home Economics Head teachers have lost their positions in the collapsing of two previous faculties into one. The consequences of these factors are less easy to quantify.

Schools have long established facilities for separate classes in foods, textiles, wood and metals. None of these rooms or their internal equipment met the diverse requirements of a design and technology class where students could be working a wide range of materials and processes. Computers have traditionally been concentrated in laboratories with individual classes going to a room for specific lessons. Design and Technology requires constant access to a computer within the classroom. Whilst small amounts of funding have been available to many schools to purchase new equipment or to redevelop existing rooms, staff hesitancy about the best possible decisions to make given the courses are still in beginning stages and the realisation that once spent, further money will be unlikely to become available readily, have served to slow the process of redevelopment of facilities. The State government has spent large amounts of money on a few selected schools established as technology high schools. The gap between the resources available to these showcase schools and the local comprehensive high school has also made many teachers feel they have little chance of catching up in the technological resource race.

Teacher confidence with a changed role, with the demands of computer expertise, with allowing a multitude of possible outcomes has been significant in the change environment. Whilst many teachers display a readiness to learn new information, few are willing to concede that their teaching practice needs revision. Battersby (1989) has highlighted the ways in which teacher preparation programs provide method and skills, school experience where the student is provided with hands on situations where existing teachers are practising like method

and skills, and an attitude that is non-critical and non-reflective. Teacher reluctance to change is sometimes expressed in terms of supposed inability of the class to work in new ways, an inability sometimes perceived by the teacher prior to actually trialing the new processes of learning.

Opponents of the changes have drawn heavily on documents such as National Curriculum Technology: The case for revising the order (1992), especially that suggestions that teachers have not found it easy to translate technology into effective classroom practice. Similarly the gender mix in individual classes is cited to suggest that students like or are better at certain aspects of technology. In some cases, a conscious effort is being made to change the technologies available to students. In at least two all-girls secondary schools, the Principal has invested large sums of money establishing Industrial Arts type facilities and directing female Home Economics teachers to use unfamiliar equipment in an attempt to promote gender equity. The attitudes expressed in Excellence and Equity towards gender issues, that previous access to technology for girls through Home Science, Textiles and Design and Art was limited and for boys through Industrial Arts was extensive but narrowly focussed, can be a partially explanation for such actions. Given that all students had for a long time been exposed to the same experiences of both curriculum areas in Years 7 before electing a maximum of two subjects for further specialist study, one can question the assumptions made about the quality of experience for girls and boys.

### **Theorising on resistance in implementation of curriculum change**

Thus far it has been possible to describe what has been happening in New South Wales secondary school within a framework of curriculum change at National and State levels. The remainder of this paper will attempt to pose some theoretical models firstly to explain the changing focus of learning, its clash with traditional methods and secondly to understand the ways in which various players at different levels of curriculum implementation are able to amend, negotiate and frustrate agendas for change.

As previously noted, teachers now engaged in technology education have a long history of practice wherein the development and application of practical skills, those concerned with making, have been valued at the expense of higher order thinking skills. New curriculum, indeed new ways of working in manufacturing and other enterprises demand individuals who are flexible, innovative, able to work cooperatively and solve practical problems.

This ability is seen as crucial not only to the short term economic good of the nation but also as linked to an acceptance of the value of life long learning.

Habermas' theory of communicative action provides a way of delineating between technical, practical and emancipatory actions of individuals. According to this theory, humans act in ways which serve primarily to control the natural environment, these being labelled technical interests. Having mastered some aspects of the technical environment, humans focus more attention on interaction with others to create a shared understanding of their world, a practical interest. Habermas claims that humans aspire to greater things, to be free of external constraints and to act autonomously - an emancipatory interest.

Grundy (1987) has translated Habermas' three interests into a model for understanding of curriculum decisions. Current curriculum reform in Australia as in Britain has been driven by economic goals. The development of curriculum has been centralised, National Statements and Profiles attempting to control input and outcomes of State based education systems. The Design and Technology syllabus documents openly embrace the world of work and the importance of education to providing appropriate workers. That schooling should be related to work is seen as 'commonsense' and the Report of the Carrick Committee (1989) suggests that any distinction between vocational and general education is 'false consciousness'. To this end, technical interests of society could be said to prevail.

At the classroom level, previous modes of operation have served the technical interest well, focussing on skill development suited to repetitive tasks, producing students who were accepting of teacher authority. The certainty and authority of the teacher as information giver has been central to teacher image as well as to expectations of students, their parents and the broader society.

Practical or hermeneutic interests are more concerned with the processes by which knowledge is acquired through interaction with others within a range of alternatives. This practical interest has not been well developed in those subjects concerned with technical process, the recipe / job-sheet approach to an end product. The desire for Design and Technology to employ a practical approach in the classroom is evident in the emphasis given to the design process as a means of structuring classroom learning. Reference to group and collaborative projects and the need to explore issues relating to design and technology through

discussion and other interactive learning strategies is made openly in support materials.

As Grundy (1987) suggests, teachers do have the ability to interpret provided documents for themselves, such interpretations being influenced by their subject backgrounds and readiness to change. Positive opportunities for interaction in interpretation has been given through retraining programs offered across the State.

Emancipatory interests for the achievement of autonomy encompass a critical perspective, the willingness to question elements of given curriculum. As Grundy (1987, 99) states, this interest is largely incompatible with the technical interest without a transformation of teacher consciousness. Teacher retraining packages provided for Design and Technology have supported the technical aspects of upgrading and multi-skilling attempting to cover as much content as possible at the expense of time for reflection and debate about issues surrounding technology education. This has resulted in ongoing debates about technical aspects of the implementation rather than a collaborative effort to define some parameters for future teaching and learning.

Values outcomes stated in the documentation applaud the work ethic, quality, efficiency and responsibility. The critical pedagogue should engage students in dialogue to establish what is evidence of quality in design, how one goes about deciding on positive and negative aspects of technology, and for whom. However, critical pedagogy is driven by both human and material resources. Sirontek (1988, 56) draws a parallel between available resources to support a curriculum change and the teacher-pupil interaction, lesson content and evaluation possible. Without a history of emancipatory pedagogy, lacking specific retraining for critical understanding, design and technology education seems likely to be subsumed by a rhetoric of economic crisis which legitimates a curriculum where workplace skills assume primacy at the expense of social justice.

Earlier statements suggest that curriculum has been directed towards schools by decision makers at National and State levels. Implementation decisions have been made by school administrators, heads of faculties within individual schools and within the four walls of the classroom. Teachers perceive an era of top down curriculum control and yet seek to manage imposed curriculum in such a way as to maintain some power in the decision making process. To explain the ways in which teachers circumvent the power of the official curriculum, Foucault's concept of power will be explored briefly.

Foucault perceives power as a force which is transmitted but not possessed, as existing only in actions (Barker, 1993, 78). Any display of power is countered by a resistance. Out of such resistances comes new knowledge.

*"as soon as there's a relation of power, there's a possibility of resistance. We are never trapped by power; it is always possible to modify its hold, in determining conditions and following a precise strategy."*

Foucault, translated by Bennington (1980).

In this way, power is a productive force, one which allows for the creation of new ways of understanding and operating in the world. Power also guides the possible actions of others - such power is vested in systems of differentiation determined by

- privilege, in this case access to the ear of the decision maker, access to retraining;
- forms of regulation, in this case the national agenda for common assessment of outcomes,
- how the power relations are brought into being, in this case the formal documentation of curriculum, and
- the objectives of those who act as resistance to the force of power, in this case individual teachers and teacher organisations.

(Dreyfus & Rabinow, 1983, 223)

Power plays in the implementation of technology curriculum exhibit a myriad of levels of power and resistance, between National and state agendas, between school administrators and staff, among faculties and individual staff, and between teachers and their classes as curriculum interpretations are negotiated and renegotiated to create a new experience of technology education. Theorising from Foucault's concept of power, it seems that the forces of National Curriculum will be unlikely to control the implementation of this curriculum in ways assumed by the curriculum developers. As Australian schools enter the era of Profiles and common reporting of the outcomes of schooling, the jury is still out.

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