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Discipline renewal of teachers of technology

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Abstract
Discipline renewal for technology teachers has become an important focus for National and State governments in Australia as they implement new curriculum frameworks in technology education. This paper reports on an Australian Government initiative designed to promote understanding of the new curriculum and increase technology teachers' pedagogical and discipline knowledge. It identifies some of the conditions which influenced discipline renewal and discusses key aspects of the professional development model which led to increased knowledge and understanding of curriculum design, and the change process in implementing new technology curriculum into primary and secondary schools.

Introduction
The development of a National Statement and Profile for Technology in Australian Schools accentuated the need for professional development of teachers expected to implement the new curriculum. The Australian Government, through the National Professional Development Program sponsored by the Department of Employment, Education and Training, acknowledged this need by providing funding for a pilot project entitled the Discipline Renewal of Teachers of Technology (DROTT). Submissions to undertake the $120,000 pilot project were invited from universities throughout Australia. The authors are members of a team who were successful in winning the contract.

The Project commenced during the 1994 September school vacation with a scheduled completion in July 1995. A total of 125 primary (Years P-6) and secondary (Years 7-12) teachers from government and non-government schools in metropolitan and country districts have participated in the project.

The objectives of the project were to:
• improve the quality of student learning in technology;
• renew technology teachers' discipline and pedagogical knowledge and skills;
• promote a culture of ongoing learning and renewal for teachers of technology;
• increase teacher understanding of the nature and purpose of technology education.

The Phases of the Project
Phase One introduced participants to the new technology curriculum through a series of workshops. A rationale for technology in schools, specific content, outcomes and assessment, and catering for preferred learning styles of students were addressed during this phase. Teachers were encouraged to work in district groupings as a means of establishing localised support between contact sessions.

Phase Two focused on meeting the knowledge and skill needs as identified by the participants. Each participant selected ten preferences from 41 elective sessions. Based on these responses, a program was then constructed and conducted over a four day period in the 1995 summer vacation in January. The workshop themes covered curriculum design, managing change, information technology and computer and workshop practice.

Phase Three is designed to consolidate participants' understanding of the new curriculum and to prepare them to act as change agents for technology in their respective districts. The program requires participants to set personal goals regarding an aspect of technology in their school or district. They are to report the outcomes in detail to the final workshops in July. Participants will be supported during this final phase of the Project by field visits and telephone contact initiated by members of the planning team.
Results of Phase One and Two
These results are analysed through seven assertions. The study at the time of writing, late March 1995, is currently between Phase Two and Three. Further refinement of these assertions and more comprehensive results will be presented at the September Conference at both the presentation and in a supplementary written paper.

Assertion One
Prevailing climates in school systems, particularly at the local level provide both pressure and resistance to participation in professional development programs.

It was unfortunate that the timing of the commencement of this project coincided with the incoming Victorian Government's massive restructure of schools which included self management and school closure or amalgamation (some 270 schools were closed). These changes resulted in low morale in many school communities and uncertainty of employment and career futures for teachers. Many teachers were named in excess and allocated to district pools for redeployment. Many others, often highly regarded for their competence, took redundancy or early retirement packages offered by the government. Approval and exit usually came at short notice creating workload and organisational difficulties for teachers. The government's plan for the school system also included changes in working conditions for teachers that included increased class sizes.

In this climate it was difficult to persuade some teachers to participate. They confused the National Discipline Renewal of Technology Teachers Project with State Government initiatives. Some were openly hostile.

At the other end of the spectrum, the introduction of the new National and State curriculum frameworks and the establishment of technology as a Key Learning Area, provided the incentive for many teachers to take the opportunity to join the Project to improve their knowledge and practice. 1995 is regarded by the Victorian Directorate of School Education as a year of planning and review. However, the Directorate expects government schools to implement the new Curriculum Standards and Frameworks in 1996.

Assertion Two
Formal time to meet and talk enables teachers to build supportive networks and share ideas, resources, experience and advice.

Networking occurred formally and informally. A key feature of the program was the formation of district groups (primary and secondary teachers) to set up support structures for participants who were, in general, sole attendees from their schools. Participants responded enthusiastically with each group setting a goal, to be achieved by the next session of the program. Generally, ambitious group goals such as meeting on a regular basis were not achieved. Once teachers returned to intensity and unpredictability of school life, juggling teaching, administration, and coping with massive change in curriculum and system structures, the good intentions, as far as district goals were concerned, were subsumed by higher and more immediate priorities.

Also, timing was an issue here. The program commenced at the beginning of the final term of the year in 1994 - a busy time for teachers whose priorities were final assessments and reports, budget submissions and curriculum planning for the following year, and end of year activities. The professional climate of low morale and uncertainty about school and personal futures were also burdens. Teachers were tired.

However, we discovered that the scheduled meeting times in the DROTT sessions became networking times. Ideas were suggested to someone who was struggling with influencing colleagues and curriculum committees, and useful resources and ideas for particular groups of students were shared. Outside this formal time, some links were made between teachers in local primary schools and secondary colleges with respect to teaching ideas and access to equipment. On another level, a computer network was established specifically to communicate good ideas for teaching technology.
Many personal goals were achieved and most teachers made attempts towards achieving these goals. The formal inclusion of structured sessions in the program provided an incentive for personal action. Knowing that your turn would come to tell the group about something you had attempted provided pressure for action.

As the group participants came to know each other the climate became less threatening in which to air concerns and problems. It also provided an audience to “show and tell” the gains that were made. Celebration and acknowledgement of these gains provided personal satisfaction and encouragement. For some participants, gains might have seemed small and insignificant in comparison to those made by the few high flyers. This is where strong group facilitation became important. The staff made sure every contribution was acknowledged as being worthwhile to the group’s collective knowledge. Hall (1980) also found teachers’ concerns need to be recognised and that differences should be expected according to the person’s knowledge, experience and confidence in teaching.

Assertion Three

Team based familiarisation workshops in using materials, equipment and tools increase confidence to teach technology; and provide a vehicle for developing related teaching ideas.

The Phase One program included experiential workshops which introduced participants to specific strands of the new technology curriculum. Primary and secondary teachers worked collaboratively in their district groups on simple design briefs which they then used as a basis for developing teaching ideas for a particular strand of the new curriculum. The purpose was to share expertise within the groups; and to provide opportunities for professional conversation about approaches to finding design solutions; and translating these activities into meaningful curriculum.

For those teachers who had no more than partial understanding of the new technology education, these workshops built confidence and fostered development of useful teaching ideas and program units. An offshoot of these workshops was the swapping of units between teachers, especially primary teachers. The management team had numerous requests to reproduce these units for all participants. At the conclusion of Phase Three resources will be directed towards collating some of these materials and refining them for inclusion in a publication for wide distribution.

Assertion Four

Workbooks which provide a format for teachers to record teaching ideas developed in workshops within National Curriculum frameworks offer teachers immediate curriculum materials and a framework for developing more of their own.

The workbooks used in the introductory workshops were designed to provide teachers with a visual framework to construct program units, linking the four phases of the technology process described in the technology curriculum documents (investigate, design, produce and evaluate). This format proved to be very useful to assist teachers to make sense of the new curriculum. A spin-off has been that many teachers used the format as workbooks for their students. We believe that the visual dimension of the workbook may help concrete thinkers make sense of abstract concepts such as “investigate”. Also, from a teacher’s workload point of view, the labour in developing the format and layout of the workbook was completed - an important consideration when lack of time and lack of computer resources or skills were barriers to developing one’s own.

Assertion Five

Not all participants’ needs are met sufficiently in mass technology professional development programs which are delivered in workshop sessions alone.

Even though participants were surveyed prior to the program it was difficult to design a program to meet each individual’s wants. After the Phase One program, a small number of participants dropped out of the program,
some citing work or personal commitments preventing them from continuing. A few believed they were sufficiently familiar with the curriculum documents, or wanted recipes for program units or changing attitudes of colleagues rather than guidelines and principles from which to develop their own programs in collaboration with others.

It may be unrealistic to expect one hundred per cent retention in professional development programs such as this. Joyce, Bush and McKibbon found teachers who are unwilling to change their existing practice, function in a survival mode, or who are not risk-takers in their teaching, are unlikely to respond positively to change proposals. Also, as Johnson notes, matching professional development to teachers' needs as they perceive them may reinforce existing practice rather than foster change. Professional development requiring them to change would be perceived as threatening and uncomfortable. Nevertheless, the reasons for, and/or conditions, which led to participants leaving the program are important considerations for evaluation of this program. Similarly, the reasons for, and/or conditions, which have led to continuation of participants in the program need to be identified and understood.

Assertion Six
Participants need assistance to establish supportive environments and networks for ongoing local professional development initiatives.

Many participants are sole representatives of their schools and have expressed frustration about lack of interest shown by colleagues. At the same time they welcomed opportunities to network with like-minded teachers in their districts and during the workshops conducted in the program. However, collaboration without an action focus can degenerate into a vortex of grumbling, frustration and helplessness. It can also reinforce deficit attitudes towards professional development, that is, identifying people as problems instead of acknowledging and supporting colleagues in any learning effort and in creating action plans to improve curriculum and teaching methodologies. Dillon-Peterson identified this latter approach as a major shift in effective professional development in the last two decades, that is, a move from a deficit model of teacher development to a model of growth and change. Key features of the DROTT pilot project are to support participants in growth and change through:

- establishing local networks; and
- for Phase Three, undertaking small-scale action research projects which requires them, as individuals or groups, to work towards improving some aspect of their teaching of technology or implementation of technology curriculum in their schools.

Assertion Seven
Rewards and recognition are important catalysts for teachers to engage in extended professional development programs.

A key aspect of recognition for many participants in the Project is the notion of credits towards tertiary courses. Within the Department of Vocational Education and Training at the University of Melbourne credit will be given for one of the subjects in the Graduate Diploma of Technology Education, provided the DROTT participant has fulfilled the attendance and written requirements to a satisfactory standard. Although other tertiary institutions are not participating in this program, the Project requires participants to submit substantial written evidence of curriculum planning or implementation of a curriculum change process in technology. This has been done to enable participants to put together a substantial portfolio to assist them to gain credit towards other study programs.

The Discipline Renewal for Technology Teachers Pilot Project has provided an opportunity to research factors affecting the transfer of new system-wide curriculum frameworks into technology teachers' practice. At the same time it has enabled a broad cross-section of technology teachers from primary and secondary schools to gain practical understanding of curriculum design in relation to the new technology frameworks and skills and knowledge in information
technology and workshop practice. The initial phases of the program have been successful in meeting the immediate needs of most participants. Unintended opportunities for participants to explore new territory such as computer networks have emerged as the Project evolved. At the time of writing the third and final phase of the Project has just commenced. It is this phase which will focus on conditions which enhance technology teachers' commitment to ongoing professional renewal in their local contexts.

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