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**Developments in Technology  
Education in New Zealand  
1993-1995:**

**An Analysis of the  
Reflections of Key  
Participants**

A thesis submitted in fulfillment of  
the requirements for the degree of

**Doctor of Philosophy**

By

**Vicki Joanne Compton**

University of Waikato

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## **Abstract**

As of February the 15<sup>th</sup> 1999, Technology Education came into New Zealand's education system as a legal requirement for students from years 1 to 10. All schools under the New Zealand Ministry of Education's jurisdiction were required to implement technology into their school curriculum for these year levels in order to meet this requirement. Schools and teachers were supported in doing this by a national curriculum statement in technology that had been released in 1995. Developments that occurred during the 1993 to 1995 time period leading up to the release of the technology curriculum statement were critical both to the curriculum development and subsequent developments in the field of technology education in New Zealand.

Technology's entry into New Zealand education as a learning area in its own right reflects a worldwide trend whereby technological literacy has been identified as a worthwhile goal for formal schooling. Alongside the arguments for economic growth and the future wellbeing of societies, educationalists have supported this entry by way of educative arguments based on technology providing a site for the synthesis of theory and practice. New Zealand's movement into technology education reflects all the international rationales, but contains another dimension that sets it apart. That is, an emphasis on the sociological aspects of technological developments and practice. It is this aspect of technology education that provides the potential for technology education in New Zealand to support student empowerment through the development of a liberatory technological literacy.

Working from a conflation of interpretivist, praxis-oriented and postmodernist methodological discourses, this thesis provides an explanation of the developments between 1993 and 1995 in terms of the interactions of people involved, rather than the outcomes alone. Such an explanation can also provide opportunities for the future developments in field of technology education as people from both within and outside the developments come to better understand the complex interactions that determined the nature of technology education's past.

An analytical framework reflecting sociocultural theories was developed to fulfil this intent. This framework specifically uses components of practice theory developed by Bourdieu, and notions of learning through participation in communities of practice as developed by Lave and Wenger. It provides a framework by which the reflections and perceptions of individuals involved in key groups within the developments can be brought together to provide an interpretive account of the groups themselves as a collective. Research data was therefore gathered from participants involved in two key groups in the development of the technology education in New Zealand. These being the Curriculum Development Group and the 1995 Facilitator Training Group. From such an analysis the explanatory account developed would be more robust in that it would be developed from multiple, and often contradictory, perspectives.

This thesis concludes that the nature and direction of the field of technology education in New Zealand has been determined by a very small number of individuals within the development. This aspect of its developmental history has resulted in barriers to technology education's potential for educational reform. However, this thesis also concludes that these barriers are not insurmountable and potential does still exist for technology education in New Zealand to provide opportunities for students to develop liberatory technological literacy.

The literature review, data analysis and resultant explanation provided in the form of this thesis should go some way towards addressing teachers' and teacher educators' feelings of confusion and alienation that have arisen from the centre-peripheral nature of curriculum development adopted and the lack information and consultation identified during the 1993 to 1995 time period. The resolution of such feelings will remove one of the identified barriers to reform.

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# Chapter One: Introduction

## 1.1 Introduction

Technology education both nationally and internationally is a new and rapidly developing area. Technology's entry into the New Zealand curriculum as an essential learning area (Ministry of Education, 1993a), has resulted in a number of issues which have had a resounding impact on the nature of the area, and the directions in which developments have progressed. Technology education as outlined in *Technology in the New Zealand Curriculum* (Ministry of Education, 1995), necessitated a major shift in practice, of one sort or another, for most teachers in New Zealand. For teachers in lower and middle primary schools (teachers of year 1 – 6 students), this shift was in terms of incorporating technology as an additional learning area in their practice for the first time. For these teachers there was no established subject subculture of technology to either support or impede the implementation of technology. However, for specialist teachers previously involved in 'technical education' in upper primary, intermediate and secondary schools (teachers of year 7 – 13 students), the shift required was by way of a significant reconceptualisation of technology, and a probable subsequent shift away from their past teaching practices. For this second group, the established technical subject subculture generally did not provide fertile ground for the implementation of technology, and as such often served to impede rather than support its introduction.

Whilst there was transitional time provided between the release of *Technology in the New Zealand Curriculum* (Ministry of Education, 1995) and its subsequent gazetting in February 1999, the events preceding the release of the final statement served to provide the grounding basis for subsequent development in technology education in New Zealand. This basis therefore influenced the nature and direction of the area both prior to, and for some time after, the final statement's release date. Between 1993 when the draft technology curriculum was released, to the release of the final curriculum in 1995, a number of factors influenced the establishment of this basis. From early 1993 until late 1995 was therefore the time period selected for the focus of this research.

## 1.2 Rationale

The rationale for this research is that understanding the development of technology education in New Zealand relies on understanding its past. For those currently involved in technology education in New Zealand such an understanding is crucial for their own development work whether it be in a classroom setting or at the policy level. This research therefore sought to provide an explanation in order to aid the development of greater understandings of the nature of technology education as at the release of *Technology in the New Zealand Curriculum* (Ministry of Education, 1995).

Providing such an explanation relies on more than a chronologically based account of 'what' happened. Rather, there is a need to focus on explaining 'why' things have happened. The need to critically analyse events in terms of the people involved, decisions made, and resulting effects and implications, is fundamental to the provision of an explanation that provides for enculturation into understandings that would empower those currently involved in technology education and thus provide opportunities for their own practice.

To provide an explanation of the developments within technology education in New Zealand from 1993 to 1995 I have sought to gain insights from the perspectives of people involved. I have done this by analysing the reflections of a group of people who participated in varying ways in the developments of the national curriculum statement in technology (through the Minister's Advisory Group and the Curriculum Writing Group) and/or its early implementation in schools (through the Facilitator Training Group). In order to carry out this analysis I employed a number of analytical and descriptive tools that were an integral part of my analytical process. Thus the specific nature of the tools employed were developed from the data collected (for example, the category labels employed in the initial stages of analysis arose out of the data itself), and descriptive/presentation tools in turn shaped the nature of the data available for further analysis. This iteration between my analytical process and the tools involved, was embedded in an interpretivist methodology consistent with sociocultural theories of how people construct the world. The development of this analytical process was also important in order to meet the specific purpose of interacting my own perceptions of the way things happened with the reflections of the research participants. Thus enabling the development of a more robust and less partial view of what happened in technology education during this time and why.

### **1.3 Researcher Background and Position**

My background in education over the last ten years has impacted greatly on the nature of this research and my assertion that an explanation such as that described above has worth to the technology education community in New Zealand. In this section I wish to briefly outline aspects of this background I consider significant, before specifically explaining my position in this particular research.

#### **Personal Background**

After completing an undergraduate degree in biological sciences in 1985, I worked in industry for a short time as a microbiologist. From 1987 to 1989 I was the primary caregiver for two children during which I time I was out fulltime employment, but began working part-time in the tertiary education sector as a tutor in microbiology and biochemistry. During these years I was also enrolled part-time at university studying in the areas of education, psychology and feminist theory. In 1990 I returned to fulltime education as a teachers college student to become a qualified secondary school teacher in the areas of general science, mathematics, senior chemistry and senior biology. My experience as a secondary school science teacher resulted in personal frustrations due to the barriers I found at the classroom, department and whole-school level in terms of developing an inclusive learning environment and curriculum. For example, trying to access written classroom resources which did not use sexist language and/or gender and racial stereotyped illustrations was a major undertaking and one that was perceived by the majority of my science colleagues as a meaningless exercise. Additionally, the underpinning ethos of the school was aligned with notions social reproduction rather than education for social change and student empowerment.

With the birth of my third child, I again withdrew from fulltime employment and took the opportunity to return to university and enroll in a masterate degree with the then Centre for Science and Mathematics Education Research. Initially I focused on science education, with a specific interest in feminism and inclusiveness. This led me to undertake research into classroom curriculum and environments that would provide opportunities for student empowerment in the established learning area of secondary school science (see Mather, 1994a). After examining the literature and undertaking my own research, I began to see that past exclusive practices and ideologies were so firmly entrenched in the science education subculture that any changes seemed to be occurring at an excruciatingly slow rate, if in fact they were happening at all.

Moves towards validating alternative perspectives in the area of science and providing environments whereby children could feel some sense of 'belonging', consequently seemed a long way off. At this time I was introduced to technology education by Alister Jones as part of one of my science education modules. The philosophical grounding of technology as it was being constructed in New Zealand at that time, and the lack of an established presence in schools, provided me with a vision for technology education that involved the potential to make a relatively immediate and fundamental difference to children's school experience. I maintained that schools should provide experiences that allow for student empowerment, rather than be sites of oppression and conformity. Therefore, I perceived that movement within New Zealand's educational community towards such a view would more likely occur through technology education than any other avenue currently available within the New Zealand curriculum.

However, in order for technology education in New Zealand to live up to the potential for student empowerment, something expounded by myself (Compton 1997; Mather, 1994b), and others (Burns, 1997; Davies, 1998a; Davies 1998b; Jones, 1995; Wenmoth, 1997), I argue it must be fully understood by those involved in its future development and implementation.

### **Position in the Research**

My ability to undertake this research and provide an explanation of the developments from 1993 to 1995 in technology education has been made possible due to my own position within the development of technology education during this time period. Having been involved in both the curriculum development and its initial implementation, my role as researcher is both situated and complex. In all of the interactions with my research participants during data collection and analysis, our past and present relationships have always been in the foreground.

After my introduction to technology in 1992, I began working in the area of technology education in 1993 as a member of the Learning in Technology Education (LITE) research team. This was a Ministry of Education research contract held by the Centre for Science and Mathematics Education Research. At the same time I was completing my masters degree. The contract director, Dr Alister Jones, was one of my lecturers, and he later became the supervisor for both my masters thesis, and for this thesis.

When the contract for the development of the draft technology curriculum was won by the Centre, again led by Alister Jones, the LITE contract was put on hold. I was employed as the team leader for the 'Girls and Women' group in this development due to my background as outlined above. In this role I worked alongside all of the research participants from the curriculum writing group, including Alister Jones. Mike Forret, my second supervisor for this thesis, was also a member of this team. Another two research participants were from the Minister's Advisory Group, one of whom played a large role as an intermediary between this group and the writing group.

After the completion of the draft technology curriculum, and the LITE contract, the Centre won another Ministry of Education contract. This contract was also led by Alister Jones and its key aim was the training of fifteen teachers or advisors in 1995, to become facilitators of technology education professional development in keeping with the curriculum. I continued to work with Alister on this new contract, he as the Director and myself as the Project Officer. It was also during this time that we were both contracted as consultants to the Ministry of Education for the rewriting of the draft into the final technology curriculum statement.

As part of the facilitator training course, all participants were required to complete a masters paper in technology education that had been developed by Alister and myself. This ran as part of the University of Waikato's Centre for Science, Mathematics and Technology Education Research's summer school masters programme, and required the facilitators to attend the course during their summer holiday break, and two follow up weekends. They completed the academic requirements for the awarding of a masters paper. In addition to this they attended two week long courses that focused on developing a better understanding of the technological areas, technological practice and professional development facilitation in general. They were also required to develop and trial professional development programmes in their own schools/institutions and nearby schools. Throughout this year-long programme, I was the facilitators' tutor for the masters paper, coordinated the technological area programmes and worked alongside them in the development, trialing and evaluation of their professional development programmes. Many of these people became both professional colleagues and personal friends over this year, and remain so now.

My multiple level relationship with Alister throughout this time is important to acknowledge at the outset of this thesis. In assuming the position of Contract Director and therefore online manager, colleague, supervisor and friend, different power relationships between us co-existed over this time period.

The relationships I developed with each of the research participants were also important to acknowledge. These relationships, which developed both during the two-year period focused on, and since that time, have been of benefit to my ability to carry out the data collection and analysis. For example, as I approached people to ask if they were willing to be research participants for my thesis, all those approached responded positively to my request. Many of them would normally have turned down such an offer due to heavy workloads. When being interviewed, they also provided very open and honest accounts of their experiences as they knew me well personally and therefore felt comfortable in an interview situation. They also knew that I had an understanding of the wider context of that which they were describing.

Another significant factor was the wealth of background knowledge from which to make my interpretations of their experiences. From comments I have received as part of the data checking and editing process, this factor was recognised and appreciated by the research participants who often commented on how well my analysis had 'captured' and represented their experiences in technology education. These comments, which were made through out the analysis and write up period, provided me with an ongoing indication that the account being developed had a high level of respondent validity.

## **1.4 The Thesis and Research Questions**

### **The Thesis**

In order to understand the development of technology education as an essential learning area in New Zealand's curriculum, it is important to understand its historical underpinnings, including the views of people involved in its development from 1993 to 1995. By focusing on the reflections of those involved during this time and employing an analytical process based on sociocultural theories, an account can be provided that fully locates the development in the context of the time and focuses on the interactions of people, rather than outcomes alone. Such an analysis can provide new insights into the development of technology education in New Zealand.

## **Research Questions**

This research undertook an analysis of the reflections of selected people involved in developments in technology education, in order to provide an explanation of these developments. The people selected were some of the key participants in the development of the national curriculum statement in technology and/or its subsequent implementation into New Zealand schools. These participants were therefore members of the Curriculum Development Group (which included the Minster's Advisory Group and the Curriculum Writing Group) or members of the 1995 Facilitator Training Group. The time period selected reflects a critical time in technology education's history in New Zealand, that is 1993 to 1995.

The specific questions this research sought to answer were as follows:

- i) What factors did the members of the Curriculum Development Group (including those from the Minster's Advisory Group and the Curriculum Writing Group) and the 1995 Facilitator Training Group identify as the most influential on the developments that occurred from 1993 to 1995?
- ii) How did these factors influence the resultant nature of technology education as at the end of 1995?
- iii) Does a sociocultural analytical process provide for a useful historical account of developments within technology education in New Zealand?
- iv) What are the implications of this research for future development in technology education in New Zealand?

## **1.5 Chapter Overviews**

Chapter One provides an introduction to the research including its rationale, researcher background and position within the research, the thesis and related research questions, and an overview of the document by way of brief chapter summaries and an outline of the intent of the document structure.

Chapter Two provides the theoretical underpinnings of this research including a review of the literature that backgrounds recent educational change in New Zealand particularly that of relevance to the development of technology education. It provides an explanation of technology education as it is represented in the Technology in the New Zealand Curriculum (Ministry of Education, 1995) and an overview of technology education internationally.

This chapter also discusses the sociocultural stance of the research, particularly that which supports the data collection and analysis, including the presentation of concepts used in my analysis from Bourdieu's Practice Theory (Bourdieu 1977), and Lave and Wenger's notion of communities of practice (Lave and Wenger 1991), as a potentially useful descriptive tool in such an analysis.

Chapter Three discusses the methodological framework within which this thesis is positioned, and explains the methods employed in the collection of data, and its analysis. The analytical process employed not only provided the resultant explanation, but also suggests a way of manipulating and presenting individual's interview data to tell a 'bigger story'. This enabled the validation and application of my own lived understandings of the happenings of 1993 to 1995, as well as the exploration of other's perspectives in a way which increased the validity of the resultant explanation through reducing its partiality.

Chapters Four and Six present data in the form of personal stories as based on the participant's interview transcripts. The personal stories provide the basis for each participant's description. Chapter Four presents members of the groups involved in the development of the draft technology curriculum statement, whilst Chapter Six presents members of the group of 1995 trainee facilitators.

Chapters Five and Seven provide an analysis of each group employing the descriptive potential of Lave and Wenger's community of practice ideas as based on the descriptions presented in Chapters Four and Six respectively. Each chapter concludes with a description of the respective group as a collective.

Chapter Eight provides validation of the significance of these two 'communities of practice' as based on the participants' comments, and provides a further analysis of the material presented in Chapters Five and Seven.

Chapter Nine draws on all the above in order to answer the research questions and therefore support the argument underpinning this thesis. Each of the answers is discussed, drawing on the literature presented in Chapter Two, and includes a discussion of the implications of the research findings to future developments in technology education in New Zealand. Finally, recommendations for future directions for research and development within the field of technology education in New Zealand are presented as part of the overall summary.

I have structured this document to provide an account showing a range of perspectives with varying combinations of my own voice and those of my research participants. Through the early stages of Chapters Four and Six, I have attempted to clearly differentiate my own voice, and allow that of my participants to dominate through an extensive use of transcribed quotes. In the latter stages of this chapter however, the dominance shifts strongly towards my own interpretation of their experiences. Whilst Chapters Five, Seven and Eight are all still data chapters, they are primarily dominated by my voice as they are based on my interpretations of data previously presented.

This structure has been achieved both through the analysis itself, and the expression of the results of this analysis. I hope this provides the reader with enough material to allow them opportunities to read the text in a more dialogic fashion - entering into debate with the many voices present, and thus further reducing the partiality of the explanation provided.

## Chapter Two: Literature Review

### 2.1 Introduction

This chapter provides a review of literature of relevance to New Zealand's early and continually changing educational climate, and technology education's position within it. It also introduces the theoretical basis of the process of analysis developed for this research in order to answer the research questions.

Section 2.2 focuses on past educational reforms in New Zealand, particularly those of direct relevance to technology education. In this section recent educational change in New Zealand, and past changes, are discussed and linked to the development, and eventual release, of *The New Zealand Curriculum Framework* (Ministry of Education, 1993a) and *Technology in the New Zealand Curriculum* (Ministry of Education, 1995). Section 2.3 presents an overview of technology education as it is represented in the policy papers, *Technology in the New Zealand Curriculum Draft* (Ministry of Education 1993b) and *Technology in the New Zealand Curriculum* (Ministry of Education 1995). Section 2.4 summarises the position of technology curricula internationally and locates the New Zealand situation within this.

Section 2.5 explores in more depth the concepts underpinning technology education in New Zealand and the relationship between technology education and educational reform. Section 2.6 explains the sociocultural stance underpinning this research. Educational theories of learning that are consistent with such a stance are introduced. Bourdieu's Practice Theory (Bourdieu, 1977) is introduced and discussed particularly in terms of the concepts of capital and habitus employed in this thesis, and Lave and Wenger's notion of Communities of Practice (Lave and Wenger, 1991) is specifically discussed in terms of its potential usefulness as an analytical and descriptive tool. Section 2.7 presents a brief summary of this chapters content and intent.

## 2.2 Educational Reform in New Zealand and the Development of Technical and Technology Education

In order to understand the development of technology education in New Zealand's education system, it is important to understand the historical precedents to technology's inclusion in the *New Zealand Curriculum Framework* as an essential learning area (Ministry of Education, 1993a). To this end, this section discusses both policy and structural changes leading up to the release of the *Technology in the New Zealand Curriculum* (Ministry of Education, 1995), which have relevance to the advent of technology education in New Zealand schools. This section begins by outlining the foundational events of New Zealand's education system and follows developments in a loosely chronological fashion in order to show relationships between past initiatives, current policies and the situation in schools at the time *Technology in the New Zealand Curriculum* (Ministry of Education, 1995) was released.

### The 1877 Education Act

New Zealand's national education system is widely thought to be founded on the 1877 Education Act (Openshaw, Lee and Lee, 1993). Whilst the Act's original intent was to provide for a national primary system of schooling, modifications served to extend this to include a basis for early childhood and post-primary education (Openshaw, Lee and Lee, 1993). The structures which were set in place under this Act remained intact until the late 1980s, with the additional 1914 and 1964 Acts reinforcing and consolidating the 1877 structural foundations (Openshaw, Lee and Lee, 1993). This longevity of position is somewhat intriguing given that the underpinnings of the 1877 Act met with much resistance from a number of different sectors. The four fundamental 'problems' that the Act served to deal with were: 'the form which the administrative machinery of education would take so as to balance central control with the maximum of local freedom'; 'the sources from which a sufficiency of revenue might be forthcoming necessary for the adequate support of the schools'; whether the education provided was to be made compulsory upon all children of a determined school age'; and 'the manner in which religious consciences could be protected in a system of common schools' (Mackey, 1967, pg. 178). In resolving these 'problems' the Bill that gave rise to the 1877 Education Act was hotly debated in Parliament and many compromises were made in the name of political expediency. Not only was the resultant Act therefore controversial in nature, but due to the aforementioned compromises, it was also not particularly reflective of the original educational intent (Openshaw, Lee and Lee, 1993).

Given its somewhat inauspicious beginnings, it is perhaps surprising that this Act should therefore have provided the underlying structural framework for the next 100 years of schooling in New Zealand. However, it did not do so without continued dissent, with calls for change within New Zealand's educational system being widespread from both within and outside the general education system ever since the passing of the Act. In the area of post-primary education especially, dissatisfaction with both curricula and pedagogy has been loud and clear since the turn of the century when the composition of secondary schools changed significantly, particularly with the advent of 'free place' policies.

### **Early 1900s Curriculum Reform**

Whilst there was much debate regarding the need for reform leading up to and during the 1920s, no major structural changes were seriously contemplated. However, a change in the Inspector-General position saw what has been referred to as the 'advent of liberal and progressive primary and post-primary school policies' and subsequent changes to the school curriculum. The new Inspector General was George Hogben who assumed the position in 1899 at a time when the then Seddon administration was advocating far-reaching social, economic and educational reform. Of most relevance to technology education, was Hogben's position on secondary education, which was that it was still much too 'bookish' and disassociated from the common experiences of life, particularly for boys. (Hogben, 1890). In 1900 the Manual and Technical Instruction Act was released to provide for the general introduction of technical education initially as an attempt to cater for those people who had left school without attending secondary school and without a professional career. The intention was to provide these people with an avenue to increase their manual skills – for men in the area of the quality of their workmanship, and for woman in the area of improving the quality of their homemaking (Day, 1992). In the new primary curriculum released in 1904, Hogben was responsible for curriculum regulations which provided detailed prescriptions of subjects and stated that teachers should aim to provide for greater subject integration and give more emphasis to practical work (Openshaw, Lee and Lee, 1993). The 1900 Manual and Technical Instruction Act was linked specifically to school curriculum in order to formalise the entry of technical education in schools in the last two years of primary schooling. These moves to incorporate manual-technical training were strongly criticised not so much for their intent to incorporate the practical into children's schooling, but more in terms of the narrowness of how practical training was being defined. As stated by one critic, the recommendations in terms of manual-technical training '...often provided the most glaring instances of rigid formalism' (Campbell, 1941 pg. 94).

Campbell went on to state 'It was a form of technical training that quite overlooked the creative impulses of children... it certainly implanted sterile conceptions of art and handwork' (Campbell, 1941 pg.s 94-95). This may be explained by Hogben's adherence to the doctrine of social efficiency. He, along with many others at the time, viewed that the role of schools was to establish the intellectual and practical aptitude of the student and then educate them accordingly in order to assume their 'position' as citizens in a democratic society. It was not therefore education for social change, but rather education for social replication. Thus vocational education and general education were beginning to be viewed as providing different pathways for different students, but equally valuable to each group of students. In order for this to eventuate technical subjects needed to be viewed as fully integrated into the overall curriculum. Coordination between the manual subjects and the rest of the curriculum was a huge problem however, not least because of the expensiveness of the workshops and the subsequent economic solution with the development of centrally placed workshops (Watson, 1964). In these workshops specialised teachers and their specialist facilities could be fully used by transporting students to them from surrounding primary schools. The first three of these workshops were opened in Auckland in 1903, and others throughout the country opened soon after. As early as 1905 major concerns were being raised about the effectiveness of this solution – particularly in terms of the tendency to separate manual subjects from the rest of the curriculum, and the inordinate amount of time students spent in transit (Watson, 1964). However, it wasn't until 1936 that the then Superintendent of Technical Education, La Trobe, reported officially on the inadequacies of this system and recommended a return to manual subjects occurring alongside other subjects in the same physical location (Watson, 1964).

Hogben's influence did not stop at the primary level as he advocated that separate schools, to be known as Technical Schools, should be set up to cater for the more 'practically minded' (Openshaw, Lee and Lee, 1993). The first of the technical schools was opened in 1905, and by 1910 such schools had been established in all the main centres in New Zealand (Mawson, 1998). However, by 1915 Hogben had realised New Zealand's size would not support such a system of technical and secondary schools, but should move towards single type secondary schools with a 'multi-lateral' curriculum. As would be expected, given his underlying social efficiency stance, Hogben was a strong supporter of differentiated curriculum for boys and girls. However he did warn against total segregation, promoting some subjects as being places where girls and boys could learn together.

As with the technical school programmes, the 'technical subjects' were viewed as clearly gender differentiated leading to their future development and practice as inherently gendered in nature. Technical subjects also tended to show strong class differentiation – reflecting again the education for social replication focus. As discussed by Fry, this was a feature of education rarely questioned from 1900 to 1970 given it reflected the dominant traditional assumptions regarding the role of woman and the need to retain the 'social order' (Fry, 1985). This was particularly relevant at this time with the advent of the 'new woman' who had emerged out of the suffrage and temperance movements, and who presented an uncomfortable challenge to male dominance (Mawson, 1998). Introducing 'technical education for girls was therefore an attempt to put the 'new woman in her place' (Mawson, 1998, pg. 40). Support for such a stance was widespread in the community with many arguments coming from the biomedical community. It was during this time that 'science' was supposedly providing 'factual' information regarding the physiological differences between men and women and linking these to their 'natural' role in society. The often quoted Dr Truby King, then Superintendent of Seacliff Mental Asylum, strongly advocated in both 1909 and 1914 the need to differentiate the curriculum from puberty onwards in order to protect both girls and society. He argued this in terms of the harmful effects of mental stimulation on the physiological and psychological development of girls. This gender differentiated nature has remained with technical education in New Zealand throughout their curriculum life, as seen by relatively recent research carried out in New Zealand (Burns, 1990). This 'nature' remains a major site of contestation for technology education as seen in more recent critiques, for example, that by O'Neill and Jolley, (1996/7).

The 1914 Education Act did little to resolve the 'general versus vocational' education debate. In fact, contradictory definitions given within this act served to further confuse the issues. For example, it was stated in one section that vocational education should come under the framework of general education in order to better prepare all students for their future citizenship, whilst in another section the implication was the two were, and should be, quite discrete (Openshaw, Lee and Lee, 1995). At this time Hanan was appointed as the new Minister of Education and strongly advocated for functional changes to occur in post-primary in order that schools be more reflective of the wider community. He sought to use his office to expand the number of compulsory courses provided and the examination regulations (Openshaw, Lee and Lee, 1995).

In this way Hanan attempted to follow Hogben's lead, providing a more differentiated curriculum with academic and vocational courses being seen as equally valuable to their respective students in obtaining a sound general education. The response from teachers, parents and students however was to thwart this stance as they continued to view academic subjects as those with credibility due to their link to school credentials by way of examination. Further differentiation also resulted from the 1914 Act between District High Schools and Technical Schools, and Secondary Schools in terms of the length of study assumed necessary for each as based on the perceived exit points of their respective students. This resulted in the statute compelling Secondary Schools to provide courses of not less than three or four years and District High Schools and Technical Schools to provide courses of not less than two or three years (Openshaw, Lee and Lee, 1995). Thus technical subjects became not only 'gendered' and 'classed' in terms of their student base, but also perceived to be less valuable in terms of education generally (Mawson, 1998).

### **Intermediate Schools - linking of Primary and Post-primary**

Concerns regarding the lack of cohesion between primary schools and post-primary education had been raised throughout the late 1800s and early 1900s. In fact as early as 1894, a schooling system was established in Nelson trialing the idea of separate schools for junior and senior primary students. In this case two 'central schools' were set up – one for boys and one for girls between the ages of 11 and 15 (standards III to VII). The curriculum in the Nelson Central School for Girls included cookery and dressmaking years before it was established in primary schools. However due to these schools not fitting into the National organisational scheme at the time this programme was modified significantly. As stated by Watson,

...the salaries and staffing arrangements of the two central schools did not fit neatly into the provisions for primary teachers as a whole in the national scales that were adopted in 1911. There is nothing to show that the organisation was scholastically ineffective. However, exceptions have often succumbed before the tendency to remove anomalies even when they were justifiable on other grounds (Watson, 1964, pg. 9).

As mentioned earlier, the establishment of central workshops for manual subjects from 1903 became a major cause for concern.

By 1907 recommendations were being heard that supported a return to the model similar to the ill fated Nelson central schools with the suggestion that all pupils above Standard III be taught in the same school. Purdie, an Auckland teacher and school inspector, (later to become the Secretary of the Auckland Education Board when it began establishing the first intermediate schools), argued the development of such schools on both educational and economic grounds (Watson, 1964). Much of the focus of the arguments was in terms of narrowing the gap between primary and post-primary as well as between technical subjects and other subjects within each system. However the 1914 Education Act's creation of separate controlling authorities for technical schools, as well as for primary and secondary schools, served to provide an even deeper gulf (Watson, 1964).

In 1920 James Parr was appointed as Minister of Education. After much consultation, particularly with the New Zealand Educational Institute (NZEI), planning began in earnest for the establishment of junior high schools. The recommendation to begin establishment of junior high schools that were unattached to either secondary or technical schools, and consisted of a three year balanced technical and traditional programme, was made in March 1922 (Watson, 1964). Reports from inspectors of secondary schools indicated that 'junior classes in existing secondary schools were usually taken by untrained and inexperienced teachers' (Watson, 1964, pg. 38). Parr also observed that 'the effect on pupils of these classes who have just left the hands of highly trained teachers in the primary schools cannot be other than unsatisfactory' (Watson, 1964, pg. 38). As a result, the recommendation was that staff for the junior high schools should be mainly primary trained teachers. The first junior high school was Kowhai Junior High School in Auckland which opened in October 1922, and 'it was to be the only independent school of its type for more than a decade' (Watson, 1964, pg. 41). The establishment of these schools was dependent to no small extent on the Parr Government's perception of economic advantage – that is, areas whose community were willing and able to contribute significantly to the establishment of the envisaged separate junior high school would get one, where as other areas junior school development 'consisted of little more than a record of form I and II classes being attached to secondary school' (Watson, 1964, pg. 42). It was not long before 'there was a chorus of complaints that secondary schools with intermediate departments were leaving Forms I and II to young and inexperienced teachers' (Watson, 1964, pg. 52). By 1925 therefore, whilst five junior high schools had been established – only the first of these was independent and the intent behind the move was not being realised.

However by 1926 a new Government had been elected and in the light of acute financial pressure, plans for junior high school developments were put on hold to the extent that seven years later only five more junior high schools had been established nationwide. This was ten in total, and still with only one of these independent, six attached to secondary schools, one to a technical school, one to a district high school, and one to a primary school.

In retrospect, the lack of progress was probably a good thing given the sudden and unexpected change in regulations that occurred in December 1932, and the subsequent Education Amendment Act passed in March 1933. This turn of events was to make the following significant changes:

- to reduce the period of instruction from three years to two;
- to change the name from junior high school to intermediate school or department;
- to introduce less generous staffing and salary scales.

(Watson, 1964, pg. 55)

Whilst the rationale behind this shift in focus was never clearly articulated, there is conjecture that it may have resulted in pressure from regional educational boards facing a loss of control over the form I and II area, coupled with the financial costs involved in establishing yet another controlling authority. This new concept of an intermediate school ensured they remained under the auspices of the primary school system. This in turn removed the temptation of starting on a secondary programme and thus prioritising academic subjects over the technical, aesthetic and craft subjects. It also served to consolidate earlier directions through the promotion of social cohesion, provision of both general educational and vocational guidance, and by the perception at least, of a reduction of the gap between primary and secondary schooling (Watson, 1964). In contrast to the earlier slow establishment of junior high schools, intermediate schools were relatively quickly established – with five independent intermediate schools and eleven intermediate departments operational by 1936.

Intermediate schools were expected to provide a richer, more integrated programme, which was flexible enough to cater for a range of student abilities and interests. The regulations that came in under the junior high school legislation meant students at intermediates had a longer school day than their primary counterparts.

Along with this extended school day, time was saved by the students not having to travel to manual training centres, and by allocating some of the students' leisure time to elective activities. The biggest factor in terms of increasing 'time' however, appeared to be the efficiency of the intermediate timetable, which resulted in a higher '...likelihood that all sections of the curriculum will in fact be given the time allocated to them' (Watson, 1964, pg. 170).

Whilst the advent of intermediate schools resulted in organisational changes regarding technical subjects, there was relatively little change in terms of their nature. The technical subjects offered by intermediate school were homecraft, sewing and woodwork and metalwork. All but metal work had been part of the curriculum at this level of schooling for many years. However the perception of some of these areas did undergo modifications due to the change in the staffing, and the subsequent improvement of the relationship between these staff and other staff members in many intermediate schools. Most of the technical teachers in intermediates 'were part of the post-primary service', and had often 'entered teaching from a wide variety of callings' (Watson, 1964, pg. 172). Research undertaken by Watson suggested that,

...many of these teachers were convinced of the advantages of intermediate schools for the teaching of their subjects. They enjoyed the opportunities available to take a full part in the life of their schools... Several craft teachers, especially women, went so far as to claim they had been attracted to intermediate schools from secondary schools simply because of the greater appreciation shown toward their work.

(Watson, 1964, pg. 172)

There was some advance therefore in the area of raising the 'value' attributed to technical subjects in intermediate schools and in some situations technical teachers and their colleagues began to develop closer relationships which were seen to be beneficial to all parties, including the students. However, as mentioned above, these changes did not result in significant changes in terms of the nature of the programmes offered with the exception of woodwork, which is discussed in more detail below.

Technical programmes for girls in particular showed little change from the past. The technical teachers and the homecraft syllabus still focused on food preparation, care of utensils and laundry skills, and sewing focused on practical knowledge regarding both hand and machine sewing, exploration of aesthetic considerations, and personal grooming (summarised from Watson, 1964). In short these subjects still had as their primary aim, girls developing all the skills they needed to become 'good housekeepers and wives' through what was commonly referred to as the 'family centred approach' (Watson, 1964).

This focus on increasing girls' 'status' and 'usefulness' within the family showed interesting parallels with their own teachers perceived status and usefulness within the school. Watson describes his ability to determine the 'status' attributed to the sewing teachers in an intermediate school by determining if 'her influence was noticeable in the choice of curtains in classrooms, the furnishings of the staffroom, the properties used in plays, bedcovers in the sick room, and so on' (Watson, 1964, pg. 178).

The boys metal work focus was that of learning basic skills and processes. For example, 'soldering, riveting, and possibly wirework and decorative metalwork' (Watson, 1964, pg. 180). This focus on basic skills and processes was in keeping with the girls' technical subjects, even though metal work was introduced some sixty years later. Metal work teachers specifically expressed the view that skills and safe practices were of paramount importance and needed to be taught through highly structured programmes. They claimed that 'until a boy has some command over tools and some appreciation of workshop practice, it would be a disservice to him... to give much freedom in the planning of projects and in elective group work' (Watson, 1964, pg. 180). A large proportion of these teachers were immigrants, many being ex-navy men (Watson, 1964).

The boy's woodwork teachers however, showed some significant shifts away from the narrow and stereotyped technical focus underpinning the views and practices described above. In contrast to the other technical teachers, the woodwork teachers interviewed by Watson perceived their educative role as having a much broader focus and interpreted their syllabus accordingly.

For example, the woodwork teachers' view of the overall aim of their subject was that it should:

...improve a boy's understanding of his physical environment, to stimulate clear thinking both through the planning of articles within his competence and the selecting of the required materials and tools, to increase his appreciation of good workmanship and design, to give experience in handling materials and tools, to improve muscular co-ordination, and to develop creative, constructive and critical abilities... (Watson, 1964, pg. 179).

Further to this, 'they claimed expressly that these skills were better taught incidentally through tasks of real interest to boys' (Watson, 1964, pg. 179). Thus showing a shift in programme delivery and teaching practice as well as overall intent. The trend for teachers of 'woodwork' to be leading shifts in philosophy and pedagogy within technical education is reflected in secondary schools also - as discussed later in this section.

### **Education for Citizenship**

With the 1935 general election resulting in a Labour Party Government, previously discussed shortcomings of the present system were taken into the political arena and formed the basis of policy decisions for widespread change. The Government's educational policy was outlined by Peter Fraser, the first Labour Minister of Education, and included the following:

The Government's objective, broadly expressed, is that every person, whatever his (sic) level of academic ability, whether he be rich or poor, whether he live in town or country, has a right as a citizen, to free education of the kind for which he is best fitted, and to the fullest extent of his powers. (Fraser 1939, pg.s 2-3)

Fraser went on to state that the 'full acceptance of the principle' inherent in his words above, would 'involve the reorientation' of the education system' (Fraser 1939). Fraser's successor, Rex Mason, was a strong supporter of the need for schools to educate adolescents in order that they might take their rightful place as future citizens. He was concerned that boys and girls might be missing out on such an education with long term effects on New Zealand society (Openshaw, Lee and Lee, 1993).

Major changes did occur during this time, including the extension of free secondary schooling to all children and the raising of the school leaving age to fifteen. Structural changes which had constrained the taught curriculum were made firstly with the abolition of the 'proficiency examination' in 1936 and the 1944 decision to make English the only compulsory subject for the new university entrance qualification. With this came considerably more freedom for all schools to accommodate all their students' needs, at least in terms of curricula.

The Thomas Report was commissioned by Mason in an attempt to establish a core curriculum to include all post primary schools. This report supported the need for a reform of teaching practices and attempted to widen the taught curriculum with the introduction of a core cultural curriculum consisting of English, Social Studies, General Science, Health, Handwork, Art and Arithmetic (Department of Education, 1944). The newly appointed Director of Education, C.E Beeby, supported this stance. Beeby had a strong belief in the need to educate the 'average student' and to educate them in a balanced well-rounded fashion, so as to educate the whole child. He further expounded the notion that an educated populace was central to a workable democratic society (Beeby, 1940). Beeby also emphasised to the Thomas committee that it was essential the technical schools were included in the 'core curriculum' scheme (Openshaw, Lee and Lee, 1993). The Thomas Report however did not advocate any changes to the gendered nature of technical subjects. In fact it served to reinforce the need for a differentiated curriculum in this area by stating that post primary education for girls should contain studies directly related to the home, whilst boys should be offered courses whereby they could acquire a reasonable level of skill in an art or craft (Department of Education, 1944).

In 1945 a common core of technical subjects was introduced at years nine and ten (forms three and four) that included cooking and sewing for girls, and metal and woodwork for boys (Mawson, 1998). In this way, gender differentiation continued to be supported. Further to this, the 1960 primary syllabus in homecraft for girls at upper primary served to differentiate homecraft from other technical subjects by suggesting that there may not be enough money available for these courses and therefore, parents should provide some of the ingredients themselves. If they did not do so, the girls would 'miss out' on the activity. This was not a feature of the workshop syllabus for boys, or any other curriculum area in the school at this time. As stated by O'Neill and Jolley, 'this placed food studies in an unprofessional light and also contributed to its marginalisation in the school curriculum' (1996/7 pg. 228).

Initiatives for change during this time were hampered by two main factors. The first factor being that 'most teachers did not understand fully the nature and implications of the proposed changes or they were opposed to them in principle' and the second being that 'the social and economic pressures of the community for examination qualifications were so strong that the schools were obliged to comply with their demands' (Whitehead, 1974 pg. 52). In terms of technical education however the resistance to change was centred more in the wider community. As stated by Mawson, 'As had been the case since 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' (Mawson, 1998, pg. 41). Over the twenty-year period between 1950 and 1970, technical schools were phased out and renamed as secondary schools. However, achieving 'academic respectability', after their 'technical' background, proved difficult for many of these schools (Mawson, 1998).

Debates regarding the best way to effect change in classroom practice were rife during this time with the problems associated with school 'freedom' and 'choice' being highlighted by many as they attempted to straddle the line between encouraging progressive educational practices and imposing them on teachers. Beeby was emphatic in his opposition to teacher imposition of this type. In fact in a reflective article written some 20 years after, Beeby states that 'no fundamental change can be brought about in schools on a national scale unless average teachers understand the change, believe in it and, above all, accept it as their own idea' (Beeby, 1986 pg. 53).

All the curriculum reforms to date had been in keeping with what McGee refers to as the prevailing 'centre-periphery' model (McGee 1997).

That is:

Curriculum innovations were initiated at the centre, which was the government's official education arm, the Department of Education (now the Ministry of Education), and transmitted to the periphery – the schools - for implementation.

(McGee, 1997, pg. 260).

The reforms outlined in the discussion so far can be seen to have been clearly underpinned by such a 'centre-periphery' model of curriculum development and, as such, imposed on teachers. They were overtly reflective of political agendas rather than being a response to teachers' own needs and/or requests, and in fact often flew in the face of these. As found by Nisbet (1980), several conditions are necessary if teachers are to readily adopt and implement curriculum innovations.

The conditions are summarised and discussed by McGee as follows:

- Teachers need to perceive that there is a *need* for them to change, but when change is imposed from the outside it is not *their* change, not *their* need.
- Teachers must identify a range of alternatives that might meet the need.
- Teachers must work in a school which has a climate conducive to change.

(McGee, 1997, pg. 261)

With these conditions not being met, the expected sweeping changes in school curricula and pedagogy did not eventuate at this time. However, a number of trials by individual teachers were carried out as based on the Thomas Report, and subsequent Department of Education encouragement. All these trials were school-based innovations and stressed the importance of subject integration, breaking down subject boundaries, and encouraged learning to be set in the wider school community (as reported on in McKinnon, Nolan, Openshaw, and Soler, 1991). Whilst it has been reported some positive changes may have occurred within these schools (Nolan, Openshaw, McKinnon and Soler, 1992), subsequent curriculum changes at a national level in line with these changes are yet to be seen.

### **1970s/1980s Reforms**

The acknowledgment of the need for widespread change in the whole education system continued and various other reports came out which echoed and extended the recommendations that had come before. For example, The Currie Report, (Department of Education, 1962); Report on Educational Policies in New Zealand (Department of Education, 1982), OECD Report, (OECD, 1983), and the Curriculum Review (Department of Education, 1987). However the Currie Report (Department of Education, 1962), picked up on the unsuccessful nature of the centre-periphery model and suggested that a Curriculum Development Unit be set up within the Department of Education.

The rationale for this was the hope that it would facilitate a more consultative relationship between teachers and government officials during the development of curriculum, resulting in a greater likelihood of teacher ownership and acceptance, and in turn, a change in school and classroom practice at a national level.

One result of this with regard to technical education was the 1975 Form 1-4 Workshop Craft curriculum, and the 1977 Form 5 Workshop Technology. (This was followed by developments in other areas, particularly the development of the draft Form 1-5 Science Syllabus as reported in Bell, 1991). Not only was the mode of development of these curricula different, but so was the content of the curricula themselves. This was particularly significant in the shift to workshop technology, with a movement away from 'content driven, exam oriented curriculum' to one that had 'a design focus, covered a range of materials and was fully internally assessed within a framework of a national moderation system' (Mawson, 1998, pg. 42). Whilst the focus was still heavily on skills and the development of a product with 'take home' value, design and a related study exercise together made up fifty percent of the overall grade (Mawson, 1998, Jones, 1998).

In further recognition of earlier failures of teacher uptake, a well-resourced professional development programme was undertaken in order to increase the likelihood of teacher acceptance of the reform captured in the syllabus. Whilst there is some anecdotal evidence to suggest this was not completely successful (Mawson, 1998), other evidence (for example from moderation experiences of people in the field) would suggest that a critical mass of teachers did change their practices and the reform did impact on the student's experiences of technical education (Harwood, 1999).

No parallel initiatives occurred within the (traditionally) girls' technical education curricula, with the homecraft syllabus remaining unchanged from its instigation. There was a move in intermediate schools to reduce the gendered nature of these technical subjects by making the girls take metalwork and woodwork, and boys take sewing and cooking. This attempt also occurred in some Form Three programmes (Mawson, 1998; Jones, 1998). However, this had little effect on the gendered nature of technical subjects once they became optional at secondary school.

By the 1980s concerns were raised about the somewhat ad hoc fashion of educational reform with the Director-General of Education claiming when addressing the Annual Principal's Conference that 'piecemeal' change would not achieve a 'satisfactory or complete answer to the changes required of the schools' (Renwick, 1981 pg. 2). He went on to reinforce that what was needed was a major change in the 'structure' and 'ground rules' of New Zealand's education system (Renwick, 1981).

The general direction of change in keeping with liberal educational ideals remained the same throughout this time, apart from a relatively short period of time when the National Minister of Education, Merv Wellington, sought to move against the advice given in the preceding reports. In a reactive move, he began plans to instigate a 'back to basics' campaign linked in with the notion of a core curriculum, which would dictate both content and framework. Wellington appointed a committee steeped in conservative educational ideals that resulted in a report of a totally different flavour – the Review of the Core Curriculum (Department of Education, 1984). By the middle of 1984, despite growing criticism from all education sectors, it looked as if the 'implementation of these ideas was inevitable' (Snook 1990 pg. 6). However, this was not to be, due to a 'snap election' being called by the then Prime Minister, Robert Muldoon, which resulted in the National government, and therefore Merv Wellington, losing power, and a subsequent return to the earlier directions in education.

The incoming Labour government's first Minister of Education was Russell Marshall who immediately moved to seek public opinion on reviewing the curriculum. Whilst this was occurring in 1985 the Department of Education abolished University Entrance external examination in favour of school based internal assessment. As in the case of earlier recommendations, this was an attempt to further encourage schools to 'improve their existing curricula and develop programmes that would benefit the whole range of secondary students' (McKinnon, Nolan, Openshaw, and Soler, 1991 pg. 159). At this time Renwick, who was still the Director of Education, became interested in both the global trends in 'technology' education and the parallel trends within existing school subjects to include more 'technology' in their curriculum. For example science was including technology in terms of an applied science focus, social studies was focusing on technology from a technological deterministic focus, and information technology primarily by way of computer studies was growing in schools (Jones, 1998).

In 1985 Renwick called for a paper to explore Technology Education, and shortly afterwards The Beattie Report (1986), recommended greater funding in science and technology and stressed the economic and technological ends of education' (Mawson, 1998, pg. 43). Findings of this report were incorporated into the brief of the 1991 Ministerial Task Force (Ministry of Research, Science and Technology, 1992), introduced later in this section and discussed in Section 2.3.

In keeping with the call for a more coordinated and effective strategy for change, reports focusing on learning and achieving (Department of Education, 1986), and a review of the curriculum as a whole (Department of Education, 1987), were commissioned by Marshall. Whilst the Curriculum Review was never acted on formally, it did provide an insight into the 'diversity of views and demands of the community in regards to the education system' (Simon and Massey, 1994 pg. 73). There was a high level of public discussion and consultation carried out by the committee undertaking the review, which resulted in the inclusion of a range of disparate voices being represented. For example, the 'radical left' including high representation from Maori and their supporters focusing on biculturalism and bilingualism, the 'liberals' focusing on equality for all, and a subsequent move towards multiculturalism, and the neo-conservatives or 'new right' focusing on moving the curriculum away from such 'frill' education with a continuation of the 'back to basics' campaign (Simon and Massey, 1994).

Perhaps one of the most significant shifts that occurred with this review was in the area of how the nature of curriculum was perceived. Instead of viewing curricula in terms of a syllabus or examination prescription with specified content to be learnt and examined, the committee interpreted curricula to be more inclusive of the overall learning environment (Bell, Jones and Carr, 1995). In the report to the Marshall the committee stated 'the curriculum to be all activities, events, and experiences that take place in the school's learning programme' (Department of Education, 1987, pg. 6). The key recommendations from the Education Review are summarised as follows: that there should be an official (through regulation) common national curriculum for all schools from new entrants to form 5; the national curriculum should provide guidance for forms 6 and 7; the national curriculum should provide for a broad and general education consisting of national principles and three aspects of learning, knowledge, skills, and attitudes and values; schools would develop their school curriculum in keeping with the national curriculum; responsibility for consistency between schools' curricula and the national curricula would lie with all stakeholders, including students, teachers, parents and the wider community (Department of Education, 1987).

A draft of such a national common curriculum was written and published in 1988, and promoted the following principles to support curriculum development: focusing on the learner; promotion of cultural identity and equity; achieving balance and coherence; and providing accountability (Department of Education, 1988a). It also suggested the following curriculum aspects: culture and heritage; language; creative and aesthetic development; mathematics; practical abilities; living in society; science, technology and the environment; and health and well being (Department of Education, 1988a). From this, it can be seen there was a direct and overt attempt to move beyond the differentiated curriculum of the past, and to shift the emphasis on schooling towards the development of the whole person. Due to the short lived nature of this draft, it is unclear what the implications for the 'technical subjects' or technology education may have been. However, it can be interpreted that provision for these subjects was being allowed for both separately (practical abilities) and in an integrated fashion (creative and aesthetic development, living in society, science, technology and the environment, and health and well being) within the suggested curriculum aspects.

### **The Radical Restructuring of Education**

Before the curriculum review findings could be taken any further into schools however, the 1987 election saw Labour returned to government but the Minister of Education portfolio was assumed by the then Prime Minister, David Lange. With the change of Minister came a change of focus whereby curriculum reform was put on hold in order to focus on far more wide reaching structural changes centred around education administrative and managerial reform. Like his predecessor, one of Lange's first acts was to establish a national investigation, not into curriculum, but rather to review educational administration, later known as the Picot Report (Department of Education 1988b). The findings of this review were to provide recommendations for a complete and radical restructuring of New Zealand's education system.

The Picot Report (Department of Education 1988b) formed the foundation of policy decisions which were to impact on the education system in a manner which would force administrative change and therefore, it was hoped, effect changes in school and classroom curricula and ultimately classroom practice. One of the most significant changes underpinning the restructuring was the move away from 'the belief that the state was the most appropriate authority to control education' (Simon and Massey, 1994 pg. 74).

The other significant change to past policies was the shift of focus from equality to equity. Rather than developing an education system whereby all students would be able to access 'equal opportunities' they would now experience 'equality of results/outcomes'. Thus 'following Picot, equity objectives were expected to underpin all activities in school' (Simon and Massey, 1994 pg. 74). Alongside this was a focus on increasing efficiency in terms of school management and standards in terms of student learning.

In line with the recommendations of the Taskforce set up to review educational administrations, and as part of the drive for efficiency, Lange disestablished the Department of Education and replaced it with a Ministry of Education. This was an attempt to remove bureaucratic constraints, and remove the State from the day to day running of schools. The role of the new Ministry of Education would be to provide policy advice, administer property and manage financial and operational activities. A school review and auditing agency would also be established, later to become known as the Education Review Office (Openshaw, Lee and Lee, 1993). In so doing the Curriculum Development Division was also disbanded and curriculum development became a service contracted out into the marketplace and monitored by the Ministry of Education. This, in effect, dismantled the Curriculum Development Division's teacher consultative network. McGee argues that this has resulted in a reversion back to a curriculum development system with even less teacher input, and therefore ownership, than that which existed prior to the Currie Report based reforms. That is, he claims that 'the new system of contracted national curriculum writing and teacher development in schools is largely a centre-periphery model' (McGee 1997, pg. 296).

### **Education as a Commodity?**

The change to a Labour Government in the 1984 election was the result of a general public reaction against the interventionist policies of the Muldoon National government and the fact that New Zealand was nearing a state of bankruptcy (Bell, Jones and Carr, 1995). Therefore education, as with all other service sectors, came under treasury scrutiny in a way which was to mark a shift away from the normal 'centre left' politics of Labour, towards policies usually touted by the 'new right'. By 1987 the Treasury began to clearly articulate its views on education, as stated by Peters, Marshall and Massey (1994, pg. 258), 'The Treasury's ideas on education indicated that education shared the main characteristics of other commodities traded in the market place' and should be managed as such rather than 'regarded as a form of welfare' (Peters, Marshall and Massey, 1994, pg. 253).

Thus a very uneasy tension was played out with the Prime Minister (and Minister of Education) trying to hold on to his socialist ideals whilst seeking also to appease his Minister of Finance, Roger Douglas – proponent of New Zealand’s version of neo-liberal economic theory known as ‘Rogernomics’ (Peters, Marshall and Massey, 1994). This tension became too much for David Lange who resigned his position, and shortly after, Labour lost the 1989 election to a new and overtly ‘new right’ National government.

### **The New Zealand Curriculum Framework**

The National Government’s Minister of Education, Dr Lockwood Smith, continued to support the ‘Tomorrow’s Schools’ transition through what was termed the Achievement Initiative’ (Ministry of Education, 1991a). Also a part of this Initiative was a return of focus to the review of the curriculum (as started by Marshall) but now in keeping with both the new educational administrative structures, and the view of education as a commodity. This resulted in a more pronounced weighting on such things as efficiency and consumer choice, although the notion of equity remained as an overarching principle.

The Lough Report focused on the processes of the educational reforms was published in 1990 (Ministry of Education, 1990) and was followed with the draft National Curriculum Framework (Ministry of Education 1991b) and the final National Curriculum Framework, released two years later (Ministry of Education, 1993a). Whilst there are many links with Marshall’s Curriculum Review recommendations, there was a notable shift in the language used in terms of a shift away from a purely educational discourse towards one inclusive of the marketplace (Peters, Marshall and Massey, 1994). By discourse I refer here to a notion broader than that of a purely linguistics concept of word usage, towards one which includes the underlying assumptions and meanings attributed to those words due to their location and the manner of their use. This is in keeping with Foucault’s work where he explores discourses as ‘ways of constituting knowledge, together with the social practices, forms of subjectivity and power relations, which adhere in such knowledges and the relations between them.’ (as summarised by Weedon, 1987, pg. 108).

*The New Zealand Curriculum Framework* (Ministry of Education 1993a), was the culmination of past curriculum initiatives however, and sought to provide a framework which gave guidelines to schools without dictating the terms by which those guidelines were to be met. A 'core curriculum' of particular subjects was replaced with essential learning areas in an attempt to encourage a breaking down of subject boundaries and the integration of different knowledges and skills. These essential learning areas would have national curriculum statements to aid their implementation - including the provision of achievement objectives that would become the legal requirement for every school as each statement became gazetted. The framework included a set of key principles, upon which all curriculum development should be built, emphasising in particular the assumption that programmes of learning should have the student and her/his needs as the central factor in their development and teaching. Eight generic essential skills were named which were to be seen as threading through all learning areas. A section highlighting the importance of attitudes and values was included in the framework, with the expectation that these too would be reflected in all curriculum developed under its framework. A section on curriculum statement structure, assessment and learning outcomes was also included (Ministry of Education, 1993a, pg.s 22-26). This dictated that all national curriculum statements in the essential learning areas would specify achievement objectives that would give clear guidance to the teacher regarding learning outcomes. Alongside these, a series of level objectives to be used for assessment purposes would need to be given. It was suggested these be divided into eight levels. The retention of a notion of a 'core curriculum', or in this case, a set of seven essential learning areas, one of which was technology, was based on the belief that all students, including those who suffer from inequitable practices, are best served by a curriculum and pedagogy with some level of commonality.

By resisting the calls for a 'back to basics' curriculum, the *New Zealand Curriculum Framework* (Ministry of Education, 1993a) has gained the support of many educationalists. For example, Capper suggests that whilst its language may be conservative, its structure is liberal. He therefore views it as a positive document overall (Capper, 1992). The essential skills component of the new framework served to appease those community groups concerned with a general lack of 'basics', whilst the learning areas concept provided grounds for the development of school curriculum which is both appropriate and relevant to all students. Other educational commentators however do not agree. For example, Peters and Marshall argue that the document is essentially an extension of the National Government's vision of an enterprise culture (Marshall, 1992, Peters, Marshall and Massey, 1994).

That technology was named as one of the seven essential learning areas reflects not only international trends in education, but also the findings of another specifically commissioned report. Under the Achievement Initiative's momentum (Ministry of Education, 1991b), a Ministerial Task Group was set up jointly by the Minister of Education, and the Minister of Research, Science and Technology. This Task Group was established in June 1991 to review Science and Technology Education and reported the following year (Ministry of Research, Science and Technology, 1992). The members of the Task Group came from secondary and tertiary institutions, but also included representation from industry (Jones, 1998). This was a crucial report for technology education due to its key recommendation that technology should be developed as an area in its own right (see Section 2.3 for further discussion on the report's recommendations). These recommendations provided a powerful platform, supporting the scoping of technology (Ferguson, 1991) and the subsequent development of technology education policy (Jones and Carr 1993a; Guy, 1992). The Group's findings met with the approval of the Minister of Education as he saw strong links between the recommendations for Technology Education and the Porter Report on New Zealand's economy, which suggested that New Zealand must become more innovation driven (Mawson, 1998). This linking of the development of technology as an essential learning area, and Smith and his Government's focus on economic survival, has resulted in a number of criticisms of, and claims about, technology education as being an imposed socio-political tool of a market driven government (for example O'Neill and Jolley, 1996/97; Mawson, 1998; Davies, 1998a).

The Ministry of Education contracted out the writing of technology education policy papers. The main writers of six of these policy papers then tendered for and won the contract for the development of *Technology in the New Zealand Curriculum Draft* (Ministry of Education 1993b). *Technology in the New Zealand Curriculum* was released two years later (Ministry of Education 1995). (See section 2.3 for further discussion of the Task Group Report, the Technology Education Policy Papers and the draft and final technology curriculum statements). Technology education, as opposed to technical education, was now poised to enter into New Zealand's education system with a potential status technical subjects had attempted to gain but never achieved. As with all the other curriculum developments under the *New Zealand Curriculum Framework* (Ministry of Education 1993a), the development was essentially that of a centre-peripheral model (McGee, 1997). The chances of teachers reacting negatively to Technology education were therefore always going to be high, if only due it being another top down imposition which flew in the face of 'parental, employer and teacher indifference' (Mawson, 1998, pg. 45).

## 2.3 Technology Education in New Zealand

By virtue of inclusion as one of the seven essential learning areas, technology education has been given a high priority in New Zealand through *The New Zealand Curriculum Framework* (Ministry of Education, 1993a pg.s 5,8 &13). Unlike curricula for the other essential learning areas in New Zealand however, the technology curriculum had to be developed without an existing curriculum statement or syllabus, and without a basis of practicing technology teachers. Whilst it could be argued that there was a pool of practicing teachers from the teachers of the technical subjects, and areas such as science, social studies and computer studies, research undertaken in New Zealand showed clearly that the concept of technology and technology education held by these teachers differed significantly from each other, and from those upon which technology education in New Zealand was being developed (Jones and Carr, 1993a). Not only did their concepts of technology differ, they also brought with them many pedagogical practices as part of their subject subcultures which were deemed unhelpful for technology education (Jones and Carr, 1993a; Jones, Mather and Carr, 1994).

As introduced in Section 2.2, interest in technology education in New Zealand was initiated during the mid 1980s, and a series of discussion papers developed in 1991 by Don Ferguson who was a member of the policy division of the Ministry of Education. In these papers Ferguson presented a review and critique of international developments in technology education (Ferguson, 1991). At the same time the 1991 Ministerial Task Group was convened and charged with reviewing science and 'technology' education within the present curriculum structure. This was a joint undertaking between the Minister of Education and the Minister of Research, Science and Technology, and was significant in that those involved in the Task Group represented a range of people from both within and outside of education. In this way people from the private and public world of enterprise, who had previously only been involved in education in a critical 'after the fact' way, were given the opportunity to work together with educationalists and provide guidance on the development of technology education in particular, (Task Group Report - Ministry of Education & Ministry of Research, Science and Technology, 1992). The inclusion of this group was particularly noticeable due to the contrast it provided to the earlier curriculum review where the committee consisted solely of educationalists (Jones, 1998).

The 1991 Ministerial Task Group addressed the concern that education was seen by students as providing information which was often of little relevance to their lives, and which was seen as only important for passing examinations, rather than informing the life of students. Problem solving skills and communication skills were seen as being neglected in favour of the acquisition of knowledge (Bell, Jones and Carr, 1995). Recommendations from this report that were important in the development of technology education were that:

- technology be an area of study in its own right rather than seen as a subset of other areas such as science or social studies;
- the area should encompass a broad range of knowledges and skills, extending those focused on in the present technical subjects and situating these in their sociological contexts;
- practical skills should be recognised as valuable in terms of academic achievement;
- both the contexts, and the knowledges and skills, should reflect New Zealand's environmental, social, cultural, historical, economic, and political climate;
- issues of inclusiveness should be paramount, with particular emphasis on gender inclusiveness and the need to gain input from Maori in order to ensure Maori knowledges and skills (including Te Reo ) were acknowledged and valued.

(summarised from the Task Group Report, Ministry of Research, Science and Technology, 1992).

### **Technology Education Policy Papers**

In 1992 the Ministry of Education contracted the Centre for Science and Mathematics Education Research situated at the University of Waikato, to develop policy guidelines for technology education in New Zealand. From this contract six policy papers were developed which took account of both Ferguson's discussion papers and the above recommendations, along with ongoing reflection on international experiences of technology education (Jones and Carr, 1993a). These policy papers provided an initial framework for the development of the draft technology curriculum. The six papers were as follows: Rationale for Technology Education; General Aims and Expected Learning Outcomes for Technology Education; Achievement Aims of Technology Education; Strategies for Implementation of Technology Education in Schools (at the school level); Approaches to Teaching and Learning in Technology (at the classroom level); and Access to Technology Education (Jones and Carr, 1993a, pg.s 3-47) A seventh policy paper was developed by educational consultant Terry Guy and was entitled Resources and Facilities for Technology Education (Guy 1992). An eighth policy paper, Assessment in Technology Education (Jones, Hawe and Mather, 1994), was completed at a later date and did not influence the development of the draft curriculum.

Each of the first seven policy paper included key elements that impacted directly on the development of the draft curriculum in technology, and also had some influence on the structure and content of the final curriculum. The key elements from these seven policy papers in technology are discussed below, for a full description of the policy papers see Jones and Carr (1993a), and Guy (1992).

The first paper presented the Rationale for Technology Education. The rationale for technology being an essential learning area was argued in terms of six factors. These were economics, pedagogy, motivation, culture, environment, and personal development (for a full explanation of each of the arguments see Jones and Carr, 1993). Reference was also made to technology's contribution to the development of the essential skills (Ministry of Education 1993a). A key recommendation to come from this paper was that Technology should have equal status with other essential learning areas in the school curriculum (Jones and Carr, 1993a).

The second policy paper presented three general aims, these being:

- to develop technological knowledge and understanding;
- to develop an understanding and awareness of the interrelationship between technology and society;
- to develop technological capability.

(Jones and Carr, 1993a, pg. 7).

The third policy paper introduced the concept of technological areas and contextual themes. The technological areas were a means of ensuring that the learning area of technology both reflected New Zealand's social and physical environment in order that it was appropriate to New Zealand students. Technological areas were conceptualised as both a focus for learning, and the provider of specific knowledges and skills. In this way the technology curriculum itself would not be structured around any specific content, but rather as a generic framework within which the learning of a range of technological knowledges and skills would be supported. The technological areas given in this policy paper were:

- materials technology;
- information and communication technology;
- electronic/control technology;
- biotechnology;
- process technology;
- design technology and graphics;
- food technology.

(Jones and Carr, 1993a).

It was clearly stated that 'technological activity may span several technological areas' (Jones and Carr, 1993a, pg. 12). The contexts were provided as a means by which the technological areas could be accessed. Those presented in this paper were:

- personal;
- recreation;
- business;
- community;
- home;
- industry

(Jones and Carr, 1993a, pg. 13).

The achievement aims developed, elaborated on the general aims, and were given as follows:

- gaining technological knowledge and understanding;
- understanding the interrelationship between technology and society;
- exploring and researching needs and opportunities;
- planning, developing, and producing 2 and 3-D models, products, systems and environments;
- reflecting and evaluating as a continuous process;
- communicating and presenting designs, plans, strategies and solutions

(Jones and Carr, 1993a pg. 13).

Also of importance in this paper was the statement that these achievement aims 'are not discrete entities to be taught separately' (Jones and Carr, 1993a, pg. 13). As described in this policy paper, the achievement aims were further broken down into three or four strands (see Jones and Carr, 1993a, pg.s 18 – 20 for details of these).

The key outcome of the fourth policy paper was the need for technology education's implementation to be gradual, well resourced and monitored, and included the suggestion that each school develop its own implementation plan in order to take account of internal management, collaboration with other schools and acknowledge the involvement of the community and industry. (Jones and Carr, 1993a). In this policy paper the favoured implementation model was that of a modular system whereby many subject areas contributed. It was suggested these could be time tabled separately as technology, or other subjects could be adapted. A completely separate subject approach was discussed in this paper as possibly resulting in less desirable outcomes for technology education (Jones and Carr, 1993a).

The fifth policy paper presented an approach to classroom teaching that focused on cooperative learning, allowing for risk taking and supporting student initiative, and was based on a constructivist teaching philosophy. Emphasis was also placed on the importance of students reaching practical outcomes, and on utilising the school community as a resource and context (Jones and Carr, 1993a).

The sixth policy paper provided direction for the development of technology as a learning area that meets the needs of all students. Comment was made with regard to the exclusive nature of both technical and technologically oriented subjects' past curricula and practice and the need to move beyond this (Jones and Carr, 1993a). Inclusiveness was defined in terms of 'all student of all ages have the right to achieve to the maximum of their potential in technology education regardless of their abilities, needs, socio-economic background, gender, and ethnicity' (Jones and Carr, 1993a, pg. 43). This was in keeping with the principles of the National Curriculum Framework and its focus on equity rather than equality of opportunity (Ministry of Education, 1993a).

The seventh policy paper was based on the preceding six papers and discussed the implications for resources and facilities. A key element of this paper was the emphasis on critical importance of teacher education and professional development, with Guy stating 'the most important resource, if this subject is to prosper, will be the knowledgeable and skilled teacher of technology education' (Guy, 1992, pg. 3). This paper also explored implementation models and recommended an option that saw technology being introduced in schools as both a separate subject and across the curriculum. It was suggested that such a model would provide economic, management, teaching, and long term developmental advantages (Guy, 1992). Suggestions were also made regarding organisation of physical space, tools, equipment, and material across all levels of schooling, including implications for preservice teacher education.

### **Curriculum Development**

As introduced in Section 2.2, curriculum development in New Zealand at this time was a process whereby contracts were advertised by the Ministry of Education and tendered for by interested parties. The draft technology curriculum development contract was won by the Centre for Science and Mathematics Education Research. The developmental process involved three distinct groups. These were the Curriculum Writing Group, the Contract Review Group and the Minister's Advisory Group.

The Curriculum Writing Group was directed by Dr Alister Jones from the University of Waikato, and he and Eleanor Hawe from Auckland College of Education, coordinated the draft curriculum writing groups. Details of the development process are provided by in a paper focusing on the move from policy to curriculum (Jones 1995). The Contract Review Group was formed by the Ministry of Education and served to monitor the contract in terms of whether the technical aspects of the contract were being met.

The Minister of Education, Dr Lockwood Smith, set up the Minister's Advisory Group. This group was facilitated by a Ministry of Education official, and was to offer advice to the Minister of Education on the overall nature of the technology curriculum development and resulting statement. Because the policy papers had already been developed as discussed above, the Minister's Advisory Group replaced the Policy Advisory Group that had been a part of the earlier Science and Mathematics curriculum developments. Lockwood Smith and his Ministry of Education advisors determined the membership of the Minister's Advisory group. The members were selected from a list of people drawn up by the Ministry of Education. This list represented people in New Zealand who had been active in technology education developments to date, at a teaching and/or policy level, or people who were from community groups with an interest in this new learning area. Jones and Hawe used a similar list to select writers on their team, thus reducing the number of people available for selection for both groups, as there could be no joint membership.

Both the Minister's Advisory Group, and the Draft Curriculum writers, are viewed as belonging to an overall curriculum development group in this thesis. Five members of this overall formative group were research participants in this research. More details of each of these groups are provided in Section 3.4.

### ***Technology in the New Zealand Curriculum Draft***

The draft curriculum statement reflected the key outcomes from the first six policy papers discussed above. The three general aims remained the same apart from minor word changes. For example, 'to develop an understanding and awareness of the interrelationship between technology and society' was replaced by 'to develop understanding and awareness of the relationship between technology and society'. The three aims were broken down into six strands, one for both 'technological knowledge and understanding' and 'understanding and awareness of the relationship between technology and society' and four corresponding to the 'technological capability' Aim (Ministry of Education, 1993b, pg. 7).

The Strands were further broken down into a varying number of achievement objectives across the eight levels as specified by the National Curriculum Framework (for details of this see Ministry of Education, 1993b, pg.s 18–122). There was one exception to this, in that one of the achievement objectives under the technological knowledge and understanding strand – ‘explore the ideas that contribute to technological developments’, was only developed from level four upwards. This was a contentious issue and reflected a dominant perception in the group at the time that younger students would be unable to achieve this objective.

Emphasis was placed throughout the draft on the integrative nature of the strands, and specific reference was made to this through the following statement that occurred at the beginning of each set of achievement objectives:

Students’ experiences should reflect the interlinking nature of the achievement aims and objectives. Learning experiences and assessment examples should include aspects from the knowledge, society and capability aims.

(Ministry of Education, 1993b, pg. 17, 35, 53, 71, 89, & 107)

The technological areas suggested in the policy papers were adhered to in the draft, as were the contexts (the only change being ‘home’ changed to ‘domestic’). The draft followed up on the recommendations regarding inclusiveness through its underlying philosophy, the objectives, and specific reference to the importance of inclusivity as stated under ‘The Approaches to Technology Education’ (Ministry of Education, 1993b, pg. 10). (For detailed discussions on the inclusive nature and intent of the draft technology curriculum see Compton, 1997 and Mather 1994b).

The implementation section again mirrored the policy paper in that it suggested a combination of distributing technology over existing areas and providing a time tabled subject by way of a modular approach which may provide schools with a mechanism for implementing technology ‘in their own way’. (Ministry of Education, 1993b, pg.16). The need for school-based decisions was strongly emphasised as discussed elsewhere (Compton, 1997).

*Technology in the New Zealand Curriculum Draft* (Ministry of Education 1993b) was developed within a twelve-week timeframe (Jones 1995). It was released into schools for comment at the end of 1993 and feedback gained throughout 1994 and early 1995.

The process of collating feedback and subsequent revision was not fully contracted out but was managed within the Ministry of Education by the same Ministry of Education official who had managed the earlier development work. However guidance was sought from members of the draft writing team by the letting of short-term consultancy contracts on a needs basis.

### *Technology in the New Zealand Curriculum*

The final version of the curriculum statement in technology was officially released and launched in late 1995. The statement was gazetted in February 1999 and is now mandatory for all schools from years 1-10. This was a relatively long time period between the curriculum's release as a final document and its gazetting. It is worth mentioning that this time lag had both positive and negative implications for technology education's implementation nationally, but it is outside the timeframe set for analysis in this research, and as such a point, outside the scope of this thesis.

As represented in the *Technology in the New Zealand Curriculum* (Ministry of Education, 1995), technology education contributes to the intellectual and practical development of students, both as individuals and informed members of a technological society. The general aims in the final statement remained the same as those in the draft. That is, to develop:

- technological knowledge and understanding;
- technological capability;
- understanding and awareness of the relationship between technology and society.

(Ministry of Education, 1995 pg. 8)

However, instead of the aims giving rise to six strands as in the draft, in the final statement they corresponded directly to the three strands. This served to dispel any notions that the capability aim was any more important than the other two aims by virtue of the number of strands it gave rise to. Feedback from the draft showed that more emphasis needed to be placed on the way in which the strands are interrelated and overlap. For example, technological capability involves using knowledge and understanding and also takes into account issues related to technology and society. In order to better highlight this, the differentiation between the strands was minimised and the interlinking was highlighted more effectively than in the draft through the use of coloured text and text boxes (Ministry of Education, 1995 pg.s 10, 31, 35, & 41). Whilst the intent of the achievement objectives from the draft remained much the same, the layout in the final statement was more user friendly with eight achievement objectives overall – see Ministry of Education, 1995, pg. 10.

One significant change was a shift away from the earlier position mentioned above regarding the ability of younger students to 'explore the ideas that contribute to technological developments'. In the final curriculum this aspect of technology was not only considered appropriate for all levels, but its intent was made more overt.

The corresponding objective was now written follows:

Objective 7 understanding the ways in which beliefs, values, and ethics of individuals and groups:

- promote or constrain technological development;
- influence attitudes towards technological development.

(Ministry of Education, 1995, pg. 10)

In many ways this example epitomises the major differences between the draft technology curriculum and the final statement. Whilst the draft can be seen as somewhat tentative in nature, the final statement expresses its intent in a more clear and direct manner, particularly through the use of more succinct language and consequently better defined achievement objectives.

The technological areas section in the final technology curriculum showed a number of changes. Firstly, whilst Design and Graphics was perceived as a separate technological area in the policy papers and the draft technology curriculum, (Ministry of Education, 1993b) in the final statement Design is explained to be an integral part of all technological activities, rather than being a technological area as such.

Similarly, in a move away from technical subject specification, graphics was also seen to be an integral part of technological activity in terms of a communication tool. Another change was the inclusion of an additional area called Structures and Mechanisms. Finally the way in which each of the areas had previously been defined was reworked in order to broaden the nature of these areas, and provide more opportunities for students at every level in each area.

A brief description of the primary focus of each area as based on the *Technology in the New Zealand Curriculum* definitions (Ministry of Education, 1995 pg. 12), is as follows:

**Biotechnology:** understanding and developing and/or employing a range living organisms and/or systems, or their derivatives, as the primary means of meeting a need or opportunity;

**Electronics and Control:** understanding and developing and/or employing a range of electronics/electrical devices, or alternative control systems, as the primary means of meeting a need or opportunity;

**Food Technology:** understanding and developing and/or employing a range of practices for the safe and effective means of producing, preparing, presenting, and storing of food. Also includes understanding and developing and/or employing a range of marketing, packaging and development strategies for new foods/food products;

**Materials Technology:** understanding and developing and/or employing a range of materials in order to meet a need or opportunity;

**Production and Process Technology:** understanding and developing and/or employing a range of processes and systems involved in the manufacturing and/or assembly of products from components;

**Structures and Mechanisms:** understanding and developing and/or employing a range of structures and mechanisms in order to meet a need or opportunity;

**Information and Communication Technology:** understanding and developing and/or employing a range of processes and systems to enable effective storage and manipulation of information and how it is communicated.

The final curriculum statement included the six contexts presented in the draft (but 'domestic' was changed back to 'home') and included an additional three; school, environmental, and energy production and supply. Examples of these were given to better explain how they might be useful for teachers.

The 'Implementation of Technology' section is more comprehensive in the final statement, explaining the issues associated with each model suggested in the draft. Suspending the timetable was also offered as a suggestion and discussed. As in the draft, the final document highlighted the importance of school-based choice and no model was portrayed as being more favourable than any other. The final curriculum statement included more guidance to teachers regarding teaching and learning in technology, including sections on 'language' and 'health and safety', and a much larger section on assessment and evaluation which included 'indicators of progression' as based on the level achievement objectives.

The feedback from the draft tended to focus primarily on the difficulty that teachers were having in terms of interpreting what 'technology' was all about. The final document attempted to respond to this with more explanation than was present in the draft. This included a 'Glossary of Terms' (Ministry of Education, 1995, pg.s 85-86).

Overall, the three general aims provided a framework for the development of expected learning outcomes, and provided a crucial basis for the formulation of a balanced school and classroom curriculum in technology education. Technology was conceptualised in technology education in New Zealand as more than artefacts; it also included processes, systems and environments. Therefore in technology education students would be expected to design, make, modify, maintain, evaluate and improve devices, processes, systems and environments. The aims of technology education, in terms of creativeness and inventiveness would only be realised if learning environments actively encouraged this. Technological practice was portrayed as involving multi-disciplinary activities and this was to be reflected in students' experience of technology education.

Whilst stating that all strands of the final curriculum are interlinked in technology education, further explanation was provided regarding each strand also. The 'technological knowledge' strand was explained as primarily being concerned with knowing about a wide range of technologies, developing a practical understanding of the concepts involved in a variety of technologies and coming to terms with technological language. The 'capability' strand was explained as being primarily concerned with developing capability in a number of technological areas. This may include coming up with actual solutions to needs and/or opportunities, although that may not always be the case. The 'technology and society' strand was explained as being primarily concerned with developing an understanding of the way in which technologies have been arrived at, the influences on their development, and the way in which they influence specific people, communities and society as a whole, in the past, present and possible future.

As shown through diagrammatic form in the technology curriculum, (Ministry of Education 1995, pg. 8) it is only when students are provided with opportunities to undertake technological practice, incorporating all of the three strands that they can be considered to be becoming technologically literate. (The concept of technological literacy employed in New Zealand is identified in Section 2.4 and explored in more detail in Section 2.5)

## 2.4 Locating New Zealand's Technology Curriculum Internationally

After a number of false starts under the umbrella of alternative disciplines (for example, Craft, Design, Industrial Arts, and Science), technology education is now a very real international phenomenon. It has begun to take a place in many countries as a discipline in its own right, and its successful entry has been largely attributed to the political support it has gained. As stated by Layton:

Support for technology education now comes from powerful sources including governments and industry... the scale of the current endeavour is altogether more extensive than previously. Although many problems remain and there are no grounds for complacency, the resources being brought to bear are much more commensurate with the task than was the case in previous decades.

(Layton, 1994 pg. 11)

Due to the huge room for development in this emerging area, reformers have employed concepts such as technological literacy in a variety of ways. Often there is no obvious coherency between the desire for technological literacy and what is taking place within the curriculum at a national or school level. In some cases the actuality of the national curriculum can be recognised as related to very narrow notions of literacy, with a focus on technical competency being paramount. In other cases national curricula appear to support a much broader focus of intent and therefore broader view of technological literacy. The basis of this wide variance would seem to reflect the way in which particular stakeholders in any country have managed to grasp control and direct development. In this way, approaches taken are not so much dependent on historical traditions, as they are on decisions regarding the relative position of technology in the curriculum and therefore the aims and purposes deemed to be relevant.

Black (1994) discusses the approaches taken by countries already implementing technology education as falling into five distinctly different categories that reflect their differing perspectives on technology. He discusses these differences both in terms of the definition of technology and its educational purpose.

These five perspectives are presented below as summarised from Black (1994 pg.s 114-115).

### *Technology as craft skills*

Here the concept of technology is primarily linked to making things via recipe step-by-step instructions. The educational purpose would seem vocationally oriented.

### *Technology as 'design and make'*

The concept of technology here is an expanded version of the 'Technology as Craft' in that whilst it is very skills oriented, it incorporates elements of design as distinct from making from a given recipe. Again the educational purpose is primarily vocational.

### *Technology as a subset of science*

Here the concept of technology is essentially applied science - reducing often to applied physics. That is, technology is the practical application of scientific knowledge and skill. Educational purpose still could be considered vocational but in a different sense to the first two. Some links are made to general education specifically for future citizenship of 'technological' societies.

### *Technology as 'design and make' in the context of the application of scientific principles*

Here the concept of technology focuses on the process of design and manufacture, however the focus includes that of exploring the questions of 'purpose and value' in the context of solving problems using scientific or mathematical principles. The educational purpose of this perspective would seem to be a more focused attempt to educate people as future citizens, able to make informed decisions from a 'rational' as opposed to an 'emotional' basis.

### *Technology as practical capability*

The concept of technology here is primarily centred around a complex process that focuses on co-operation, defining of needs, designing, implementing and evaluating solutions. Scientific (including mathematical) domains are viewed as being important, but only one of many domains critical to technology. Educational purposes are for citizenship, broad vocational fitness, and personal development by way of the development of a synthesis of the powers of analysis, decision making, manual and aesthetic skills, evaluation and collaboration with a range of others.

These perspectives provide descriptors that could be placed on a continuum whereby the first reflects 'technological literacy' as restricted to technical competency and the last suggests a far broader inclusive notion of technological literacy.

The concept of technology underlying technology education in New Zealand, has some similarities with that described in Black's fifth perspective, that is, 'Technology as practical capability' (Black, 1994). However the New Zealand position places an equal emphasis on technological knowledge, and the relationship between technology and society and technological capability (as discussed earlier in section 2.3). Whilst it could be argued these aspects are fully intended as being included in Black's 'capability', they are given more prominence in New Zealand's technology education policy and curriculum, making them significantly more overt factors in the concept of technology.

Related also to the inclusion of these additional aims, is a widening of the educational purpose of technology education in New Zealand context. Along with Black's stated purposes of 'citizenship, broad vocational fitness, and personal development by way of the development of the synthesis of the powers of analysis, decision, manual and aesthetic skill, evaluation and collaboration' (Black, 1994, pg. 115), there is another purpose - that of education for social change (Compton, 1997). Again this could be argued as inherent in Black's notion of citizenship, however citizenship is used more frequently to suggest an ability to work *within* society, rather than an ability to *change* society.

Technological literacy therefore can be seen to mean different things as dependent on the concept of technology and technology education within which it is embedded. The links between technological literacy and educational reform are explored further in Section 2.5.

France (1997), analysed the position of technology education in nine geographical areas, including Australasia, in order to further detail the variances indicated by Black's 'Five Perspectives' (1994). She identifies the historical precedents of technology education in each country within that area, and provides a summary of the focus of the practice implemented. She also indicates the position technology holds within the overall curriculum, and the place of Biotechnology within technology education.

The following (Table 2.4.1) is a summary table that has been modified from that developed by France, (1997 pg.s 10 & 11), in that it shows the 'Historical Traditions', 'Models Practised', and 'Place in Curriculum' only.

**Table 2.4.1: Summary of Technology Education Worldwide**  
(modified from France 1997 pg.s 10 & 11)

<b>Geographical Area (and major reference)</b>	<b>Historical Traditions</b>	<b>Models Practiced</b>	<b>Place in Curriculum</b>
<u>United Kingdom</u> <ul style="list-style-type: none"> <li>• England and Wales (McCormick, 1992)</li> <li>• Scotland (McCormick, 1992)</li> <li>• Northern Ireland (McCormick, 1992)</li> </ul>	<p>Craft, design and art led to CDT focus.</p> <p>Craft, science and engineering</p> <p>Craft, manual, science, and art</p>	<p>Design focus. Emphasis on competency- technological capability. Values covertly signalled. Weak science links.</p> <p>Design, key competency. Concentration on process skills and capability in manufacturing systems. Two courses - technology studies and craft and design.</p> <p>Design approach. Broader framework- home economics, art and design, CDT. Design and manufacture of products.</p>	<p>Foundation subject (5-16 years)</p> <p>General course in curriculum</p> <p>No information</p>
<u>Western Europe</u> <ul style="list-style-type: none"> <li>• Netherlands (de Vries, 1992)</li> <li>• Germany (de Vries, 1994)</li> <li>• France (de Vries, 1994)</li> </ul>	<p>Craft, Manual, Science</p> <p>Craft and industrial production</p> <p>Craft</p>	<p><i>Wide diversity of examples</i> Craft with design, two forms- general and vocational General focus- designing, making and using. Science links.</p> <p><i>Complex situation because of merging of Federal and Democratic Republic</i> General education moving to general technological concepts and key competencies.</p> <p>Economic ( industrial production and STS combination). Also 'high tech' approach.</p>	<p>According to elective schools.</p> <p>Except in gymnasium</p> <p>Comprehensive middle schools</p>
<u>United States</u> (Dyrenfurth, 1994)  <i>Programmes</i> <ul style="list-style-type: none"> <li>• Educating Americans for 21st century (McCormick, 1992)</li> <li>• Project 2061 (AAAS, 1989)</li> <li>• Technology Education (Lewis, 1991)</li> </ul>	<p>Industrial arts and applied science</p> <p>Science STS</p> <p>Science STS</p> <p>Industrial arts</p>	<p>No national strategy.</p> <p>Science and Technology /Education of future citizen, applied science with STS links.</p> <p>Science and Technology. Problem solving leading to understanding scientific principles/ engineering influences.</p> <p>Education of future citizen. Emphasis on understanding STS influences. Aspects of capability</p>	<p>Elective</p> <p>Elective</p> <p>Elective</p>

**Table 2.4.1: Summary of Technology Education Worldwide (Cont.)**

<b>Geographical Area ( and major reference)</b>	<b>Historical Traditions</b>	<b>Models Practiced</b>	<b>Place in Curriculum</b>
<u>Nordic Countries</u> Kananoja (1994)	Design associated with craft traditions ( <i>sloyd</i> movement)	Two areas of development. (1) preservation of Nordic <i>folk</i> culture and art (2) technology education - education for work.	No information
<u>Central and Eastern Europe</u> (Blandow & Mosna, 1994)	Polytechnic (industry, productive work and education)	Moving towards general technology while keeping links to industrial production.	General education in polytechnic system
<u>Africa</u> (Wanjala Kerre, 1994)	Craft	variety of programmes • traditional vocational training • perceived need to develop training for regional requirements - integration of vocational cluster.	No information
<u>Latin America</u> (Londoño, 1994)	Traditional technical education	Variety of approaches. eg. Colombia How is it made? What for? - Integration of maths and science	No information
<u>Far East</u> (Morgan, 1994) • Malaysia  • Singapore	Craft  Craft high technology	Vocational training technology as craft  Developing general technology courses for all	No information  No information
<u>Australasia</u> • Australia (Morgan, 1994)  • New Zealand (Ministry of Ed., 1995)	Craft, manual training, industrial arts and design  Craft, manual training, design	Design. Four strands- designing/making/ appraising, materials, information and systems. Can be integrated or taught discretely. Values issues  Technological Literacy (Three interwoven strands - capability, knowledge and understanding, technology and society) Societal issues.	National Curriculum - Core subject  National Curriculum Core subject (5 – 16 years)

As can be seen from the above table, New Zealand's position has a similar historical tradition to countries such as United Kingdom, Western Europe, Nordic countries, Africa and Australia – that is, a technical education background with an emphasis on craft and design. In contrast to the majority of areas however, technology education in New Zealand has been given a relatively high status in the overall national curriculum framework. Only England, Wales and Australia have positioned technology in their National curriculum in an equivalent manner.

Whilst many countries indicate positions moving towards Black's fifth perspective with an indication of the role of values and technology's interactions with society, New Zealand is shown to be most overt in this respect showing a clear focus on a broad technological literacy.

This, combined with the high status given to technology as an essential core learning area, reflects to some extent New Zealand's relatively recent entry into technology education. As discussed elsewhere (Compton, 1997), having the benefit of evaluating the policy and national curricula developments and resultant classroom practices in other countries served New Zealand well. Development work in New Zealand could identify and incorporate those features proving successful in other countries, whilst modifying and/or rejecting those which were proving problematic. More recent advances in the theoretical understandings of education generally were also able to be translated into the area in an attempt to develop a learning area and national curriculum statement reflective of contemporary learning and curriculum theory (see Compton 1997 for further discussion of this).

One significant movement on from the information presented in France's summary, is that of the publication of the *American Standards for Technological Literacy: Content for the Study of Technology* (International Technology Education Association, 2000). These became official standards in April 2000 and as such it is too early to explore their impact on technology education either within the United States or internationally. For example, it is unclear whether the nature of technological literacy they uphold will translate into similar forms of technological literacy in practice as the New Zealand stance, or something other. This movement on in American technology education will however provide technology education in New Zealand with valuable experiences to monitor and critique for future developments.

## **2.5 Technological Education and Educational Reform**

As outlined in Sections 2.3 and 2.4, the overall aim of technology education in New Zealand is that of technological literacy as broadly defined by the interweaving of the three strands of the technology curriculum, with its purpose being centred on student empowerment. Narrow skills-based notions of competency in technology such as those which underpinned earlier technical education both in New Zealand and overseas, had vocational education as their primary purpose. In this respect therefore they served to ensure children were 'educated' to become able to fulfil the roles society deemed appropriate as discussed in Section 2.2.

The shift in the purpose of technology education towards student empowerment through the broadening nature of technological literacy will only translate into a change for students if it is supported by educational reform. I argue that if this technological literacy is empowering in nature it will in turn support and enhance the reforms in general education that allowed for its initial development. In this section I explain the need for educational reform to support technology's entry into the New Zealand curriculum as based on key concepts underpinning technology education in New Zealand, including the concept of 'liberating technological literacy' (Burns, 1997; Davies, 1998a; Davies, 1998b). I discuss the barriers to successful implementation and explore professional development programmes that may have the potential to counter these.

### **Concepts Underpinning Technology Education in New Zealand**

Technology education has been developed from a sociocultural view of education whereby learning is seen as situated in the social context in which it is experienced (Jones 2001). The implications of this can be clearly seen in key concepts that underpinned the development of technology education in New Zealand. These are, the concept of knowledge, the concept of curriculum, the concept of technology, technology education and the concept (and purpose) of technological literacy.

#### *The concept of knowledge*

Within a sociocultural framework, knowledge is perceived as that which is developed as an outcome of social interactions and where human mental processes are situated within their historical, cultural and institutional setting (Wertsch, 1991). If learning is viewed as a process of making experience meaningful for the learner, mediation is a critical component. That is, as summarised by Vygotsky (1987), mediation is essential in order that there is a relationship between the cognitive processes of the individual as they are involved in interactions with others, their past by way of their cultural experiences, and their communications.

Gerber (1995) argues strongly that all aspects of the learning process are in fact cultural due to people's reliance on linguistic and practical tools for making the world intelligible. This has links to the disruption of modernist notions of 'truth', as Rorty states, 'To say that truth is not out there is simply to say that where there are no sentences there is no truth, that sentences are elements of human languages, and that human languages are human creations' (Rorty, 1989, pg. 5). Knowledge is therefore perceived as a social construct, and as such may be reflective of a number of 'truths' as defined in time and culture.

Sociocultural discourses are many and varied. However all can be recognised as having moved the focus of ontology away from the individual, towards the social. That is, they all work on the basis 'that humans are essentially social beings' (Ohlssen, 1991). How a person may act, including the way in which they construct knowledge, is 'located in the public realm' (Ohlssen, 1991). Further to this is the way in which forms of knowledge can be used to regulate populations by describing, defining and delivering forms of normality and of educability (Foucault, 1980). Understanding how such 'regulation' occurs is therefore a critical aspect of knowledge itself.

These perspectives provide a powerful alternative concept of knowledge from that of the dominant concept, especially as found in schools, that knowledge is stable, consistent in meaning and reflective of reality via neutral/value-free a-theoretical investigation. In contrast to this, knowledge as it is perceived from a sociocultural perspective, is never abstract or neutral. That is, knowledge may be perceived no longer as a means of 'mirroring of reality' but rather as a means of 'coping with reality' (Atkins, 1988).

### *The concept of curriculum*

As outlined by Jones, the technology curriculum was intended to function as a framework within which people could operate and think (Jones, 1995). Such a concept of curriculum lies outside traditional curriculum development as practiced in New Zealand in the past when 'worthy knowledge' as determined by 'experts', provided the content basis of curricula. This reflected a general trend within curriculum theory away from a view of curriculum as centred on content, towards one which encompasses all aspects of the teaching/learning situation (Codd, 1984). Given this trend, prescriptive curricula became problematic and alternative concepts of curricula needed to be developed.

Stenhouse had previously described curricula in terms of 'an attempt to communicate the essential principles of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice' (Stenhouse, 1975, pg. 5). Doll (1989) also showed a move from prescription with a conceptualisation of curriculum as a 'multi faceted matrix to explore'. Such a shift would in turn require curriculum development to provide opportunities for multiple and complex perspectives to be inherent in, and central to, the resultant curriculum.

In keeping with this view, Cherryholmes (1987) supported a notion of curriculum that validates both constructive and deconstructive practice and Giroux (1990) supported this stance by stating that curriculum must both embrace the 'language of critique' and the 'language of possibility'. Giroux explains the 'language of possibility' and its importance to curriculum by stating 'It would infuse pedagogical work both in and out of schools with a discourse that can function so as to raise real hopes, forge democratic alliances, and point to new forms of social life that appear realisable' (Giroux, 1990, pg. 144).

Curriculum as conceptualised as a transient framework therefore, would serve to open spaces for a social constructionist stance on knowledge, and support and validate both constructive and deconstructive practice. By the term constructive practice I include the way in which meanings are negotiated within their sociocultural location, and practices promoted and validated from the discourse as it is understood at that time. By deconstructive practice I refer to a process in which these meanings are challenged and decentred to allow room for alternative meanings and alternative practices. The practice of construction and deconstruction needs to be linked and viewed as dependent on one another if curriculum development is to be successful in establishing a discourse supportive of a concepts of curriculum as introduced above.

This view is linked with postmodernist perspectives that underpin various undertakings in education, but which also combine modernist agendas particularly linked to critical theory. For example, Giroux's 'language of critique/language of possibility' combines democratic philosophy and postmodern theories of resistance as he argues against postmodernism as a rejection of modernism, but rather attempts to take from each that which can be considered useful (Giroux 1990). (Modernity and postmodernity are discussed further in Section 2.6 below.)

Therefore, the focus of curriculum development can no longer be that of determining, and providing, the most 'worthy knowledge', but must become centred on such things as whose knowledges have been and continue to be validated as the most worthy, how has this has occurred, and how is knowledge experienced and constructed by different people within different discourses (Miller, 1992).

### *The concept of technology, technology education and technological literacy*

Within the development of technology education, technology was theorised as being inherently inclusive (for discussion of this see Mather 1994b) and fitting within a sociocultural view of technology. Such a sociocultural view describes technology as an integral feature of the relationship between humans and their environment (Hansen and Froelich, 1994).

This is further supported in philosophical writings of Idhe, (1983) who presents a definition of technology based on the explorations of technology by the existential philosopher Heidegger (1977). That is, technology as a 'mode of revealing the world' (Heidegger, 1977) or 'a mode of truth' (Idhe, 1983, pg. 246). Idhe explains this defining of technology through the example of the clock. As described by Mumford (1934) the clock has long been recognised as having played an important role in historical developments and it is an example Heidegger (1927) also uses when explaining technology as being so much more than an artifact. Based on both these accounts, Idhe discusses the development of a 'clock' as the beginning of a 'perception of time through technology'. As the nature of the clock changed, so too did the nature of the perception. One example provided within this discussion which serves to explain this view of technology as 'a mode of revealing' (Heidegger, 1977) is the shift from analogue clocks to digital. The development of the technology necessitated a shift in the way we perceive time. That is, using an analogue clock one 'sees' time as a 'spatial' relationship, whereas with a digital clock one is forced into 'calculative thought' in order to ascertain a notion of time. The 'mental operation for telling the time changes' and with it our way of being in the world. (Summarised from Idhe, 1983).

This sociocultural view of technology which underpinned the development of technology education in New Zealand was communicated in the curriculum through the following broad definition, 'Technology is a creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems and environments. Knowledge, skills, and resources are combined to help solve practical problems. Technological practice takes place within, and is influenced by, social contexts.' (Ministry of Education, 1995 pg. 6).

The inclusion and nature of the 'technology and society' strand was an attempt to make more overt the sociocultural location of the practice of technology and resulting technologies and their uses. Technological practice therefore was positioned as incorporating a wide range of activities, carried out by a variety of people, and as such being responsive to a diversity of perspectives.

These perspectives were viewed not as valuable to, or 'enriching' for, technology education, but as an integral part of the practice of technology. This conceptualisation of technology relied upon diversity, multiple perspectives and the acknowledgment of a wide range of values. In this way inclusiveness would be created and validated by the learning area of technology as students were offered opportunities to both undertake technological practice, and analyse, critique and develop a deeper understanding of their own and others' practice. Such understandings are what allow for the empowerment of students as they underpin their developing technological literacy. That is, the development of a liberating literacy that allows for the suggestion that things may be 'done differently' (Davies, 1998b).

The three strands of the technology curriculum were developed to work together to create an opportunity for students to develop technological literacy as linked to notions of student empowerment. That is, students are supported in the process of developing the ability to not only understand the world in which they live, in all its sociocultural complexities, but also be in a position to affect changes in that world - that is to become empowered citizens. Literacy as supported by this curriculum, can therefore be described holding out the 'promise of a liberating technological literacy for New Zealand school leavers' (Burns, 1997, pg. 1). This 'promise' is viewed as resting very firmly on the integration of the three strands, with the third of these, 'technology and society' being seen as crucial. As summarised by Burns (1997, pg. 3), 'Understanding the relationship between technology and society is essential to liberating technological literacy; without this understanding technological problem-solving is trapped within the confines of current practice.' It is this commitment to the interweaving of a sociological focus throughout all technological undertakings that makes the concept of technology, technology education and thus technological literacy in New Zealand's curriculum fundamentally different from technology education in other countries to date. This focus is discussed further in terms of the need for educational reform below.

### **Educational Reform to Support Technology Education**

In order for technology education to be implemented in keeping with the concepts discussed above, educational reform would need to occur to support its entry in to New Zealand schools. A general reconceptualisation of the nature of knowledge, curriculum, and technology - and thus what it is to be technologically literate would need to underpin such reforms.

Such reforms would therefore require fundamental changes at a philosophical and theoretical level regarding education generally, and specific enhancement of knowledge within technology education specifically, before it such a literacy focus could translate into the classroom. Davies (1998b) highlights the need for further refinement/development of understandings within technology education when discussing the importance of the relationship between technology and society to the development of a liberating technological literacy. She states,

...understanding the relationship is dependent on significant knowledge, including knowledge of cultural worldviews, social, political and economic systems at local, national and global levels, and the relative limitations and insights provided by determinist, social constructivist and ecological views of technology.

(Davies, 1998b, pg. 3)

As indentified by Goodman, 'making changes in schools which result in a substantive transformation of the teachers' and students' educational experiences is difficult to imagine...despite the sometimes impassioned rhetoric of school reform, the ways of educating children have remained remarkably durable over the last hundred years.' (1995, pg. 2). Goodman discusses changes as being ameliorative or radical (Goodman 1995). Ameliorative reform is 'designed merely to make ongoing practices more efficient and effective. Basic values and power relationships within the institution are not examined as part of the change effort. Radical reform in contrast 'would confront the cultural and pedagogical traditions and beliefs that underlie current practices and organizational arrangements.' (Goodman, 1995, pg. 2).

What is being argued here is that it is radical reform that is needed to ensure technology education is successfully implemented in New Zealand schools as per the above concepts. Ameliorative reform will only serve to undermine the potential of technology education, and lead to superficial changes in classroom practice.

### **Barriers to Reform and Successful Implementation**

Returning to Nisbet's findings introduced in Section 2.2 on educational reform internationally (Nisbet, 1980), many reform mechanisms fail to result in anything more than ameliorative changes, if that, because they fail to develop any sense of 'teacher ownership' of the reform. Teacher ownership is well documented as a critical element in initiating teacher change (For example, Bell, 1993; Jones, Mather and Carr, 1994; Jones and Simon, 1991; Fullan with Stiegelbauer, 1991).

In any educational reform initiative, if there is not a 'critical mass' of teachers on board, together with ongoing structural and environmental support, it must be accepted there will be little hope of success. In keeping with most people, teachers are unlikely to spend the time and energy required changing and/or extending their knowledge and practices if they are not convinced of the benefits such changes would bring to their students and/or themselves.

The potential of technology education to support subsequent educational reform primarily focuses around the concept of a liberating technological literacy. Teachers who understand this focus are more likely to find the area liberating themselves, in that it provides a framework for their own practices to be developed rather than imposing specific practices on them, complete with inherent, but often not stated, values and understandings. From such a position of philosophical understanding, teachers may well feel empowered as professionals to accept technology as a new learning area, and to feel motivated towards, and committed to, its successful implementation and therefore willing to undertake the level of radical change required. In contrast to this, if teachers are not allowed opportunities to develop an understanding of the underpinning conceptual and philosophical basis of technology education in New Zealand and its situated developmental history, they will continue to view it in terms of another 'imposition' as suggested above.

Teachers in both the primary and secondary sectors who are expected to implement technology, come to technology education from a range of backgrounds (Jones & Carr, 1993a) and therefore will have a range of influences acting on them. However, one overarching influence is the difference in the general nature of primary and secondary teachers of technology.

The majority of primary teachers already work across a number of learning areas that often require different philosophical and pedagogical approaches. However, primary teachers tend to lack domain knowledge and skills related to technology, and as is the case in areas such as science, this tends to result in situations whereby these areas are 'covered' through learning experiences which reflect language based learning outcomes with which they feel more comfortable. In such instances, technology is 'dis-integrated' into programmes in effect, and essentially lost. For intermediate and secondary specialist teachers, coming from different subject backgrounds results in a variety of competing subject subcultures that tend to reinforce a 'renaming of existing subjects' approach to implementation, in order that teachers can remain within their comfort zones.

That is, those subjects which they have been perceived to be technological in the past, can be continued to be taught as such, but can be renamed 'technology' in order to 'meet' the *New Zealand Curriculum Framework* (Ministry of Education, 1993a) requirements. Each existing subject subculture will provide a different teaching and learning approach. Those teachers with the most power within a school may access the extra funding which comes with technology as an essential learning area, resulting in their previous subject subculture becoming dominant. This will be compounded as many subjects that have perceived themselves to be technological in the past, have their subject syllabus revoked, for example the traditional technical subjects. Teachers from these areas may attempt to push for ownership of technology in the name of job preservation. Past exclusive perceptions and practices which have accompanied these subjects, along with the low status attributed to many of them, will become a part of the newly developing technology subject subculture.

Such minimalist implementation, no matter what the basis, will result in technology subject subcultures that vary markedly between schools leading to an overall fragmentation nationwide. The networks between different sectors of New Zealand's educational community will become sites of a number of contestations as different stake holders fight to attain or retain control over the learning area. Community groups who have a vested interest in retaining the status quo in order to maintain control in the community may also assert financial pressure on schools in their areas. Resources developed by different groups will serve to provide material for use in the classroom which support their particular perspectives and few teachers and students at this stage of technology education's development would have the critical base to ascertain the bias. Members of such networks who do not hold political or financial power will lose influence over the direction of developments.

At such a point, the overall effect of technology education's entry into New Zealand schools in terms of educational reform will be negligent at best. At worst it will serve to further entrench the notion of schools as limiting institutions of little value to young people today. Neither teachers nor students will experience any change in their relative positions of power in society. In this instance technology education will be seen as another successfully resisted example of an imposed reform attempt and the potential of technology education as a reforming initiative in these cases would be lost.

## Countering Barriers

Minimalist implementation strategies could be avoided if technology education is perceived, understood and in some way 'owned' by all involved in its implementation. For teachers to develop such a position towards technology education in keeping with *Technology in the New Zealand Curriculum*, (Ministry of Education, 1995), and subsequently implement technology in their classrooms as a new learning area with equal status and time to that assigned the other essential learning areas would require extensive and intensive professional development.

These professional development programmes would need to be specifically designed for the target group of teachers involved. For example, the professional development programmes for primary teachers who are generally well grounded in educational theory and have experience across a range of pedagogical practices, should focus on developing a sound understanding of technology and technological practice – including the knowledges outlined by Davies (1998b) as essential to understanding the relationship between technology and society. Further, these programmes should provide opportunities for the development of a range of technological knowledges and skills. The challenge for professional development programmes for specialist teachers, who may already have excellent technological knowledges and skills in one or more areas, would be to broaden their understandings of technology to be inclusive of all technological areas, and technological practice as defined by the interweaving of the strands in the technology curriculum - again including a strong focus on the knowledges inherent in developing understandings of the critical technology and society relationships. Such programmes would also need to focus on providing opportunities for development in the areas of educational theory, particularly pedagogy, in order that they could provide students with opportunities for learning in technology that were not isolated skill and/or knowledge oriented.

A common focus of all programmes should be that of the issue of ownership. As discussed above, reforms that are imposed on teachers, and subsequently do not meet the conditions Nisbet (1980) identifies as conducive to teacher change, have had little effect in terms of changing classroom practice due to high levels of teacher resistance. Technology education as an example of a centre-peripheral model of curriculum development has been argued as resulting in high levels of teacher resistance (McGee, 1997; Mawson, 1998). This lack of acceptance has been combined with a lack of opportunity to develop a shared understanding of both the nature technology education as it has been developed, and the implications of the changes required to implement it as the developers intended.

As speculated by Snook (1990), the role of Government must be that of producing national guidelines to be applied at a local level in order that a new dialectic be set up which may lead to a 'genuine synthesis' resulting in an education system in New Zealand which meets the needs of our students. Whilst structurally this speculation could be argued as having come to pass, such a synthesis remains unlikely to occur whilst the issues of teacher resistance and/or lack of understanding are not tackled head on.

In keeping with Nisbet's findings on international reform attempts (Nisbet, 1980), New Zealand research that documents teachers' responses to the reforms to date, suggests that teachers view recent curriculum reforms as having been imposed upon them, with only five percent of one sample viewing the reforms favourably (Wylie, 1991). There is no evidence to suggest that reaction to the changes brought about by technology education's entry into the New Zealand curriculum shows any deviance from these general findings.

Whilst it is not possible to reverse the centre-peripheral process already embarked upon in the development of technology education, it is possible and profitable to make the process overt and meaningful to those outside of it. That is, the majority of people now responsible for its implementation. The explanation of the nature and development of technology education during the 1993 to 1995 period that this research presents is therefore of critical importance in providing for an understanding of the people, their interactions and the tensions that influenced technology education during this time. By providing an account of events and outcomes as located in the context of the time and in terms of the perspectives of the people involved it will provide an opportunity for audiences across a range of sectors within New Zealand's education community, to develop an understanding of not only what, but *why* things happened as they did, and the implications of this for their own practices and future developments. In this way they too may be allowed the opportunity to develop some level of 'ownership'.

## 2.6 Theoretical Underpinnings of the Research

The final section in this chapter presents and explains the theoretical underpinnings of this research.

As discussed earlier, technology education is still in its infancy both internationally and within New Zealand. International research in technology education (for example, Fleming, 1987; Gardner, 1994; Kimbell, 1993; Kimbell 1994; Layton, 1993; McCormick, Murphy, and Harrison, 1992; McCormick, Murphy, and Hennessy, 1994; Raat, de Klerk and de Vries, 1987; Rennie and Jarvis, 1995) initially tended to focus on philosophical issues concerning the nature of technology education, whilst more recently the focus has turned to what students do when engaged in technological activities (Jones, 2001). Research undertaken in technology education in New Zealand has been focused on such things as concepts/perspectives of technology, curriculum issues, implementation issues and teacher professional development (for example, Burns, 1990; Compton and Jones 1998; France 1987; Jones and Carr, 1993a; Jones and Carr, 1993b; Jones and Compton, 1998; Jones, Mather and Carr, 1994; Mather, 1994; Moreland, 1998; Northover 1997). The theoretical stance taken by most of the more recent research undertaken in technology education has been in keeping with a sociocultural view of education and a contemporary view of technology itself as socioculturally located, as outlined in Section 2.5 above.

This research is also positioned within a sociocultural framework, with concepts of knowledge, technology, technology education and technological literacy as per those explained in Section 2.5. There are a number of additional concepts underpinning this research, particularly as related to learning theories, the nature of the analysis as described in Chapter Three, and descriptive tools in education research. All of these are consistent with a sociocultural stance, however further explanation is provided in order to fully position this research within the various discourses categorised as such. As described by Wertsch, the basic goal of a sociocultural approach is provide an account of human cognition that recognises the essential relationship between mental processes and their cultural, historical and institutional settings (Wertsch, 1991). This approach underpins a number of different discourses, each with their own specific priorities and focuses. Thus it is important to explain which of these I have drawn on in carrying out this research and the development of this thesis.

## **Educational Discourses and Sociocultural Theories of Learning**

Educational discourses are many and varied but all have as a central part of their makeup a shared understanding of learning. Packer and Goicoechea argue that contemporary theories on learning should be explored in terms of two levels, that is, their epistemological basis, and their ontological basis (Packer and Goicoechea, 2000). Epistemology is defined as 'the theory of knowledge, or the theory of how it is that men (sic) come to have knowledge of the external world' (Abercrombie, Hill and Turner, 1994 pg.147). Ontology in contrast is 'concerned with the nature of existence' (Abercrombie, Hill and Turner, 1994 pg. 292). Packer and Goicoechea's state that traditionally discussion on learning theories has been based on an epistemological level where learning is defined in terms of changes in knowing. They argue that accounts of learning can be further developed through focusing on the often 'hidden' ontology of learning theories, where learning is understood to involve changes in being (Packer and Goicoechea, 2000).

Two educational discourses of particular importance in New Zealand are the constructivist discourse and sociocultural discourse. As outlined in Section 2.5, sociocultural perspectives such as that underpinning technology education, emphasise social interactions and the social, historical and physical location in which they occur. Constructivist perspectives, such as those that underpin mathematics education and science education (Bell, 1991; Haigh, 1995; Neyland, 1996), emphasise the learner's active involvement in the process of learning.

It has been argued previously (Cobb, 1994; Greeno, 1997; Hiebert, Carpenter, Fennema, Fuson, Human, Murray, Olivier, and Wearne, 1996) that constructivist and sociocultural theories are not necessarily contradictory, but rather may well be complimentary. Hierbert et. al., assert in fact, that constructivist perspectives are functional in nature, whilst sociocultural perspectives tend to be structural in nature.

When discussing a theory of learning in terms of its epistemological stance, constructivist and sociocultural theories commonly refer to knowledge as an endpoint resource or product entity. As explained by Lagache, 'Organisms accumulate and/or transform what they learn... What is learned is a resource that is always co-located in the organism, but that remains distinct from the organism' (1995 pg. 12). In the case of the personal constructivist theorists, the knowledge is referred to in terms of a personal construct, whereas both social constructivist and sociocultural theorists refer to the knowledge as a social construct (as identified earlier in Section 2.5). Within this broad concept of knowledge as either personally or socially constructed, learning is then described and supported in different ways.

From a constructivist standpoint learning is viewed as something that is happening within a learner with varying degrees of distinctiveness from the learning environment. Thus the ontological nature of these learning theories, whilst often not stated is that of a dualistic ontology (Packer and Goicoechea, 2000, pg. 228). They argue the philosophical basis of this is due to constructivism's historical development from Piaget who situated his work in the tradition of Kant (Packer and Goicoechea, 2000). Whilst Piaget's dualistic ontology is implied rather than stated, Kant clearly employed a dual ontology with his assertion of a subject and independent world - insisting that for logical reasons we must believe that 'things' exist, even though we can never 'know' them directly. (Packer and Goicoechea, 2000, pg. 228). (It is outside the scope of this thesis to further explore the area of the philosophy of Kant and those who built on his work. The intent here is purely to identify the philosophical underpinnings of these theories.)

In contrast, many contemporary learning theories focused on situated learning and situated cognition from a sociocultural standpoint have in common an account of learning as a process of interaction. Within this notion, learning is described as a transformative process during which the learner, the process, and the world are mutually constitutive and inseparable. As described by Lave, cognition is 'a complex social phenomenon... stretched over, not divided among – mind, body, activity and culturally organised settings (which include other actors)' (Lave, 1988, pg. 1). Thus the ontological nature of these learning theories is argued by Packer and Goicoechea to be a non-dualistic ontology (Packer and Goicoechea, 2000, pg. 229). Packer and Goicoechea trace the philosophical basis of this back to the roots of sociocultural theories through Vygotsky and Marx, and the strong influence of Hegel on their respective works. Hegel did not agree with Kant's dualistic notions and sought to develop a notion that was not based on the assumption of an individual self. Thus he viewed not only knowledge as a social construct – but also the 'knower' (Packer and Goicoechea, 2000, pg. 229). (Again it is outside the scope of this thesis to do more than identify the philosophical thread these theories are bound by.)

Packer and Goicoechea are quick to point out that whilst these learning theories call into question the more 'commonsense' dualistic ontology described above, the implications of this are far from clear (Packer and Goicoechea, 2000, pg. 229). One aspect that is immediately apparent however is the need to explore what this means for the notion of identity.

## **Identity/The Pastiche Personality**

The learning theory this research predominantly draws from is, as stated above, in keeping with a sociocultural standpoint. It is specifically that of the situated learning perspective where learning is explained as legitimate peripheral participation, and the stated ontological stance is non-dualistic (Lave, 1988; Lave and Wenger, 1991). Therefore issues of identity are important and I turn now to describing a notion of identity that moves away from a purely epistemological view of identity as self-concept or self-knowledge, towards something more in line with a sociocultural view. (Lave and Wenger's work will be returned to and discussed in more detail later in this section.)

Discussions of learning at an ontological level enable accounts to deal with complex notions of identity as it is conceptualised from a postmodernist perspective. Whereas modernist views of identity relied on a self as linked to some level of constant essence, the postmodern view arrives at what Zurcher, (1977) has coined as the 'mutable self'. Resulting from the need to respond in ways and at rates which were before unknown, the concept of a mutable self reflects the change in focus away from seeing the self as object and in effect stable, towards that of seeing the self as process - in a state of constant change. (Gergen, 1991). Thus, more in keeping with what a sociocultural view of identity may look like.

Modernism and postmodernism are differently defined across a number of sociological discourses. However, there is some general agreement that the underpinnings of modernity are those which arose from societies with 'typically industrial capitalist economies' (e.g. Fordist production and marketing), 'democratic political organisation' (including well established welfare states and public ownership) 'and a social structure founded on a division into social class' (Abercrombie, Hill, and Turner 1994, pg. 270).

Postmodernity is a descriptor used to suggest that contemporary industrial societies show different characteristics. For example the concept of social class, so important in modernity social structures, is considered in postmodernity, to be only one of a number of factors. Thus the 'social structure of society is more fragmented and complex with a number of sources of differentiation including class but also including gender, ethnicity and age.' (Abercrombie, Hill and Turner, pg. 326). Economies are based on post-Fordist notions of production and marketing that show a shift away from mass-production, towards niche and tailored production to suit different needs/desires.

Political organisation also shows a shift towards individualisation resulting in less welfare-oriented systems and an increase in self-reliance as the ideal. Alongside this is an increased valuing/recognition of the cultural nature of people's existence. The resultant shifts in terms of perceptions of identity are introduced above, and explained more fully below.

For the purposes of this thesis I perceive modernity and postmodernity in less conflicting terms. That is, in keeping with Giroux (1990) as discussed in Section 2.5, rather than rejecting modernism, postmodernism can be viewed as including a number of discourses which take from many modernist theories and practices that are considered useful at a specific time for a particular purpose. Lather (1991), also views postmodern approaches as important in this respect as they allow for both the use of modernist emancipatory discourses and the need to deconstruct emancipatory practice, to undergo a 'radical reflection on our interpretive frames' (Lather, 1991, pg. 13), rather than simply rejecting the emancipatory discourse as no longer appropriate. In this way constructive and deconstructive practices are linked and viewed as dependent on one another in order to provide new opportunities for thought and action.

The movement away from the modernist ideal of achieving an enduring consistent and true identity leads to what psychologists such as Gergen (1991) refer to as the 'pastiche personality'. 'The Pastiche Personality is a social chameleon, constantly borrowing bits and pieces of identity from whatever sources are available and constructing them as useful or desirable in a given situation.' (Gergen, 1991, pg. 150). As with Woody Allen's film *Zelig*, who one is with, is the major determinative factor for who one is. Whilst Allen's account may be somewhat extreme, contemporary research in the area of 'success' linked attributes suggests that highly situational transformative personalities such as described above, allow for a greater degree of flexibility and positive attributes leading to 'success' in the postmodern world (Gergen, 1991). When viewed from a modernist perspective, individuals with such socially-responsive/determined personalities are regarded as somehow lacking in inner fibre, and seen as deficient in terms of their identity. However, when viewed from postmodernist perspective, they become the people best suited to survival as they can find their feet in the fragmented and complex social structures they must exist within.

## **Bourdieu's Practice Theory**

Postmodernity's emphasis on the diversity of culturally based transformative identities, and the need to acknowledge the problematic nature of isolating the learner from that which is to be learnt (as identified above as a non-dualistic ontology), have resulted in two main interrelated theoretical strands. That is, Activity Theory and Practice Theory.

Activity theory was developed from the work of the Russian School of Psychology led by Vygotsky and his associates (Vygotsky, 1978) and has led to contemporary studies of cultural learning (for example Scribner & Cole, 1981) and work in activity theory (for example, Engeström, 1987). Activity Theory's site of analysis is 'setting oriented', that is, it prioritises the 'physical and social artefacts that make up a setting for social activity' (Compton and Lagache, 1996, pg. 4).

Practice Theory as developed by Bourdieu and takes a broader view than Activity Theory in terms of the site of analysis. It instead focuses on 'the stable and ongoing pursuits (practices) and social units (communities)' (Compton and Lagache, 1996, pg. 4) and therefore allows for the exploration of all aspects of social interactions including the people within and affected by them. Practice theory supposes that human cultures transmit dispositions, activities and structures that are themselves bound to local contexts (Bourdieu, 1977). Bourdieu argues that practices cannot be taken out of context without transforming them into an objective of study, which distorts their 'lived character' (Compton and Lagache, 1996, pg. 5). This emphasis on the need to situate analyses in terms of practices in context shows clear links to a fundamental issue in technology education. That is, the situatedness of technology and technological practice.

Three key concepts I specifically use out of Bourdieu's Practice Theory are Capital and Habitus and Field (Bourdieu, 1977). The following explanation is intended to background the use of these concepts as they appear in the process of analysis in Chapter Three.

### ***Capital***

The term Capital is referred to in other social theories, most notably those with roots in Marxist theory, and in numerous economic theories. However, the term as used by Bourdieu, represents quite a different concept. Capital in Practice Theory refers to a notion of power. That is, power of determination. As stated by Postone, LiPuma and Calhoun (1993, pg. 4), 'Bourdieu's notion of *capital*... entails the capacity to exercise control over one's own future and that of others.'

Bourdieu's complex notion of capital can be categorised under subheadings representing the form in which the power is situated. For example,

- Economic Capital - referring to the power of control gained from one's material wealth;
- Cultural Capital - referring to the power of control gained from one's knowledge, skill, and other cultural acquisitions;
- Educational Capital - referring to the power of control gained from one's educational qualifications;
- Symbolic Capital - referring to the power of control gained from one's accumulated prestige or honour;
- Linguistic Capital referring to the power of control gained from one's ability to speak appropriately/acceptably.

(Thompson, 1991)

Bourdieu's notion of capital as described above, serves to mediate between the individual and society - in that 'society is structured by the differential distribution of capital' and 'individuals strive to maximise their capital' (Postone et al, 1993, pg. 5). An important characteristic of capital is its convertability between forms (Codd, Harker, Nash). For example, economic capital can be 'converted' into educational capital through providing access to education institutions. Bourdieu's own work (Bourdieu, 1973) clearly outlines the way in which the cultural capital of students from dominant groups in society is converted into educational and subsequently symbolic and/or economic capital. This conversion as mediated within schools has been explained in terms of education's role in cultural reproduction whereby 'educational institutions are structured to favour those who already possess cultural capital, defined according to the criteria of the dominant group.' (Harker, 1990, pg. 34). Realisation of the potential 'power' of a person's capital, relies on the interaction of many variables therefore, one of which is their habitus.

### ***Habitus***

Two fundamental concepts in social theory that are normally presented as opposing binaries are subjectivism and objectivism. Subjectivism is a term used by Bourdieu to refer to 'an intellectual orientation to the social world that seeks to grasp the way the world appears to the individuals who are situated within it.' (Bourdieu, 1991 pg. 11). He uses objectivism to refer to 'an intellectual orientation to the social world which seeks to construct the objective relations which structure practices and representations.' (Bourdieu, 1991 pg. 11).

In moving to transcend these two orientations, and thus move in line with sociocultural theories and a non-dualistic ontological stance, Bourdieu developed his concept of Habitus.

Habitus is a set of dispositions, which incline agents to act and react in certain ways. Dispositions are acquired through a gradual process of inculcation in which early childhood experiences are particularly important.

(Bourdieu, 1991 pg. 12)

These dispositions are described as being structured, durable, and generative and transposable. These descriptors are further explained as follows (as summarised from Bourdieu, 1991).

- *Structured* - dispositions reflect the social situation within which they were acquired;
- *Durable* - dispositions are engrained in the life history of the individual and therefore they operate at a pre-conscious level and are not readily amenable to conscious reflection and modification;
- *Generative* and *Transposable* - dispositions are capable of generating a multiplicity of practices and perceptions in fields other than those in which they were originally acquired.

Habitus is a central concept in Bourdieu's Practice theory and can be thought of as 'the way a culture is embodied in the individual' (Harker, 1990, pg.34). He further explains habitus in terms of culture as follows,

Culture may be thought of as the body of knowledge, the tacit understandings, the self-presentation, language usage, values etc., which are acquired from the family of primary socialisation and are embodied in the individual as 'habitus'.

(Harker, 1990, pg. 34)

Therefore, the way in which any person's level of capital is realised in terms of their social trajectory relies on a complex relationship between their capital, habitus, and sociocultural and physical location. Actions or perceptions should thus be seen not as the result of habitus alone, but rather as the product of the multiple relations inherent within specific situations as they are positioned in time and place.

The common foundational aspects of technology educational theory and technological practice, and those underpinning Bourdieu's Practice Theory, provide a rich ground for exploration. For example Bourdieu's theory of practice is an attempt to move beyond the social sciences' preoccupation with oppositional notions which have arisen from general modernist projects. He moves to conflate aspects of the 'social', the 'cultural' and the 'individual', and is insistent on the importance of joining theoretical and empirical work. Practice Theory views one in the absence of the other as highly problematic. Likewise, one of the critical aspects of technology education is the joining of theory and practice in a way which takes account of technological practice as embedded, and influential in, its sociocultural environment, as represented in the interlinking strands discussed in Section 2.3, and 2.5 above.

Habitus and capital provide useful analytical tools as they cross all groups in society (Harker, 1990) and may be employed to describe occurrences within any sociological setting. Thus I employ these tools to aid my analysis of the actions and perceptions of people involved in the development of technology education in New Zealand during 1993-1995, and use this to describe technology education as a developing 'field' in New Zealand.

### ***Field***

The concept of field has been used by Bourdieu as a site for analysis (Bourdieu, 1977). A field is a term used to describe something that exists at an intuitive level in the world. Fields can be differentiated from one another by way of their historical and social aspects that lead to distinctively different discourses and practices. For example, the field of science and the field of sociology lack a common discourse, which makes meaningful communication difficult as the members of each field essentially play by different rules and in fact, are often playing a completely different game. Therefore the concept of field is useful in that it enables a holistic analysis of the members of particular groups, the groups themselves and the way they interact. In this way it provided a structure within account can be taken of 'the multi-dimensional space of positions and the position taking agents' (Postone, 1993, pg. 5). Every field is characterised by: its own 'determinative agents' - that is, the members of the particular field; its own accumulation of history; its own logic of action; and its own forms of capital (Postone, 1993, pg. 5).

## **Lave and Wenger's Communities of Practice**

The work of Lave and Wenger has strong links with Bourdieu's Practice Theory, as it provides the foundations for their 'Legitimate Peripheral Participation' learning theory (Lave and Wenger, 1991). Lave and Wenger's work has strong links to Situated Cognition (Brown, Collins, and Duguid, 1989) and the Cognitive Apprenticeship movement (Collins, Brown and Newman, 1989). This movement emphasised that social interactions, and in particular community development, were an important part of learning. The early papers from this work explained learning as the enculturation into communities of different practitioners, for example readers, writers, and mathematicians (Brown, Collins, and Duguid 1989). Thus, as indicated above, this learning theory, and its associated concepts, is positioned with a sociocultural discourse.

The term 'Community of Practice' refers to the analytical tool developed by Lave and Wenger (1991) in order to provide an ontological account of learning of what can be described as 'everyday practices'. As explained by Lave and Wenger, 'A community of practice is a set of relations among persons, activity and the world over time and in relation to other tangential and overlapping communities of practice' (1991, pg. 98). Lagache (1995) argues that communities of practice can be characterised by the dialectical nature of their constitution. That is, community membership both serves to define and extend existing communal practices, and the community membership is in turn defined by the practices of that community. In support of this, when referring to a 'community of students', Roth defines a group as a 'community' when 'the activities of individual children are in part determined by the "sum total" of the collective activity. Individual interests and those of the community influence each other in a reciprocal way: they are mutually constitutive. (Roth, 1998, pg.s. xv-xvi).

Within communities, Lave and Wenger discuss the make up of the participants in terms of their participatory role (Lave and Wenger, 1991). That is, membership in the community is defined by the dispositions of the members, and practices and relations between its members. From an analysis of different communities of practice, Lave and Wenger have suggested a notion of legitimate peripheral participation as a descriptive and analytical tool pertaining to the transformative process of learning. Thus, legitimate peripheral participation can be described as 'an account of learning as the social transformation of learners by participation. Like apprentice tailors or midwives, understanding is embedded within the embodied expertise of the community.' (Compton and Lagache, 1996, pg. 5).

Learning is defined as something which arises from interactions of human actors with their social and material settings (Roth, 1998). Participation in such communities results in the production of 'knowledgeability' (Lave, 1993) rather than the reproduction of 'knowledge' (Roth, 1998). Through participation 'newcomers come to share a community's conventions, standards, behaviors, viewpoints and so forth;' (Roth, 1998, pg. 12). The process of becoming a full member in these communities has been described in terms of 'a trajectory of *legitimate peripheral participation* of increasing intensity in the ongoing practices of a community.' (Roth, 1998, pg. 12). Thus allowing for the ongoing reproduction and transformation of the community.

There are many ways in which communities may be transformed. Roth (1998) groups these into three categories. Firstly, as indicated above, the enculturation of newcomers, in turn has a reciprocal effect on the community and newcomer. That is, by accepting a newcomer their individualities are asserted (at least in part) and in most cases new competencies are introduced. Secondly, communities may also change through oldtimers acquiring new resources and participating in new practices within the community and thus increasing the overall number of individuals engaging in these practices. Thirdly, oldtimers may experiment with and develop new practices in order to better meet their goals, or extend the same. Whatever the reason behind the transformation, the process of change is actioned through the medium of participation.

The nature of any community of practice will vary as dependent on the collective membership, their collective purpose, the nature of their interactions, and the expected or potential duration. Whilst communities of practice can be identified by the 'common tasks members engage in and the associated practices and resources, unquestioned background assumptions, common sense, and mundane reason they share' (Roth, 1998, pg. 10) it is important to recognise that members of any community are not 'homogenous'. That is, not all members 'know exactly the same things, or have obtained the same practices and resources.' (Roth, 1998, pg. 10). In fact, expertise within communities is often distributed, with many members participating as both newcomers and oldtimers as dependent on the specific situation at any one time (Collins, Brown and Newman, 1989; and see Brown and Duguid, 1992, for an example where a community of practice was specifically designed to model such multilevel expertise.) Further to this, a community of practice does not 'necessarily imply co-presence, a well defined identifiable group or socially visible boundaries' (Lave and Wenger, 1991, pg. 98).

Some communities of practice may come into existence at a particular time, exist for a finite period, and then dissolve when their purpose has been achieved, for example Scuba-diving certification class (Lagache, 1995). Others may have grown into existence over a period of time and may have the potential to exist for an extended but unknown period of time, for example traditional midwives (Jordan 1989). Communities of practice may be described as 'socially reproducing' or 'non-reproducing', with apprenticeships forming an important level of participation for those which are reproductive (Lave and Wenger, 1991, pg. 99). What is common to all communities of practice is that 'participants share understandings concerning what they are doing and what that means to their lives and for their communities' (Lave and Wenger, 1991, pg. 98).

Whilst Lave and Wenger's development and account of legitimate peripheral participation is primarily based on the analysis of mature communities (Lave and Wenger 1991) it has since been employed in analysing immature communities (for example, Lagache, 1995, Roth 1998), and redefined into the context of education to both analyse, and guide the design of, teaching-learning contexts (Roth, 1998; Collins, Brown and Newman, 1989; Brown and Dugoid; Ryba, Selby, and Kruger, in press). Roth (1998) provides an extensive discussion on the translation of Lave and Wenger's theories into schooling for the express purpose of creating student-centred science learning environments. The evaluation of this programme provides strong support for the use of such an analytical focus in education, and indicates the need for further research into 'conditions which afford or constrain the emergence of knowledge-building communities' (Roth, 1998, pg. 280).

Work in special education in New Zealand employing Lave and Wenger's analytical tools has begun to focus on the identification of such conditions and has resulted in the provision a set of guidelines for the creation of sustainable communities of practice. These are underpinned by the principles of 'active participation, guided learning opportunities, intellectual collective, identity construction, building cognitive structures, shared decision making, altruism, and psychological safety' (Ryba, Selby, and Kruger, in press).

Such work supports the use of Lave and Wenger's communities of practice in educational settings.

Within technology education in New Zealand many groups may be conceptualised as a 'community of practice' at various levels of maturity. As outlined in Chapter One, I focus on two such groups in this thesis and describe them respectively in terms of examples of a short-term community of practice (that is, the curriculum development group) and a developing community of practice with a view of becoming sustainable (that is, the facilitator training group). These communities of practice are explored primarily through members' perceptions, including a focus on their capital, and habitus, in order to gain insight into the overall nature of each community. In this way I hope to both employ the concept of Lave and Wenger's communities of practice as a descriptive tool, and evaluate its usefulness in aiding the development of a useful historical account of curriculum development.

## **2.7 In Summary**

Chapter Two provides the theoretical underpinnings for the rest of the thesis. An overview of education in New Zealand, in particular those aspects of importance to technical education, and more recently technology education, shows that the entry of technology education in to New Zealand's curriculum is only one of a number of past initiatives for educational reform. Whether this initiative has the potential to meet with any more success than its predecessors is yet to be seen. As discussed throughout this chapter, there are both reasons to doubt this will be the case, as well as reasons for hope. Perhaps one of the strongest influences may be the relatively high status which has been attributed to technology education in New Zealand and the overt focus on a broad notion of technological literacy as supported in the official Ministry of Education national curriculum statement in technology. Both of these factors make technology education in New Zealand quite different from that in other countries. Concepts from the work of Bourdieu and Lave and Wenger have been introduced and discussed in terms of providing a background for the process of analysis explained in Chapter Three, and a framework within which to evaluate the successful nature of this analysis in Chapter Nine. Part of this discussion was to present an argument for the use of concepts in technology education generally and in the development of an historical curriculum development account that has a commitment to understanding and explaining the complexity of the socioculturally mediated practices of those involved.

In Chapter Three, the methodological position underpinning this research is explained and details of the participants involved and the method of data collection and analysis provided.

# Chapter Three: Methodology

## 3.1 Introduction

Chapter Three presents the methodological underpinnings of this thesis. In Section 3.2, the methodological framework that provided the interpretive space for this research, from its inception to its final write up is discussed. Section 3.3 details the methods in terms of the techniques of data gathering employed and ethical considerations and procedures followed. Section 3.4 presents a discussion of the participants involved in the research including an explanation of the reasons for their inclusion. Section 3.5 presents a discussion of my means of collation in terms of the process of analysis carried out. Details are presented of the analytical steps involved, and links made to the respective data chapter that serves to present the results of each step. Section 3.6 provides a brief summary of the chapter.

The methodology for this research incorporates a discussion of both the methodological framework and the methods employed within it. The distinction between method and methodology can be explained in that a researcher's method focuses on 'techniques for gathering empirical evidence', whilst the methodology 'is the theory of knowledge and the interpretive framework that guides a particular research project' (Harding, 1987 pg. 2). Whilst acknowledging that the theoretical basis of any framework may or may not remain consistent throughout an entire research period, the fundamental methodological underpinnings can be summarised and presented. That is, a research report should include an explanation of the methodological discourse that guided the researcher, as well as the methods by which data was both collected and analysed.

In the past, data gathering techniques have been categorised in ways which have sought to present them as being representative of particular 'methodologies'. For example, different data gathering techniques have been classified as either 'qualitative' or 'quantitative', where qualitative and quantitative are conceptualised at the level of an overarching methodology. The setting up of such 'either/or' notions has, as in the case of most binary relations, resulted in an uneven power balance between these 'methodologies'.

The direction of the power imbalance has arisen from the historical linkings of qualitative and quantitative 'methodology' to particular disciplines. For example, in keeping with the rationalist, empiricist movement that dominated scientific thought in post-enlightenment times, quantitative methods were strongly advocated over qualitative methods of data collection and analysis. The quantitative *methods* therefore came to be interpreted as equating to the quantitative *methodology* of science. Due to the high status given to the field of science over this time, quantitative research came to be perceived as the more valid research methodology for a range of disciplines. This resulted in these other disciplines either being undervalued, or attempting to gain validation through the use of often inappropriate quantitative research techniques.

Recent challenges, particularly from feminists working within the field of science, to both the status of science and the nature of science, have resulted in a significant shift in this perception. Instead of hailing science as the means of providing an 'objective' world view, that is, one in which the 'real' world is described, it is now recognised that scientific descriptions are socially mediated, in much the same way as any other description from alternative fields of inquiry (Bleier, 1986; Haraway, 1985; Harding, 1986; Hekman, 1990). In order to acknowledge the sociocultural location of scientific theorising and practice, the field of science has itself moved to validate a number of alternative research methodologies. This in turn has 'allowed' other disciplines to validate the same, and has resulted in a general sharing of ideas across different fields in order to further enhance both the fields and extend research methodologies.

With this distinct move toward 'cross-disciplinary fertilization' (Lather, 1992, pg. 90), the simplistic quantitative/qualitative means of classifying research methodology is no longer appropriate. As argued by Lather, (1992, pg. 90), 'qualitative and quantitative are concepts belonging to a discourse at the level of *method*, not *methodology* or *paradigm*' (original emphasis). Positioning particular methods as qualitative or quantitative does little to illuminate the philosophical and/or theoretical discourses of the researcher. What is required therefore is an explanation of the methodological position of the researcher. That is, the theoretical and/or philosophical discourse/s that have provided the interpretations inherent in all stages of the research process.

At this point, a discussion of methods used (which may include either, or both, qualitative or quantitative techniques), can be positioned within the specifics of the research at hand. In this way, a methodological discussion will allow for the research to be located within an overarching framework whereby the researcher can more effectively communicate both meaning and intent.

### 3.2 Methodological Framework

This research was planned, carried out, and interpreted from a theoretical research framework based on a conflation of three main educational methodological discourses. Each of these discourses is discussed in turn, highlighting those aspects selected as important for the development of my own methodology. Further to the explanation of my use of discourse as outlined in Chapter Two, I view the ‘construction’ of meaning within any discourse as a dynamic process. Therefore the interpretations of research material presented in this thesis is a joint process between the writer and the reader. Thus the more explicit the methodology (as defined in Section 3.1 above), the more likely it is that the reader will have access to the intended meanings of the writer.

In order to discuss the three methodological discourses central to this research, it is helpful to conceptualise them as part of a bigger picture. Lather, (1992) developed a summary table useful in this respect. This table uses Habermas's thesis of the three categories of human interest that underscore knowledge claims, Predict, Understand, and Emancipate (Habermas 1971 cited in Lather, 1992). However, she adds a fourth category to extend the summary to include more recent developments - that of Deconstruction. Lather (1992) argues that each of these categories, or paradigms as she titles them, support different discourses within which knowledge is constructed and legitimated. This table is as follows:

**Table 3.2.1: Paradigms of Post-positivist Inquiry**  
(Lather 1992, pg. 89)

<b>PREDICT</b>	<b>UNDERSTAND</b>	<b>EMANCIPATE</b>	<b>DECONSTRUCT</b>
positivism	interpretivist naturalistic symbolic interaction microethnography phenomenological hermeneutic constructivist	critical neo-Marxist Freirean participatory race-specific praxis-oriented feminist	post-structural post-modern post-paradigmatic diaspora

I argue phenomenology, hermeneutics, symbolic interactionism, and microethnography, can be further categorised under the subsuming discourse of interpretivism. When discussing interpretive research I have therefore highlighted aspects that in another categorisation may be positioned reasonably within any one of these other named research discourses. The reason for doing this reflects my perception that the aspects I have prioritised show more commonality across all these discourses than differences, and therefore provides grounds for their grouping under an interpretive overarching discourse. In keeping with discussion in Chapter Two, I view ‘constructivist’ to be a stance on the nature of knowledge, and as such may apply across paradigms rather than as a separate discourse. The paradigms under deconstruct above could be subsumed under a post-modern discourse as both post-paradigmatic diaspora and post-structuralism are subsets of post-modernist thinking.

This is similar to the categorisations employed by Collins (1992) as she develops a method of establishing a comparative overview of research discourses as follows:

**Table 3.2.2: A Four-Part Conceptualization of Inquiry**

(Collins 1992, pg. 184)

<b>Positivism</b>	<b>Interpretive</b>	<b>Critical</b>	<b>Post-modern</b>
	phenomenology hermeneutics socio-linguistics symbolic interactionism ethno-methodology	feminist Marxist Freirean	post-structural

Collins' subsuming of feminist, Marxist and Freirean paradigms under ‘Critical’, could be again subsumed under a Praxis-oriented discourse, along with Lather’s ‘neo-Marxist’, race specific, and participatory’ paradigms as all have the common purpose of working for social change.

I found aspects of both Table 3.2.1 and 3.2.2 useful in the development of my own methodology, and have therefore developed a research overview that combines aspects of Lather’s (1992) and Collin’s (1992) work. This overview is as follows:

**Table 3.2.3: Research Overview used in this Research**

<b>PURPOSE</b>	<b>Reflect</b>	<b>Predict</b>	<b>Understand</b>	<b>Emancipate</b>	<b>Deconstruct</b>
<b>DISCOURSE</b>	Positivist	Positivist	Positivist	Praxis-oriented	Postmodern
	Naturalist		Interpretivist		

In Table 3.2.3, 'categories of interest' are referred to as the underlying 'Purpose' of the research. In keeping with Lather's table, 'Deconstruct' is included in light of the many disruptive agendas of contemporary research that are subsumed under the discourse of postmodern methodology, including post-structural and post-paradigmatic diaspora. I have not positioned Lather's naturalistic paradigm within understanding as she does, but have added another column - 'Reflect'. This is based on my interpretation of naturalistic research as focused on a direct reflection of that which is 'real', or 'out there'. A commonality of positivism and naturalistic research would therefore be the attempt to tell a story without the researcher's voice. An example of such naturalistic research could be that of earlier feminist research which focused on providing a place for 'others' to speak, without allowing the researcher's own voice to overpower their participants. There are, however, many differences between naturalistic and positivistic research thus obviating a subsuming discourse.

As discussed above, Collins' feminist, Marxist and Freirean discourse, along with Lather's race-specific and participatory paradigms, have been subsumed under the one methodological discourse of Praxis-oriented as based on their overriding emancipatory purpose. In the same way, the Interpretivist methodological discourse includes within it, Collins' phenomenology, hermeneutics, socio-linguistics, symbolic interactionism and ethno-methodology/Lather's microethnography.

Of those discourses listed in my research overview Table 3.2.3, Interpretive, Praxis-oriented, and Postmodern research methodologies will be discussed as they provide the basis for the methodology of this research. The rationale for selecting these three discourses to draw from is related to the overall purpose for this thesis as stated in Section 1.2, as well as my reliance on sociocultural theories as discussed in Sections 2.5 and 2.6. The stated aim of this thesis is to provide an explanation of the development of the field of technology education in New Zealand through an analysis of events in terms of the people involved, decisions made, and resulting effects and implications. In order to do this it was necessary therefore to work from a methodological discourse that could provide the understanding on which to base this explanation. A primary focus on Interpretivism allowed for this explanation to be developed as based on 'interpretations' from the perspectives of a range of people involved, as well as recognising the sociocultural location of these perspectives and subsequent interpretations.

Inherent in the view of technology education as presented in Sections 2.3 and 2.5 are notions of emancipation and deconstruction. Therefore a methodological stance that drew from Praxis-oriented, and Postmodern methodological discourses would serve to further strengthen this work. Thus the following discussion relates the features of the discourse to my own methodological position.

### **Interpretive Research**

In keeping with a sociocultural stance, an interpretive research discourse is one in which the world being researched is conceptualised as constructed. This contrasts with a positivist research discourse that focuses on the exploration of a 'real' world to be described and explained. This is not to say that interpretivists hold to an 'antirealist' position, rather, they can be described as 'non-realists' (Smith, 1992, pg. 101). By the term 'non-realist' Smith suggests such researchers do not reject the existence of a real world, but rather reject the possibility of research being able to describe it as such. That is, Interpretivists do not challenge the concept of a real world, rather they simply distinguish it from notions of truth. This is in keeping with Packer and Goicoechea's view that what 'counts' as 'real' changes historically and varies culturally (2000). This is further supported by Rorty (1989, pg. 5) as he states:

We need to make a distinction between the claim that the world is out there and the claim that truth is out there. To say the world is out there, that it is not our creation, is to say, with common sense, that most things in space and time are the effects of causes which do not include the human mental states.

In keeping with the sociocultural views of knowledge as discussed in Section 2.5, within interpretive discourses the role of language provides a major focus when attempting to understand the ways in which knowledge about the world is constructed through research. This further supports the claim that interpretivists are not antirealist, but hold to a denial of any traditional notion of singular truth as representative of this real world.

Such a theoretical stance has meant interpretivist theorists have had to reconceptualise concepts such as objectivity and subjectivity. Their reconceptualised notion of objectivity moves away from viewing objectivity as some form of unbiased description representing reality, towards a perception that denotes objectivity in terms of a negotiated social agreement (normally within a defined field) of particular interpretations.

In this way an objective view is that view which is prioritised over others because it is dominant within the field. Subjectivity therefore, rather than denoting the presence of bias, refers now to a position upon which there is not complete social agreement in interpretation. Subjectivity is not a negative condition, but an important representation of any individual's own life experience. Strong objective positions must provide knowledge and/or practices that have some area of commonality with all people's subjectivity if it is to be seen as inclusive of those people. As with Bourdieu's notion of habitus (as discussed in Section 2.6), an interpretivist position therefore removes the oppositional nature of these two terms, instead allowing for them to be employed together in order to investigate social happenings in a situated fashion.

With the purpose of interpretivist research being to understand, its goals can be loosely defined as the revealing of the participants' views of reality (Lather, 1992). As summarised by Smith (1992 pg. 105), 'the focus of inquiry must be on the interpretation of the interpretations people give to their own actions and interactions with others'. Any claims to knowledge made from such research must employ a high level of argument if it is deemed to be 'good research' (Smith, 1992, pg.s 103-104).

The process of analysis presented in Section 3.5 of this chapter, shows in detail how this has been allowed for in this research. However it must be highlighted that the analysis and its resultant interpretations are firmly situated. They represent my own theorising as based on my experiences in the area of technology education, experiences of those I have worked with, and formal reflections gathered from people involved in the area. As summarised by Cherry (1995, pg. 19),

... the academic theorizer is subtly guided by his or her socialization into a discipline's normative beliefs about appropriate intellectual frameworks and scientifically respectable methodologies for bringing together hunch and evidence. It is in this effort to *construct* the meaning of an event where we also *constrict* our vision, where we fail to ask the question, 'of what else is this event an instance?'

The curriculum development history offered in this thesis therefore is necessarily restrictive of other interpretations, but is not intended to invalidate any alternative positions, nor validate its own position for all time. In this way it attempts to recognise the danger inherent in any attempt 'to canonize events and the research that follows as having one meaning for all time' (Cherry, 1995, pg. 23).

### **Praxis-oriented Research**

Praxis oriented research is that research which is explicitly committed to critiquing the status quo and building a more just society (Lather, 1991, pg. 51). Previous emancipatory research has been challenged by various feminists, neo-Marxists and poststructuralists as having paid too little attention to the 'interactive complexity, shifting centred, and multi-sited constructedness of ourselves and our worlds' (Poster, 1989, pg. 21). Research as praxis provides a reconceptualised view of that which was thought of as emancipatory research, and focuses on the importance of 'self reflexivity and deeper understanding on the part of the researcher' (Lather, 1991, pg. 60). It also focuses on the notion of reciprocity, that is, the research should have as one of its purposes an opportunity for the development of mutually beneficial relationship between researcher and those researched. This research relies fundamentally on this notion of research reflexivity and reciprocity. It is only through my own understanding of the social context within which early developments in technology education in New Zealand were embedded, that the analysis is made possible. In addition, as stated earlier, the primary aim of this thesis is to provide an explanation of the development of the field of technology education to support the future development of the field and therefore the participants within it. Thus reciprocity is inherent in the undertaking of this research.

### **Postmodern Research**

Postmodern research brings into focus the importance of understanding, and constantly acknowledging, the subjectivity of individuals, and this subjectivity is taken to be pluralistic and transient in nature. This notion of subjectivity is conceptualised in terms of that explained within the interpretivist discourse above. However, postmodern research theory provides analytical tools specific for the task of allowing the researcher to interpret the 'researched' differently. In an attempt to de-stabilise that which has been taken as representing facets of others' subjectivity, poststructural theorists in particular make visible the historical and social context of any construction of subjectivity and place it in the context of discursive practice and/or conflict. The subjectivity of an individual is thus seen as constructed as a result of '...the discourses s/he has access to, through a life history of being in the world' and 'focuses on the shifting, fragmented, multi-faceted and contradictory nature of our experiences' (Davies, 1994, pg. 3).

Past categorisations are implicit in experience and provide frameworks that both enable us to speak, and simultaneously<sup>3</sup> constrain our voices. In an attempt to escape these referents, postmodern research may draw on deconstructive practice as discussed in Section 2.5. Such categorisations have been developed by way of a modernist notion of difference-as-opposition, and as such have resulted in a myriad of dualisms, for example female/male, student/teacher, novice/expert, doing/knowing etc. Such dualisms can not only be challenged in terms of their assumption of greater difference *between* categories than *within*, but also by the way in which those terms given on the left in the pairing have been constructed in the negative, with those on the right holding positive positions in social hierarchies.

In this research the move away from an identity as a fixed characteristic of an individual towards identity as a way of being within a specific community of practice allows for the move away from any individual-linked dualisms, and towards alternative constructions of collectives as made up of members whose identities are transient in nature, that is, reflective of a 'pastiche personality' (Gergen, 1991, pg. 150). Taking account of this postmodernist focus on identity construction as a myriad of multiple and contesting ways of being, this research attempts to 'replace the starting-point in a supposed 'thing'... located within individuals, with one located... within the general communicative commotion of everyday life' (Shotter and Gergen, 1989). That is, it attempts to provide an account of the participant's perspectives in a way that reflects what Minick refers to as the 'individual-in-action' as opposed to the 'individual-as-such' (Minick 1985).

### 3.3 Methods

*The 'data' [given] of research are not so much given as taken out of a constantly elusive matrix of happenings. We should speak of capta rather than data.*

(Laing, 1967)

As discussed in Section 3.1, methods refers specifically to those techniques and procedures I employed in order to collect my research data. In this section therefore I outline both the way in which I carried out interviews with my participants as well as discuss the ethical considerations and procedures supporting this method of collecting and collating data.

## **Interview Technique**

The data was gathered through a series of informal semi-structured interviews that began in 1997 and were completed in 1999. Interviews were used in order to provide opportunities for more in depth information to be gathered than would have been possible using alternative means such as written questionnaires. They also provide grounds for a dialogue between the researcher and participant to enable meanings to be negotiated and shared. The semi-structured interview technique was chosen ensure the interview had a focus whilst also allowing a degree of flexibility for the participant to discuss a range of issues perceived to be of relevance to the discussion as they arose. It also provided me with the flexibility to respond to the comments in order to either seek clarification, extend the discussion, and/or refocus the discussion as appropriate.

Eight of the nine interviews were carried out by employing electronic mail communication technology. The remaining interview employed face-to-face audio-taped communications that were subsequently transcribed. The choice of communication medium was determined primarily by the proximity of the researcher to the participant. How comfortable the participants felt with me, the level of comfort the participant felt with the medium, and the level of access the participant had to the medium were all factors which were taken into account in the framing up of the interviews. All interviews were set up to be as informal as possible to encourage the participants to reflect on their past experiences and be open in discussing what were often very personal actions and/or reactions. As discussed in Section 1.3, the interviews were aided by my knowing all of the participants in a professional sense. In addition to this I would describe most of the participants as close personal friends, with one in fact being my partner. This situation had a major impact on the type of data gathered as the participants were not only more openly reflective and candid in their comments, but it also enabled me to ask particularly pertinent prompt questions given my knowledge and understanding of the participants' background and character.

The face-to-face interview took place over a three week period. The email interviews varied as dependent upon both my own the participant's response frequency. All interviews were completed by the end of 1999. This included the structuring of the interview data into a coherent transcript, which was returned to each participant at least once for editing. As the interviews took place over a relatively long period of time, numerous opportunities were provided for gaining reflective comment and ongoing informed consent (see below for further discussion).

The semi-structured interview schedule was as follows:

**Table 3.3.1: Interview Focus Questions**

- How would you describe the 'group' of which you were a part?
- How long was the group in existence?
- What was the purpose of the group - as you saw it then?
- What was the purpose of the group - as you see it now?
- Who do you feel determined the purpose of the group?
- Who do you feel determined what happened in the group?
- Do you feel you - as a collective, achieved the goal/s set out?
- How would you describe your role within the group?
- Did this change over time?
- Do you feel you accomplished your role/s
- Why do you think you were a part of this group?
- What effect on the group did you have?
- What effect did being a part of this group have on you?
- How would you describe the interactions of the group generally?
- How would you describe your own interactions in the group?
- What roles - if any, do you have in the area of technology education presently?
- How do you see yourself in regard to technology education in the future?
- What was your view of technology before you were a member of this group?
- Did this change during the group?
- What is your view of technology now?
- What was your view of technology education before you were a member of this group?
- Did this change during the group?
- What is your view of technology education now?
- What groups/people do you feel have been important in technology education to date?
- How would you describe technology education in New Zealand at this time?

The face to face interview used the starter questions as above, with these being sectioned into three interview sessions. The first session encompassed the first seven questions and concentrated primarily on a broad description of the group and its purpose. The second session encompassed the next eight questions and concentrated primarily on establishing the participant's perspective on the group interactions. The final session encompassed the remaining ten questions and focused on the participant's perceptions of technology education.

Having ongoing access to this participant (as explained in Section 3.4 below), allowed for further reflective comments to be made by him and/or further reflective questions to be asked by me. These were then incorporated into the interview transcript.

The remaining eight interviews were carried out using electronic mail. Electronic mail interviewing allows for a greater degree of reflection time for both the participant and the researcher than that available in most face-to-face interview situations. As opposed to such synchronous communications whereby responses are by definition immediate, the use of asynchronous communication such as e-mail allows the respondent an opportunity to explore a range of issues prior to making any response. In the past, whilst asynchronous methods of data collection have been employed through questionnaires etc, it has been time consuming and cumbersome to return to the respondents with prompts for further information and/or clarification. As discussed by Kruger and Struzzieor 'Prior to the development of computer-related technology, the advantages of asynchronous communications were often overshadowed by the slow delivery of messages, such as through postal mail.' (Kruger and Struzzieor 1997, pg. 77).

Using e-mail in this research provided a data collection mechanism that served to enable me to take advantage of an interview-prompt technique, as well as take advantage of the reflective possibilities of asynchronous communications. The use of e-mail also allowed an opportunity to develop a more informal feeling for the interview. People tend to be more comfortable writing in the medium of e-mail, than they do when committing themselves to words on a page in other settings, or when speaking into an audiotaping device.

The email interviews employed the use of the same semi-structured interview schedule as the face-to-face interview – see Table 3.3.1. As the responses came in I reformatted them into the participant's transcript, and whilst doing so I noted down prompts for clarification, further explanation, or related questions. I then sent the transcripts back to the person involved for an additional series of responses. These were then integrated into the first series of responses. If further clarification etc was needed this process was repeated as appropriate.

The transcripts for each interview were coded as follows: (see section 3.4 for a discussion of each of the 'named'<sup>1</sup> participants)

A denoted Wayne's Transcript

B denoted Pete's Transcript

C denoted Tim's Transcript

D denoted Ann's Transcript

E denoted Shona's Transcript

F denoted Ken's Transcript

G denoted Sally's Transcript

H denoted Leah's Transcript

I denoted Dianne's Transcript

These codes were then used with a page number to document where quotes used in the data chapters originated. For example A:1 referred to a quote taken from the first page of Wayne's transcript.

The interview schedule was not trialed before its use as it was specifically designed to encourage these participants to reflect on and discuss their experiences. Also, they were starter questions only and therefore did not limit the discussions in the way their use in a formal interview and/or questionnaire would have done.

### **Ethics**

This research was underpinned by the ethical requirements of the Centre for Science, Mathematics and Technology Education Research, University of Waikato. Approval was gained through the School of Science and Technology Human Ethics Committee, University of Waikato as a pre-requisite to enrolment in the University of Waikato's doctoral programme. This approval was sought and gained at a standard ethics committee meeting in May 1995.

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<sup>1</sup> The following names are not the real names of the participants, but rather are the pseudonyms used to retain confidentiality.

The stated and accepted overarching ethical guidelines were as follows:

- the value of the research will outweigh any human costs involved;
- all participants will give their free, informed consent regarding the use of any quotes taken from their data;
- privacy and confidentiality will be respected;
- research goals and methodology will be socially and culturally sensitive;
- exploitation of the researcher/participant relationship will be prevented;
- property rights will be respected - all quotes remain the property of the facilitators/all analysis is the property of the researcher;
- any conflict of interest that might develop will be declared, and steps towards resolution of the conflict will be undertaken through the appropriate channels.

All data was viewed by the facilitators, along with a discussion of the possible implications any disclosures may have at the time, and potentially in the future. An informed consent form was developed and signed by all participants prior to the interviews commencing – see Appendix A. (Please note some of the specific details included on this form changed over the period of time the research was carried out and written up. For example, the initial description of the research no longer represented the specific nature of the research undertaken due to changes made as the research developed. Details such as my name also changed, that is, from Mather to Compton. However, the details directly related to the ethical requirements and procedures did not change).

Ongoing consent was also gained throughout the interview and editing period. The participants were presented with the data collected and analysed at various stages and asked explicitly to edit each version and comment on their acceptance or otherwise of that which was being portrayed. They were kept informed of the changes within the research focus and the potential interpretations and resultant probable and possible impacts these may have on themselves and others was also discussed in an ongoing manner.

Assigning the participants a pseudonym rather than using their real name provided some level of anonymity, but due to the nature of the group, any person with knowledge of the area would have little difficulty in identifying the participants. New Zealand is a small country and the number of people involved in technology education are both few in number and relatively easily identifiable. It was essential therefore that participants were afforded some level of alternative 'protection'.

For example, due to the nature of the thesis, personal perspectives on a number of emotional issues formed a significant focus for each interview. Because of my personal relationship with the participants, many comments were made which in retrospect were judged unsuitable for inclusion as they could be potentially damaging either personally or professionally. These judgements were made in consultation with the participants.

The transcription strategies employed were as follows. After each transcript was completed, they were returned to the participant for checking and editing. Alongside the standard checking for accuracy of my interpretation and depiction of their experience, I also highlighted areas that I felt we should discuss further in terms of inclusion. This step was repeated after each participant 'story' and their description was written. Many of the participants considered the material sent back out to them accurately portrayed their feelings both at the time the events happened, and on reflection at the time of the interview. They were therefore very keen that most of the material, even that highlighted as potentially contentious, remained as part of their story. In most cases I accepted their judgement, but only after discussing all possible personal and professional ramifications of including this material. Wherever possible I have removed names and inferences to individual people, whilst retaining the underlying message. In some cases however the people being referred to are a critical part of the data and therefore their names remain as long as they also were not research participants.

These ethical considerations will become even more important in any work published from this thesis in the future. Therefore I have indicated to my participants that before I use material directly from that which they have given me, I will check back with them and renegotiate their consent in a similar fashion to that described above.

### ***Respondent Validity***

Whilst the above discussion focuses primarily on ethical issues involved in participant protection and informed consent, the processes outlined also afforded an additional opportunity to establish the level of respondent validity both during and after the data collection phase. Direct feedback from participants, including the emotional nature of their reactions, have been found to be sound indicators of the level of respondent validity. For example, positive reactions of research participants to analyses and subsequent presentation of findings tends to suggest the research has a high level of respondent validity (McCormick and James, 1983).

## 3.4 Participants

### Group Selection

As identified in Section 3.3, there were nine participants involved in this research. The participants were selected from 3 distinct groups in existence over the 1993-1995 time period. These were the Minster's Advisory Group (MAG), the Curriculum Writing Group for the development of the draft curriculum statement in technology (CWG), and the Facilitator Training Group (FTG). These three groups were selected as important to the development of technology education in New Zealand because of the formative nature of their undertakings - that is, the development of the New Zealand national curriculum statement in technology, and its subsequent implementation. Another group known as the Contract Review Group (CRG) also existed during this time with the role ensuring that the contract outcomes were met by the CWG. Whilst the MAG, the CWG and the CRG all obviously had specific and critical roles in the development of the curriculum, the MAG and the CRG played a greater role in terms of defining the parameters of the technology curriculum, and therefore had a greater impact on the nature of the field at this time. For this reason it was the MAG and CWG groups I chose to focus on in order to select participants to make up the CDG. The FTG came into existence during the training of fifteen people nationwide as technology education teacher development facilitators. (For details of this programme see Jones and Compton 1998, and Compton and Jones 1998).

Two participants were from the MAG, three from the CWG and four from the FTG. The selected participants were then regrouped in terms of purpose. The MAG and CWG were grouped together as their purpose was the development of the draft national curriculum statement in technology and are referred to as the Curriculum Development Group (CDG). Thus five of the participants were categorised as belonging to the CDG. The FTG's purpose was that of providing professional development in order to aid the future implementation of the curriculum into NZ schools. The remaining four participants were categorised as belonging to this group.

At this point I would like to reiterate my close involvement with these groups. I was a member of the CDG, as well as being closely involved in the setting up and running of the FTG. As discussed in Chapter One, this served to provide me with a position situated within the groups from which to both collect and collate data.

## **Participant Selection**

The selection criteria for the participants therefore encompassed the groups selected. That is, a fundamental requirement was they belonged to one of these three groups. The specific members selected resulted largely from pragmatic reasons of availability and researcher accessibility. As explained in Section 3.2, my focus was on ascertaining the member's perceptions of their own and others' practices – that is, a focus on the 'individual-in-action' (Minick, 1985), and thus accessibility and a willingness to provide an open account of these were deemed more important criteria for selection than any specific 'attribute' or 'background' each participant may have brought with them as an 'individual-as-such' (Minick, 1985). Therefore there was no attempt to select participants on the basis of group 'representation'. In keeping with a sociocultural view of group interactions, it is the interactions which 'represent' the group, rather than any sample of members taken as separate entities.

This is not to say the participant's 'individuality' and 'background' were not important contributing factors to the end account. They provide part of the social location of the account and as such brief details of their backgrounds are provided below. The significance of these factors was never explored in this thesis. However, it is important to note the largely 'monocultural' nature of not only my research participants, but the majority of those involved in technology education at the time. Whilst there was a relatively equal gender split within most groups, most members would be categorised as middle class Pakeha.

### ***Minister's Advisory Group - MAG***

Two participants selected were from the MAG. The MAG comprised of eight members in total. The two participants selected represented distinctively different perspectives on the shared experience of being a member of this group. Wayne was a New Zealand born Pakeha and had a primary school teaching and management background. During the 1993-1995 period he was employed as a lecturer at a New Zealand college of education. Pete was present in the group in the capacity of a New Zealand Ministry of Education official. Pete was an English born Pakeha, and had a secondary school social science teaching background. Whilst Pete was not 'officially' a member, his interactions and actions defined his membership, and he was recognised by the himself and other members as being a central 'player' within the groups interactions.

### ***Curriculum Writing Group - CWG***

Three participants selected were from the CWG. There were a large number of people involved in this group at a variety of levels (Jones, 1995), however, those chosen were selected from the smaller central core of writers, which ranged in number between 11 and 15 during the development of the draft curriculum statement. This core of people were considered to have had the most significant impact on the direction and content of the draft curriculum statement as they were the contract coordinators and/or leaders of the teams established for managing the development process (Jones, 1995).

Tim was Pakeha, born in New Zealand, and had a secondary school science teaching background. During the 1993-1995 period he was employed as a lecturer/researcher at a graduate research centre within a New Zealand university. Ann was a New Zealand born Pakeha, and had a primary school teaching background. During the 1993-1995 period she was employed as a lecturer at a New Zealand college of education. Shona was a New Zealand born Pakeha, and had a secondary school science and teaching background both in New Zealand and in England. During the 1993-1995 period she was employed as a lecturer at a New Zealand college of education, and had led a professional development contract in biotechnology. Tim and Ann were the contract coordinators, and Ann was also the team leader for the Primary focus team. Shona was the team leader of the biotechnology technological area specialist team.

### ***Facilitator Training Group - FTG***

The remaining four participants selected were members of the FTG. The four participants played a variety of roles in this group and all of the participants were still active in the field of technology as contracted teacher development facilitators in technology education at the time of the interview. Ken was a Scottish born Pakeha, and had a secondary school science teaching background. During the 1993-1995 period he was a fulltime secondary science teacher. Sally was a New Zealand born Pakeha, and had a primary school teaching background. During the 1993-1995 period she was a fulltime advisor with a New Zealand college of education, and had previously been involved in a biotechnology initiative. Leah was a New Zealand born Pakeha, and had a primary teaching background. During the 1993-1995 period she was fulltime primary teacher and had also done some work in the area of biotechnology. Dianne was a New Zealand born Pakeha, and had a specialist home economics and textiles teaching background. During the 1993-1995 period she was employed at an intermediate school as a specialist technology teacher.

### 3.5 Process of Analysis

As discussed above, the participants were selected from 3 distinct groups (MAG, CWG and the FTG) but were regrouped in terms of purpose. The MAG and CWG were grouped together into the CDG as their purpose was the development of a national curriculum statement in technology, and the FTG group's purpose was that of providing professional development in order to aid the future implementation of the curriculum into NZ schools. In order to provide an explanation of the developments in technology education in New Zealand from 1993-1995 data collected from these participants through semi-structured interviews was analysed and is presented as follows.

#### **Step 1: Participant's Story**

The transcript from each of the research participants was the data used in my primary analysis resulting in a 'story' reflective of that participant's reflections on their experiences. The primary analysis consisted of reading the transcripts and summarising and categorising the comments made, under a series of category labels. These labels were developed from the data itself, reflecting the common elements that came through from the interviews. These then provided the structure for each participant's 'story' in a way that similar threads could be explored with each participant.

The category labels were as follows:

- Description of the group
- Basis of personal selection
- Purpose of the group
- Group interactions
- Role in the group
- Impact on the group
- Group impact on participant
- Influences on technology education
- Comments on Technology Education
- Present and future directions

Focusing on presenting the participant's 'story' was an important step in providing the reader with an opportunity to make her/his own interpretations on the data gathered through the interviews as explained in Section 1.6. Whilst I have impacted on the participant's voice through overlaying a structure based on the category labels above, I have clearly differentiated my own voice, and allow that of my participants to dominate through an extensive use of transcribed quotes. The results of Step 1 are presented in Chapter Four (participants from the CDG) and Chapter Six (participants from the FTG).

## **Step 2: Description of Participant**

Each participant was then described in terms of the following:

- level of participation in the community;

The participant's level or 'intensity' (Roth, 1998), of participation is described in terms corresponding to the nature of their membership of this community. Participating at a level whereby they were mutually constitutive (Lagache, 1995; Roth 1998) would describe someone with a high level of, or intense, participation. This is presented in words in Chapters Four and Six and graphically in Chapters Five and Seven.

- participant habitus (Bourdieu, 1977);

Dispositions of relevance to the participant's membership in the group and how these were reflected in their practice.

- levels of capital (Bourdieu, 1977; Thompson 1991);

Five different forms of capital were identified as being potentially relevant in the mediation between the participant and their membership in the group. These were; educational, cultural, symbolic, political and linguistic capital. The use of these categories was as per Thompson's definitions (1991) (see Section 2.6), with economic capital being replaced by political capital as more relevant within these groups. In keeping with Thompson's definitions (1991), political capital refers to the power of control gained from one's knowledge and political affiliations. Each participant was described in terms of having a low, medium or high level of each of these forms of capital. These descriptions were based on the participant's transcripts and reflect my interpretation of their perceptions of their level of capital.

- past/present and future roles in technology education;

The participant's role in the group during 1993-1995 was summarised, along with their present and possible future roles in technology education generally. These summaries were based on the participant's transcripts and reflect my interpretation of their perceptions of their role/s.

- activity/ies resulting from the overall purpose/s of the group.

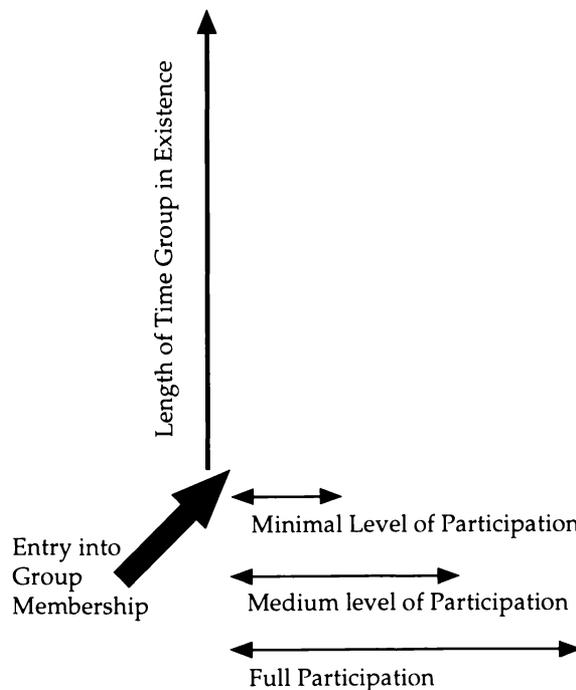
The participant's perception of the overall purpose of the group was presented by way a bulleted summary of the activities they viewed their group was charged with undertaking.

The results of Step 2 are presented in Chapter Four (participants from the CDG) and Chapter Six (participants from the FTG).

### Step 3: Describing the Groups as Communities of Practice

A further analysis of the findings from Steps 1 and 2 was carried out by way of interpreting the participant data in terms of group interactions. This included a graphical presentation of the participant's level of participation using the template given in Figure 3.5.1 below.

**Figure 3.5.1: Template Diagram of Participant Participation**



The participant's overall way of being in this group was then described, drawing on all of the descriptions presented in Step 2.

Continuums were developed in order to present an overall 'picture' of the participant as an 'individual-in-action' (Minick, 1995). The dimensions for the continuums were based on the summaries presented above. These were slightly different for the two groups, as reflective of the different nature of the groups. The common dimensions employed in the analysis of data in Chapters Five (as based on the participants involved in the CDG), and Seven (as based on the participants involved in the FTG), were as follows:

- i) Participation Level;
- ii) Level of Educational Capital;
- iii) Level of Cultural Capital;
- iv) Level of Symbolic Capital;
- v) Level of Political Capital;
- vi) Level of Linguistic Capital.

The final dimension in Chapter Five was,

- vii) Change in Conceptual Understanding of Technology/Technology Education,

whilst the final dimension in Chapter Seven was,

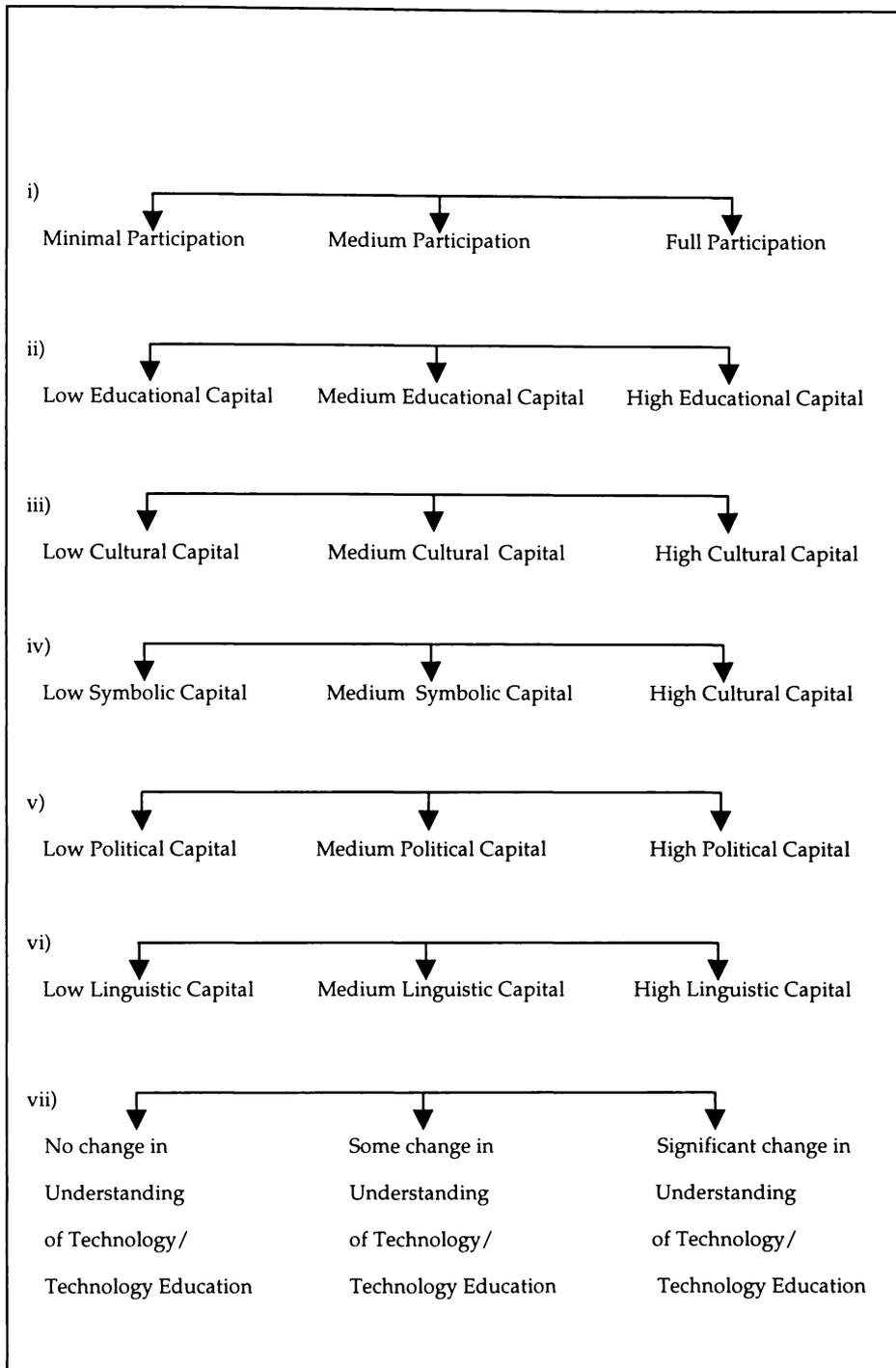
- viii) Involvement in Support Network.

Each participant was 'plotted' on his or her own continuum in order to provide a participant 'profile'. Presenting this information visually aided the description of each participant as well as providing a mechanism to aid comparisons between participants. An example of a blank continuum is provided in Figure 3.5.2.

These profiles collectively provided a basis for the exploration and description of the group itself as a 'community of practice' (Lave and Wenger, 1991).

The results of Step 3 are presented in Chapter Five (focusing on the CDG as a community of practice) and Chapter Seven (focusing on the FTG as a community of practice).

**Figure 3.5.2: Continuum for Participant Profile**  
 (As per Dimensions from Chapter Five)



#### **Step 4: Describing the Field of Technology Education**

A further analysis of the participant stories from Chapters Four and Six was undertaken in order to explore the participant's perception of influential people and groups within the field of technology education. Related comments made throughout each story were used to establish the participants' perception of these influences, and thus the significance of these two groups to technology education.

A further analysis of the material presented in Chapters Five and Seven was also undertaken. This focused on the resultant discourse and practices that could be interpreted as being supported by each group as a community of practice. This material was then used as the basis for a description of the nature of the field of technology education with reference to its philosophy and development history.

This analysis and the subsequent descriptions resulting from Step 4 are presented in Chapter Eight.

### **3.6 In Summary**

Chapter Three provides the methodological underpinnings of research. An argument for the inclusion of a methodological stance, alongside the specific methods used is presented. Thus an explanation of the theoretical framework within which the research methods were situated preceded the presentation of the details of the research process. An overall interpretivist stance was identified as the primary methodological position, however links to praxis-oriented and postmodernist research were also discussed.

The participant section presented and explained the nature and selection of the participants, whilst the methods presented the data collection techniques and the ethical procedures undertaken. The process of analysis section discussed the specific steps involved in the analysis and presentation of data, including a discussion of category labels employed. Links were made at each step to the specific data chapters in which the findings are presented.

Chapters Four to Eight comprise the data chapters of this thesis and these are now presented as outlined.

# Chapter Four: Curriculum Development Group (CDG)

## 4.1 Introduction

This chapter focuses on five participants from the Curriculum Development Group (CDG). They were from two of the most influential subgroups involved in the development of the New Zealand technology national curriculum statement. These were, the Minister's Advisory Group (MAG) and the Contract Writing Group (CWG) (see Section 2.3 and Section 3.3 for further explanation of these subgroups and the participants selected).

### Minister's Advisory Group

The MAG was brought into existence at the request of the then Minister of Education - Dr Lockwood Smith. This was in keeping with other curriculum area developments. For example in science a Policy Advisory Group fulfilled a similar role. The terms of reference for the MAG were as follows (Smith, 1993):

The Technology Minister's Advisory Group will:

- consider drafts of the curriculum statement *Technology in the New Zealand Curriculum* to be produced as part of the *New Zealand Curriculum Framework*;
- consider submissions arising from the consultation process on drafts of the curriculum statement;
- make recommendations to the Minister and Ministry about the scope and structure of the final version of the curriculum statement;
- advise the Minister about the learning support needs for technology education.

The structure of this group was minimal – with a chairperson appointed prior to the first meeting, and the remaining members participating on a supposed equal footing. The Ministry official was the self-appointed minute taker and group coordinator. As the MAG was called into being by a person who was not a member of the group, that is, the Minister of Education, the directive for its formation came from the discourse of educational politics rather than from within that of education where it was to be located. Educational politics is a discourse that can be thought of as sitting between the often contesting institutions of education and politics.

This situation whereby the initial determination of the group's purpose and selection of membership was carried out by a non-group member from an alternative discourse, had a significant impact on the nature of the dialectical process that occurred both within and around the group. This was reflected in the actions and interactions of group members as will be seen in Sections 4.2 and 4.3 of this chapter, and data presented in Chapter Five.

The timing of MAG meetings and therefore the majority of its member interactions were also determined by factors largely outside of the group's control. For example, the overt agenda of these meetings was focused around material generated outside of the MAG by the members of the CWG. These two subgroups had very little other forms of contact and thus any mediation of meaning was left almost entirely in the realm of individual members' interpretation of isolated text. This also had implications for not only the nature of the subgroups functioning, but that of the CDG overall.

Whilst this group has not been officially disbanded, the level of interaction is presently nil and therefore for the purpose of this analysis may be thought of as no longer being in existence.

### **Curriculum Writing Group**

The CWG was brought into existence by two members of the group. Both members were located within the institution of education, specifically that of the tertiary education sector. Whilst this subgroup of the overall CDG was officially recognised with the letting of the legal contract with the Ministry of Education, it had been informally in existence for some time before the contract was signed. However, the actual contract for the writing of the draft curriculum statement in technology education, and thus the official 'lifespan' of the CWG, was for a period of 12 weeks.

As mentioned in Section 3.3, a large number of people were involved at different stages during the draft curriculum development period. However, most of these people were peripheral to the development process and therefore were rather limited in their participation. The Team Leaders of the specialist writing groups (i.e. the Technological Area groups, the Primary group, the Girls and Women group, Maori group etc) and the two directors of the contract, could be viewed as being the core members of the CWG. Even within this group however, some members were more fully involved in decision making and influential in determining the practices than others - as seen from the data presented in Section 4.4, 4.5 and 4.6, and that presented in Chapter Five.

Whilst the task of this group was largely set out by an outside agency, the Ministry of Education with whom the contract was negotiated, the practices of the group were primarily determined by the group itself. Influences on these practices included feedback from the MAG as outlined above, and feedback from practicing teachers and technologists in the community. How this feedback was gained and incorporated into the group's practices was itself an important aspect of those practices. Throughout the process both the MAG and the CWG were expected to function as part of the developing discourse of technology education, as well as within the established discourse of New Zealand education. Alongside this was the impact of the discourse of educational politics, which continued to play a large role in the functioning of the overall CDG.

In the following sections, data from the five research participants selected from the CDG is presented, as discussed in Section 3.5. Each of the sections is focused on a specific participant's interview transcript. Section 4.2: Wayne, Section 4.3: Pete, Section 4.4: Tim, Section 4.5: Shona and Section 4.6: Ann. The data used is that taken from the interview transcripts A, B, C, D, and E respectively. The 'story' for each participant provides the documentation of his or her reflections on what it was to be a member of their respective CDG subgroup. The story is structured around the category labels given in Section 3.5 – Step 1. After each 'story' has been presented, the participants are further described as explained in Section 3.5 – Step 2.

As discussed in Section 1.5 and reiterated in Section 3.5, the initial component of each section focuses on providing room for the participants' voices to dominate the text. My own analysis and therefore interpretive overlay becoming progressively more dominant in the participant description, and on into Chapters Five, Seven and Eight.

## **4.2 Wayne – Member of the Minister's Advisory Group**

As outlined in Section 3.3, Wayne has a background in primary education, including experience as a principal of a large primary school. At the time of his appointment to the MAG, he was working as a preservice lecturer at a College of Education – teaching in the area of science, and technology (particularly in the area of electronics and control).

## Wayne's Story

### Description of the group

Wayne began his reflections on the nature of the group with a statement indicative of his view of the participants as somewhat isolated from each other and non-consensual in both background and intent. This was a common point he returned to throughout the interview.

*I guess my description of the group - and the description of other members of the group may not be the same... but I saw it as a group of individuals from various sectors - from industry, from education at all levels - primary, secondary and tertiary... who had an interest in what they understood as being technology education. Thinking back to the very first meeting - everybody was there with a very different view as to what technology education was about and certainly with very different agendas as to what they saw as being part of this curriculum... this learning area. That became more apparent as the meetings went on.*

A:1<sup>1</sup>

*I think that that was one of the main problems of the group itself - it was certainly - without doubt... well out of the whole group - I doubt that there were two that shared the same view of the learning area. The industry representative - well one in particular - came with a very set agenda... what they wanted to see in the document - this was of course linked to their own business objectives... this was very clear at the time... there were definite factions within the group.*

A:2

*When you sit down and really try and analyse what this group was all about it was eight people's view of technology education as they understood it - trying to shape hundreds of other's view - and it came down to individual agendas!! What actually happened in the group was largely determined by the power structures within it... there were so many factions - so many people struggling for different positions.*

A:6

Wayne's reference to the power structures within the group is a point returned to on many occasions as he describes the nature of the group. He also perceived that both the diversity of the group and their respective home locations worked against the development of an overall group identity.

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<sup>1</sup> This code refers to the interview transcript from where the quote was taken. For example A:1 refers to Appendix A: page one.

*It's funny - the group never interacted socially at all. That was one thing I did notice about them - they were all social orphans. I think Pete once sort of said after a meeting one day - how about we go down for a drink - but no - everybody was too busy for that - everybody just went off to their own little area and did their own thing. It was a group that was formed for a purpose - and that purpose was the purpose and God forbid we do anything outside of those terms of reference!! It was almost like that... and 'cos we were far flung - Auckland to Christchurch - there was also very little interaction of members between meetings... I mean nobody got in contact with me to talk about anything - any issues associated with the stuff... we all were working in isolation - then we'd fly into Wellington for the day - then we'd bugger off again, and that was about it until the next pile of paper came through. It was like that for the others as well... The Chair was good actually - he made attempts to try and get dialogue going - like saying if anyone was in Auckland to get hold of him and have a chat about it... I think he and another member did a bit together - being in the same area. But as far as I know the rest of them had no contact other than during the meetings.*

**A:9**

He also explicitly stated his belief that there were multiple agendas underpinning the group. He felt people were there for personal gain, rather than solely focused on educational objectives.

*The agendas that drove this development reflected really personal stuff... whether it was about power or ownership of areas of the statement - or whether it be career advancement or whatever - people were there for what they could get out of it. I guess that's only to be expected - why else would they be there - they knew nothing about the subject!! They weren't there I'm sure for strictly educational purposes.*

**A:13**

### **Basis of personal selection**

Wayne attributes his selection as a member of this group to a local media item that publicised some work he was involved in at the College of Education. He clearly saw his selection as based on his practice of technology education as opposed to his political or academic background in the area. In fact he saw himself as a useful person for the Minister of Education because of his 'enthusiasm' as opposed to his 'knowledge' or academic qualifications.

*I know how I got to be there... I know for a fact that it was nothing to do with my academic work in the area - because that was nonexistent!!*

**A:4**

*It was because of an article that was written in the Christchurch Press.... the guy from the Press somehow got hold of what we were doing and asked me if he could come out to the College to spend a morning with me whilst I'm working with the students... so I said yeah and he came out and took photos and things... We were basically doing - well 'research the problem... design solution... evaluate solution - you know it wasn't all that hot... just a sort of glorified design make and appraise type program - which is what my understanding of technology education was at the time!! Anyway - he came out with his camera and shot the thing - he was fascinated by it and was really interested in it and what it was all about, and why we were doing it... I told him a bit about technology education and about the development of a draft... I don't know how or where I'd got hold of stuff... can't remember - oh yeah - all of Don Ferguson's briefing papers... that's where a lot of it came from... The reporter interviewed me and I talked all about the social context of it all and that sort of stuff... and he went back and used his 'journalistic licence' and created this half page thing complete with colour photo. That's how Lockwood heard about me... He saw the article in the paper and decided I'd be a good person to have... I mean I was really enthusiastic about it - I loved it... and I'd talked about tech ed as brilliant - you know wonderful learning for kids, great context across the curriculum, it's real, its authentic - all that sort of stuff. He obviously cottoned on to it and thought 'here's someone who's keen and enthusiastic - probably doesn't know a lot - but he'll do'. I mean maybe that's a political appointment - you really don't put people on your advisory group who are going to say 'that's not good!!'*

**A:4/5**

### **Purpose of the group**

Originally Wayne perceived the purpose of the group to be that of providing an official seal on something he assumed was already developed.

*I went in there with a pretty cynical attitude towards politics - my initial reaction and understanding of the purpose was that this was just another rubber stamping exercise that no matter what we say - what 's the point as there are agendas more powerful than ours at work - people more influential than us - that were going to shape the development of technology education... but it wasn't to be - when we saw a lot of the things we were talking about coming through in the redrafts of the draft...*

**A:5**

This perception changed however when the group was in existence to that of a more meaningful purpose.

*...The purpose for me definitely changed from initially - a rubber stamping exercise to one where - hey you know, maybe some of the things we say are being taken notice of and it seemed it could be an extremely powerful role in that we were having input into something that was going to be taught in every school in the country - that we really could make a difference.... But initially I anyway got the feeling it was a fait accompli.*

**A:6**

Wayne describes the purpose of the group as it turned out was primarily that of critiquing the draft material from the writers, and providing guidance as to what should remain, be modified or be deleted.

*I guess one of the purposes of the group was to critique the work of the contractors writing the document. Basically... we received from the drafts from the writers, - we also had Tim at one meeting to explain some aspects we may not have understood. As the draft came on stream we were mailed copies of what we were to look at and critique before the meetings.... Our major goal was to look at this material and consider whether it was reflective of what we considered to be technology education.*

**A:1/2**

Wayne felt that this purpose was difficult to work toward however due to a lack of communication between group members and other groups involved.

*... in many ways we were working in a vacuum - we didn't know anything about the writing group - about all the people involved in that or the other groups - the review group... we never had any contact with these groups... no contact with any of them. We were just there as if on some almighty great pedestal - just looking at stuff that came through - to say yea or nay - this is good - this is not!!*

**A:6**

Wayne states that their feedback was mediated through the Ministry of Education official.

*This was in the terms of reference supplied to us from the Minister's office - that is to advise him as to what should or shouldn't be a part of this new learning area. However all our advice was collated by Pete... and many times I wondered how fully our meetings and advice was passed on.*

**A:6**

His comments suggest he suspected that due to this, feedback that was passed on was quite selective.

*It seemed to me that things that Pete agreed with were acted on, and presented as having our support, but some other things just seemed to drop out... I must admit Pete did leave things out of the minutes that were said or suggested... he was pretty cunning like that!! - or politically astute!!*

**A:6**

This influence was reinforced as Wayne discussed the Pete's role further.

*Pete was not supposed to be commenting on what we talked about - that was not his role - he was supposed to be there to interpret and report what we said. He was not supposed to be a member of the group - but rather to clarify any points and report from our group to the writing group. He said this himself on numerous occasions... he was here to help us interpret things not comment on our comments as to whether he thought they were right or wrong or inappropriate or otherwise - he would just pass on what we said to the writing group. But - he actually was a member... and he determined what happened on many occasions... he made comments directly related to the content - not just aiding interpretation - but rather his opinion of things - when it suited.*

**A:7**

Wayne also mentions another stated purpose he considered the group never really achieved - resourcing and professional development strategies for implementation.

*Our original terms of reference also included in our purpose advising the Minister of teacher development and other resourcing needs. So it was actually quite wide... not just looking at the content of the curriculum - but also its support. Now I think we achieved our objectives in terms of the draft... but I don't think we did very well with the other side of things - the resourcing and professional development. I'm not sure why...I remember a real kaffuffle about allocating financial resources for tech ed - the non identification of funds that went into schools operational grant... there was an increase in the first year of something like 3.2 million which was supposed to be put towards resourcing technology education - but of course because schools operational grant is bulk funded - it was not tagged for technology education. We as a group recommended that this not be the case - and instead this money be identified clearly as to be used to tech ed in information that went out to schools in the same way that at that time Maori was recognised within the operational - and special needs... why couldn't tech ed be in the same category... but it just wasn't - didn't happen.*

**A:7**

He went on to comment that the lack of progress in terms of implementation support has had ongoing implications...

*I think that's been a real stopper for tech ed. Schools saw the money coming in and did not know that it was for tech. ed resourcing and that was never made apparent to them. So they spent it on toilet paper - or whatever they needed at the time!! There was a real argument about this in the group - and of course in the first year of the professional development programme in 1995 in Wellington - this was a huge issue. We kept saying to Principals the money is there for implementation - it's in your operational grant and they would say well where is it - show us the piece of paper - I'd show them the budget - but they'd say where is it - where does it say technology education resourcing - we're not going to spend it on that. So we failed dismally on that - we recommended that at least twice - but obviously there was some other agenda with more weight than ours.*

**A:7**

### **Group interactions**

Wayne describes at some length the links between people's positions - including personal beliefs and knowledges, social representations and motivations, and their comments and actions. He felt therefore the outcome of the meetings often reflected one or more group members particular view of technology education, as dependent on that persons ability to argue their point.

*There was one situation there where I know that one of the technological areas was included because this particular person - well it was their area... other members of the group may not have see it as such, not as an area... another example was energy - as a technological area - this was suggested from our group - this was put forward by a person in our group whose subject interest was very energy related...and the same for structures and mechanisms... there was another situation where one of the members talked about extending the school day - you know as a means of dealing with fitting it in...that was taken to Lockwood Smith... you had another situation where one person was really concerned about home economics and technicraft staff - what was going to happen to them - where did they fit in... and she was really just trying to repackage what was already in existence... and was quite alarmed by some of the stuff which was coming through from the writing group - because it wasn't specific enough - it was too airy-fairy... wasn't sitting comfortable with her understanding of what it was all about...*

**A:2/3**

He further commented that due to the diverse perspectives coming through the group – many of the arguments were quite ‘heated’. Another point raised regarding the way the group interacted was that of the expectation that some members had, that all changes they recommended should have been taken up by the writing group. When this was not the case the meetings became even more tense.

*... so at times the discussion got very heated as these people would defend their positions against others in the group and against the writers - especially as it became clear in the case of energy that this wasn't going to be accepted. It was interesting as I detected quite a bit of tension - one meeting there was a particular person who came in very angry and said to Pete - 'why wasn't what I said included'. It was as if everybody on that group felt that what they said had to be done. Almost like a 'God' sort of perspective*

**A:2**

Wayne felt that right from the first meeting the group interactions were filled with ‘aggressive’ tension, and as stated earlier – seemed to reflect the personal agendas of the people involved rather than a group working together for a common purpose.

*...of course in the first two meetings it was just all lobbying for positions - it was just a real power game going on in that group - where there was just no way that everybody's perspectives were being held equitably. I can remember two university representatives - not having a slanging match exactly but they were having almost like a 'one upmanship'(sic) type situation during one lunchtime... they were referencing this and stating opinions based on that person... And they felt that because of this they had a right.... well - they were quite aggressive and in a way very detached...*

**A:4**

### **Role in the group**

Wayne felt he participated very little in the initial stages. One reason for this was his perception of a power differential between himself and some other members. His comments often reflect a concern with the type of interactions that occurred between the group members - as well as the lack of contact between meetings and between different groups.

*I consider myself - a bit of a non player in the whole thing. It was really interesting to observe the politics of it all backwards and forwards - it was all above my head. - I didn't consider myself at that stage as having any - well very little credibility and very little knowledge about it... except perhaps within control technology. All my understanding was coming from what I'd read and what I understood as being the subject - from England, from Britain - and from practice in the classroom - that was where I was coming from. Very very different perspective to the others...*

**A:3**

His perceived lack of status in the group was reflected in many comments and he often made links between his feelings of 'difference' and 'perceived inadequacy' and his subsequent level of participation.

*There were a couple of others in the group like me - but I felt - well - pretty much intimidated in a way... by other members of the group. I mean here was me - alongside 'Professor' this and 'Dr' that and the head of a Crown Research Institute and like - well - all these real powerful dudes!! I mean - maybe I'm in a bit better position to handle that now - but I wasn't in a position then - I didn't feel like I was in a position of strength from which to make comments. They had 'educational capital' well above mine - and you can say till you're blue in the face that it doesn't make any difference - but it does!!*

*I tried my best to participate - but I have to admit in the first two meetings I said two words!! well - not literally - but definitely not a lot. For the first two sessions I was just trying to come to terms with what it was all about... I'm just talking about making Lego models and plugging them into a computer and using it in the classroom - nothing about all this sort of stuff... like I felt during lunchtimes - there was a pecking order there. The academics stayed together and debated all this philosophical stuff... and the classroom practitioner - who was basically myself - as I'd only been out of the classroom and at College for a couple of months... you know - you went to the toilet a lot during lunch hour!!*

**A:3**

*I felt really unempowered. You feel really quite helpless. In some ways I wondered why the hell I was there.*

**A:4**

Another reason Wayne did not participate fully was his perception that he was on the group for reasons other than his expertise, which he considered to be very limited at this time - as discussed earlier.

*...initially I don't know why I was there... other than being a very low level political appointment because I was a tech ed sympathiser really!! So initially I was quite scared of the whole situation and didn't perceive I had much of a role at all...*

**A:8**

His comments reflect however, that even though the other group members felt comfortable participating more fully in the meetings, he wondered at times whether they really were doing so from an adequate understanding of classroom practice.

*...who in their own areas were very - well they were brilliant I'm sure - but they were really struggling to come to grips with interpreting what classroom practice in this area was all about - and understanding what technology education was all about... I think they had a pretty good understanding of technology - but I think the difference between the two, they struggled with.*

**A:3**

### **Role in the group/Impact on the group**

As the focus of the group changed from the philosophical debates as to what should be in the curriculum, towards those concerned with implementation, Wayne participated more freely due to his perception of competence in this area. He felt he was more informed than others of the group to comment on these issues, and was able to affect change in the group at this point through bringing in this perspective.

*...towards the end though I think I had a bigger role - particularly in the teacher development and resourcing side of things. I think I played a much larger role in that than in critiquing the document. When it came to the reality of classroom practice - then I contributed a lot... I think I therefore provided the group with a down to earth, pragmatic reality in a way. My nature is really quite... well there's not too many shades of grey in my outlook. I wasn't a theorist, I wasn't coming from a philosophical stance - I was looking strictly at the reality of teachers working in this area in the classroom - what are they going to need to know - what are they going to need to manage - all the nuts and bolts type issues. It really brought some of the other members down to earth. Made them think through what they were actually talking about. The Ivory tower brigade - actually brought them down to the wooden classrooms with the straws and toothpicks.*

**A:8**

*That's what I brought to the group I think - the enthusiasm from the kids for the subject.*

**A:8**

## **Group impact on participant**

Wayne's membership in this group has had a large impact on his life - both personally and professionally. His understanding of technology and technology education have changed profoundly.

*Being a part of this group was a huge learning curve for me... a really big learning curve. I gained a better understanding of what it was - but I feel I didn't need a better understanding of what it did for kids because actually working with kids in classrooms had already convinced me it was a brilliant context for learning. And that was my position of strength... that's where my capital lay - from practice.*

**A:8**

*My view of technology before I became a part of this group was that of information technology - and electronically based technologies - control technology. This changed absolutely during my involvement - things like I had no idea about biotechnology - before this, material technology meant woodwork and metal work to me...all the other areas - yeah - biotechnology in particular - production and processes - never even thought of it - it opened up a whole range of areas of learning in technology education that I wasn't aware of... This changed markedly - not only in terms of developing a better understanding of the diverse nature of what technology is but also the historical and social understandings...the influences - all the aspects associated with the environmental influences and impact, resourcing... a whole wider view... in terms of technology education now brings all these things in - in fact I see them as the most fascinating aspect of tech ed... in some ways I think - I find talking about and teaching about the social and historical aspects of technology more interesting than the actual process of development.*

**A:10**

He considers his career has been helped both by the changes in his personal and professional understanding of technology education, as well as by virtue of being a member of this high status group.

*I guess my life's never been the same since. At a professional level - it certainly does you no harm. You know you include a letter from the Minister in your C.V. and it looks pretty good no matter what context it's applied in. I make no bones about it - from there - if you look at my career it's just gone upwards and upwards!! I don't think in any shape or form that being a member of this group played a small part in that - in fact I think it played a pretty major part in it... If you track my career path it follows a fairly major ascent over a short period of time...*

**A:8**

*Personally - I think it probably had a huge effect also - in terms of raising your mana in the area - not just career wise but also just the increasing number of people who want to talk to you about it - or have you talk to them about it... or do workshops or professional development - for example winning a Ministry of Education contract two years running for professional development - writing the proposals, managing the contracts, facilitating on them... mmm yeah it's had a huge impact on my life. I have no doubt at all that without the basis that being a member of this group gave me - sure I may have been a player - but nowhere near at the level that I have had the opportunity to be.*

**A:9**

### **Influences on technology education/Comments on technology education**

Wayne considers that this group and the group of curriculum writers were influential in the development of technology education. However, the greatest influence he sees on technology education at present is from professional development people.

*Apart from the writers of the draft curriculum - their influence on tech. ed goes without saying... apart from them...and the likes of our group...*

**A:12**

*I think one group which has had a major impact on the development of technology education are those that deliver the professional development to teachers.*

**A:11**

His comments reflect serious concerns about the influence of people involved in technology education professional development due to what he perceives to be a lack of national consistency.

*I guess this is one of the problems of the whole implementation is the diversity of interpretations and programmes out there. And many are based on very different understandings or misunderstandings of what this area is all about... about what learning and teaching this area is all about. There is no consistency and no quality control - no auditing. Auditing on numbers and figures - but not of what's actually been taught...what's being put across as tech ed. This is weakening the position of tech ed I'm sure. And that's why the Ministry is looking at it very seriously - whether to put it into the too hard basket or not.*

**A:11**

*I think a lot of that's been caused by misinformation being given to schools by contractors. I suppose that's always the way when you're starting out something new I know that when I was starting out in professional development I took a different view to the one I have now, 'cos you learn as you go along - there is no basis to work from...there was no education of facilitators apart from the Waikato contract...which looked at teacher development facilitators understandings of technology education. So there was no consistency within or between programmes - that should have been done nationwide before the programmes ran - but it wasn't.*

**A:11/12**

Wayne saw this as having significant implications for the future implementation of technology education, and is critical of what he sees as the Ministry of Education's 'anything goes' approach.

*Therefore you've got huge differences between different contractors and regions. And some travel out of their regions - it's almost like spreading the plague - the further these 'rogues' go out of their regions the worse it becomes...There is so much confusion out there that the Ministry is probably thinking to hell with this it's too damn hard - lets flag it for a bit and it might go away. That's one major influence...Another are the teachers... most of whom are working from no knowledge at all. So the professional development they get will have a huge impact.*

**A:12**

*... I guess the Ministry of Education by their present absence are having an influence on the way it is developing - their lack of auditing of professional development contracts... getting caught up in all sorts of political agenda that we are not privy to - this has really obstructed things... I don't know if they were driven by some bizarre philosophy of - relativism or what... maybe that's why they let 'anything go'.*

**A:12**

Wayne does not perceive industry groups as a whole have played a large part in the development of technology education.

*Industry groups and the likes of those - I think they would like to think they've had a major impact but I don't think they have in reality. There's been a lot of talk about school industry links but very little done.*

**A:12**

His comments also suggest that current industry perspectives need to be broadened if they are to be useful in providing guidance for education.

*I think most of these groups also don't understand technology education. They are looking at it often from their own narrow perspective. I remember going to a meeting in with the manufacturers association and the message that came through loud and clear from that was what 'we want is a work force with the skills which will enable us to add value in our areas. We don't want to train - they should come out with these skills already'. They want productive units that could roll into the work force and add value from day one.*

**A:12**

He considers that Dr Lockwood Smith was important in terms of technology education becoming a part of New Zealand's national curriculum.

*It became very clear in the meetings with the Minister that he had a personal interest in this - it wasn't just something that he was doing and going through the motions - he had a personal interest in this area - about getting this thing off the ground. I think that without him it wouldn't have happened... I really think it wouldn't have been an essential learning area. He really was the one driving this and I think through his advice and all the rest of it, I don't think it would have been there if he hadn't been the Minister of Education... in spite of all of his other - faults shall we say - it was one of the things that he really did do right. He did commit to the technology education and that was bloody good.*

**A:5**

However, he clearly saw Smith's influence in terms of the political advance of technology education, and perceived he had minimal influence on the content of the curriculum or the direction of its implementation.

*I don't think Lockwood had as great an influence on the content of technology education as he'd like to think he did. He was the driving force behind it - he made it happen - I guess he got some political gain from it - increased his own political power... but he was interested I'm sure he was. He bankrolled the whole thing so he must have had a huge interest in it coming off - but I don't think he had a hell of a lot of influence in actually what went in the final document or how its taught in this country.*

**A:12**

## **Present and future directions**

Wayne considers he is still playing a small role in technology education at present but would like to see this increase in the future.

*Presently I don't have a heck of a lot to do with tech ed...I guess teaching an AST paper in tech ed is a bit of a role I have... at the moment I'm lecturing in IT - and the only reason I've got that I guess is because somebody didn't know the difference between tech ed and IT!!! I'll be lecturing in tech ed as well... I'm also doing other workshops for people in tech ed - in control technology and general planning... so I still do a bit of that sort of thing. Nothing too formal in the professional development scene...I'm still interested and still read a lot about it. In the future I don't really know - it's determined by so many other factors it's hard to predict. At the moment I'm not sure that there's a huge amount of opportunity for me in technology education. I'd like to think that one day I'd get back to HOD in tech ed... somewhere. It is certainly the area that I'm most comfortable in - enjoy teaching in. Depends on so many factors. I want to continue gaining qualifications in education and tech ed...*

**A:9**

## **Wayne's Description**

The material presented above provided the basis for a description of Wayne as a MAG member, using the descriptors presented in Section 3.5 - Step 2.

### **Level of Participation in the MAG**

Initially Wayne's participation as a member of this group can be described as being minimal. Whilst he attended all meetings, and received, read and commented on all material as requested, he could not be described as participating at a level by which he markedly influenced the practices of the group. He did not participate fully in the meeting debates until later in the group's existence. However when the focus of the group was turned to issues of school implementation of technology education his participation level rose to that which could be described as medium level participation. For example, during the development of recommendations for implementation Wayne's level of input into discussions increased however, not to the extent that his membership in the group began to define its practices.

### Wayne's Habitus

The dispositions of relevance to Wayne's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Cautious	Reticence to participate fully in actions/discussions unless confident of holding adequate capital.
Ambitious	Looks for and takes opportunities for career advancement.
Pragmatic	Looks to ensure results of practices are attainable in an authentic situation.
Suspicious	Looks for underlying intention of both own and other's actions.

### Levels of Capital

Five forms of capital were identified as important within the CDG – see Section 3.5. Wayne is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Wayne's perception of his level of capital.

Form of Capital	Level
Educational	Low
Cultural (classroom experience)	High
Symbolic	Low
Political	Low
Linguistic	Low

### Past/Present and Future Roles in Technology Education

The following is a summary of the specific roles Wayne perceived he had in the group, as well as his present and future roles in technology education generally.

- Role in group: Provide expertise in the area of school and classroom curriculum implementation.
- Present role: Provide preservice teacher education in technology education.
- Future role: Increase role in provision of teacher professional development in technology education - both pre and inservice.

## **Activity/ies resulting from the Overall Purpose/s of the MAG**

Wayne viewed the purpose of the group resulted in the following activities:

- make recommendations for the content and structure of *Technology in the New Zealand Curriculum Draft* (Ministry of Education 1993b);
- make recommendations for the content and structure of *Technology in the New Zealand Curriculum* (Ministry of Education 1995);
- respond to others' recommendations - in particular the writers of both the draft and final statement;
- make recommendations for supporting the implementation of technology education in New Zealand schools.

### **4.3 Pete – Member of the Minister’s Advisory Group**

As outlined in Section 3.3, Pete was the Ministry of Education official attached to the MAG. He was a part of the Curriculum Division at the time of the technology curriculum development, and was the coordinator for the draft curriculum development contract. Previously Pete had been a secondary teacher with a social science subject background.

#### **Pete's Story**

##### **Description of the group**

Pete described the members of this group as having been selected as individuals rather than in terms of representatives of other groups. However, he also reflects that there were a variety of backgrounds ranging from primary through to tertiary education sectors, as well as industry people.

*The group was made up of people selected for their personal knowledge and experience rather than as representatives of groups but the Technology group did have a good cross section of stakeholders - primary and secondary schooling, college of education, university and industry.*

**B:2**

He felt the group did not exhibit a collaborative nature, and that the members were highly individual in the way they interacted.

*The group was not particularly cohesive. There were a number of strong personalities who had very determined views of what was what and what should be.*

**B:3**

*Despite an apparent unanimity on key decisions, in fact the group never really was a group but a collection of highly individual individuals...I got frustrated by the group dynamics which operated in a way that a group position built quickly from an individual opinion.*

**B:4**

### **Basis of personal selection**

Pete's inclusion in this group due to his position within the Ministry of Education.

### **Purpose of the group**

Pete felt that the purpose of the group was that of providing guidance to the Minister of Education on the quality of the curriculum being developed. The original terms of reference were as set out by the Minister of Education, but the purpose was a combination of these and the practical requirements and constraints of the development period.

*The purpose of the group was initially determined by the Minister but also by the timing of its establishment.*

**B:2**

*The Minister's advisory group was selected by the Minister (Dr Lockwood Smith) to advise him directly on the development of the national curriculum statement for technology and also regarding its implementation. The Ministry was asked to suggest names and more than 20 were put forward. A number of people were ruled out because they became directly involved almost immediately in the development of the draft statement.*

**B:1**

Pete reflects that his perception of the group's purpose, (which he considers was representative of the Ministry of Education), and that of many of the other group members' perceptions, were quite different. He accepts that this may have resulted from incongruency between the terms of reference points, and the initial basis of selection, and the mechanisms by which the group was facilitated.

*The intention was that the group would give the Minister independent advice from that provided by officials, but in practice the groups were serviced by Ministry officials and had very little direct contact with the Minister - the chairman meeting him on a few more occasions than the other members. Some members of the group found this surprising, disappointing - frustrating even...*

**B:1**

*Because they had been personally appointed by the Minister, they believed that they would advise the Ministry on the development of the draft and final statements and that their advice would be acted upon...The Ministry understood that their role was to provide advice to the Minister and we were also providing advice to the Minister. And we provided advice on their advice! So they would often react in surprise, with a touch of annoyance, when things they had recommended didn't appear to have been acted upon in the next rewrite.*

**B:1**

*I'll give an example. One MAG member, with some support from others, was insistent that 'energy technology' should be a technological area. This advice went to the Minister. We (the Ministry) advised that it wasn't appropriate. The Minister accepted the Ministry's advice. We discussed this and I tried to make the position clear.*

**B:2**

*The main purpose of the group was to reassure the Minister that the Ministry was delivering a good curriculum document. That was what I understood at the time and remains my view. Some members of the group saw their role as extending well beyond this to advice on what was needed to ensure the effective delivery of the curriculum, i.e. that they would continue to advise the Minister through at least the early period of implementation. If he had originally wanted this he did not signal it at the time the final statement was launched. They would have liked to have helped in the preparation of (large) budget bids for resources to support the curriculum.*

**B:2**

*And now I look at number 3 (the third point of the terms of reference as stated in Section 4.1) again it perhaps explains the confusion as they are charged with making recommendations to both the Minister and Ministry.*

**B:3**

Given the situation of there being no overt agreed upon purpose within the group, Pete feels that whilst his purpose was achieved, many of the remaining group members may well have felt they did not achieve their goals.

*The group did achieve the goal of reassuring the Minister that the curriculum was OK but I don't think they achieved their own goals. I'm sure the group thought their brief gave them far more authority than they actually had...Some members wanted to revisit the policy for the curriculum in general, e.g., the 8 level model, the nature of achievement objectives, but the Minister made it clear that these were not up for debate.*

**B:4**

## **Group interactions**

Pete commented the interactions between the group members were often tense, with different group members taking strongly individual positions which reflected where they were 'coming from'. The differences in both the members' perception of their purpose, and their individual backgrounds and personalities, often made it difficult for a high level of consensus to occur over a range of issues.

*The position from which the group members came from was variable. In a couple of cases, from the position that they were university technologists and therefore were 'experts' on these matters. In two/three other cases, that they were teachers and knew what 'really' happens in schools.*

**B:2**

Pete found the nature of the interactions quite counterproductive to what he perceived to be the purpose of the group, and found it to be something of an 'ordeal' at times.

*There were a number of strong personalities who had very determined views of what was what and what should be. So who determined what happened in the group changed almost every 15 minutes! What was perhaps disappointing was that the chairman ran the meetings very loosely. Agendas were prepared but not formally followed. The chairman was also very difficult to contact between meetings as he was extremely busy as the CEO of a CRI and often overseas...The positions of power these people came from were educational - university or school - and to a slightly lesser extent economic in the case of the two people from industry. The two university people stand out in my memory of the group in terms of making very dogmatic statements - some of them on topics irrelevant to the matters under discussion!*

**B:3**

*I got frustrated by the group dynamics which operated in a way that a group position built quickly from an individual opinion. And we went down some 'blind alleys' as a result, eg, the idea that there should be fewer than 8 achievement levels....In some ways the meetings were like a dinner party where you end up having one or two wines too many and get really quite heated and intense and yet everyone says how much they enjoyed it all at the end and when can we do it again, while you hope never to have to repeat the ordeal.*

**B:4**

### **Role in group**

Pete initially perceived his role within the group to be that of an observer and recorder/reporter.

*I thought it would mainly be to listen and to report...To an extent I tried to get value out of the group from the Ministry's perspective - another set of relevant heads looking at draft material.*

**B:3**

However it soon became apparent this was not appropriate and instead he found he became an active participant in all discussions and in fact on many occasions was in the position of dominating the debates in order to explain and expand on decisions which were being made in other areas of the overall process. He often found this to be difficult and frustrating.

*My role was not easy. I thought it would mainly be to listen and to report but in fact I had to become an active debater in the group and ended up speaking as much as if not more than anyone - often having to explain/defend policy and decisions which members of the group didn't agree with.*

**B:4**

*I was intensely frustrated even irritated by the nature of the discussion at times...I found it quite hard work to argue the Ministry case in the meetings*

**B:4**

### **Impact on the group**

On reflection Pete feels he (as the Ministry of Education official) probably determined to large extent the outcomes of the groups' interactions. This resulted in him feeling that many of the other group members may have been uncomfortable with his involvement as it appeared to constrain what they felt they could achieve and were left disappointed overall.

*I'm sure the group thought their brief gave them far more authority than they actually had. They probably feel let down by the exercise - i.e. it didn't live up to their early expectations (and was far too tightly manipulated by the Ministry, i.e. me!!)*

**B:4**

(Also see quotes given above – particularly those from B:1).

### **Group impact on participant**

Whilst being a part of this particular group was at times difficult, as suggested in comments earlier, Pete also recognised some positive impacts the group had on him.

*I'm now ambivalent about the group. I appreciated their enthusiasm and support for the curriculum. I was intensely frustrated even irritated by the nature of the discussion at times...The meetings were positive from the point of view that all of the members really wanted the technology curriculum to go ahead, be of very high quality and be well supported and implemented. They were disappointed not to continue to advise because they thought (correctly) that just producing the final document was the start not the end of the process.*

**B:4**

In terms of his overall experience of the development of the draft curriculum, Pete feels far more positive, seeing it as a time of personal growth in technology education and very rewarding both professionally and in terms of his own learning.

*I learned a great deal through the process through all the interactions I had with the MAG, the writers, teachers etc. I didn't have well developed concepts of technology or technology education at the start. I've also learned a great deal from the reading I've done and conferences I've attended...It's been a great thing to be involved in the development of a new technology curriculum. The highlight of my career so far.*

**B:5**

**Influences on technology education** (and his own understandings of technology education).

Pete feels he has been particularly influenced by many of the writing group members he worked alongside, and through reading the work of international experts in the field. His background in teaching allowed him to enter into debates in order to further his learning and his personal level of education allowed him to be comfortable doing so.

*Particular people who have contributed a great deal to my thinking are: Tim, Ann, Shona, and yourself of course! And reading work of people like Edgar Jenkins, David Layton, Richard Kimbell, Paul Black....I enjoyed the collaborative process in particular.*

**B:5**

## **Comments on technology education**

Pete's major concerns regarding technology education at this time focus on the difficulties of implementation especially in terms of the perception that there have not been enough resources provided for successful 'across the board' implementation. He also feels there are industrial issues unresolved which also serve as a barrier to implementation.

*My concerns regarding technology education are around the final transition phase we're in. That there are still big doubts about the whole enterprise in some people's minds eg some secondary principals. That it isn't feasible. That we haven't put in place sufficient resources in terms of workshops and equipment...That the translation from Manual Training to Technology is still full of difficulties such as the industrial issues around the contracts that year 7 & 8 teachers are on - general teachers primary, formerly designated specialists secondary. These issues should have been worked through by now but they haven't been worked through sufficiently.*

**B:5**

## **Present and future directions**

Pete has since moved into the Policy division of the Ministry of Education. However he continues to watch with interest developments in technology and tries to keep himself up to date with these.

## **Pete's Description**

The material presented above provided the basis for a description of Pete as a MAG member, using the descriptors presented in Section 3.5 - Step 2.

## **Level of Participation in the MAG**

Pete's participation as a member of this group can be described as being at a high level or intensity. Pete's can be thought of therefore as a full group member who was central to both the functioning of the group and its outcomes. He coordinated and provided leadership for all the group interactions, reported outcomes to others, and provided feedback from the other groups and individuals involved. His level of participation therefore saw him operating as a mutually constituting member of the MAG, whereby his membership served to play a major role in defining the practices of the group throughout its existence.

### Pete's Habitus

The dispositions of relevance to Pete's membership in this group, and their subsequent effect are given below:

Disposition	Effect
High level of resolve	Kept group focused on issues that were within his perception of the group's purpose. Did not allow himself to be swayed by alternative positions or dogmatic statements.
Politically astute	Aware of political mechanisms and devised appropriate strategies to further Ministry of Education interests.
Collaborative when appropriate.	Able to remove 'official' hat and enter collaborative working relationships when the opportunity arose.
Becomes personally involved.	Felt the need to enter into justifications of decisions made, felt frustrated when others did not accept rationales, gained personal satisfaction from successes, enjoyed increasing his own conceptual understanding, showed high level of ownership of the development process

### Levels of Capital

Five forms of capital were identified as important within the CDG – see Section 3.5. Pete is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Pete's perception of his level of capital.

Form of Capital	Level
Educational	Medium
Cultural	Medium
Symbolic	High
Political	High
Linguistic	High

## **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Pete perceived he had in the group, as well as his present and future roles in technology education generally.

Role in group:	Coordinator of meetings and material for members between meetings. Facilitator of discussions. Mediator of feedback to and from the group. Provider of rationales for decisions made.
Present role:	Not mentioned
Future role:	Not mentioned

## **Activity/ies resulting from the Overall Purpose/s of the MAG**

Pete viewed the purpose of the group resulted in the following activities:

- read and respond to material written by Writing Group (CWG);
- make recommendations to Minister of Education regarding material drafted;
- evaluate draft curriculum in terms of whether it represented a 'good' curriculum in the view of the MAG.

## **4.4 Tim – Member of the Contract Writing Group**

As outlined in Section 3.3, Tim was contracted by the Ministry of Education to write the draft technology curriculum and was the joint coordinator for of the development group – the CWG. He was the Project Officer for another Ministry of Education research contract – LITE (Learning in Technology Education), which was put on hold for the draft curriculum development. In 1995 he was also the Director of the Ministry of Education contract to train fifteen facilitators – these being the FTG.

### **Tim's Story**

#### **Description of the group**

Tim describes the membership of the writing group as being variable in terms of their level of input and influence. Whilst acknowledging that during some of the time there were a large number of people involved in developing material, including practicing teachers, tertiary educators and community technologists, a smaller group of people had significantly more influence over the outcome of the development and the nature of the writing group.

*There were 85 writers working during a 5-6 week period and each group had a Team Leader. These included people from a range of backgrounds, including a large number of practicing teachers, people from industry - practicing technologists, and people involved in higher education - from universities, polytechnics and colleges of education.*

**C:1**

*Whilst the writing group existed for a period of 12 weeks - its membership was not really consistent. For example we pulled people in for an intensive time of planning or writing and then many would fade out again. Others were more consistent...*

**C:2**

Tim highlights the importance of four members of the writing group in particular and describes how they had an ongoing and very influential role in determining the means of development and the content of the curriculum. These people were all from the tertiary education sector - two from colleges of education and two from a university. He explains how this core group developed a strong bond as they worked together in an intensive fashion, sharing a similar philosophical background and high level of commitment to developing a curriculum of a high quality, in what was perceived to be difficult environment.

*For the final two weeks of the group's existence, most of the other writers were quite peripheral. In contrast, the final editing group that consisted of four people - Mike, Ann, you and myself provided continuity through the development and had a huge influence. This was the most intensive writing time that I had. We all worked hard to make sure we had no gaps for the different technological areas, we created and culled, and I think came up with a great list of learning experiences. This group was very influential in terms of the final shape of the draft document. We all held similar concepts of technology and therefore were able to make the draft a coherent statement - otherwise it would have had different concepts floating through it. This group not only had similar concepts, but could be honest with each other and had a common cause to get the best product possible. The people involved provided a balance in terms of different perspectives but similar attitudes towards technology.*

**C:2**

*I guess the final editing group was focused and a bond developed which I think is pretty important for technology education. The bond developed because we had a common goal. We were pushing our vision forward against real and imagined opposition. In some ways it was a political battle and consisted of strategies that were pre-emptive in nature.*

**C:4**

## **Basis of personal selection**

Tim considers he played a leading role in this group because of his past experience in a number of relevant areas including technology education policy writing and research in New Zealand, science and technology curriculum development in the UK, policy advice and curriculum development in science education in New Zealand. Due to this experience he felt he had a good understanding of both the political issues as well as the educational issues - including those at a school and classroom level, needed to take on this role.

*I was a leading member of this group due to my background in a range of areas. Technology education started officially for me in 1988 as an area in its own right with the Department of Education working party. We bid for a contract to develop the policy papers and then I guess had the inside running to get the writing contract. I had also been involved in developing national curricula in England and Wales. I learnt a lot of the politics of curriculum development in England from Paul Black. As I mentioned before I had met the Minister in UK where we had a discussion about technology education in New Zealand. I represented New Zealand at OECD meetings in Paris in technology education. Over the years I had also written in the area of technology education - my Doctorate whilst in Science was beginning to talk about technological applications, and I had developed a major research project. I wrote the Learning in Technology Education proposal and was project officer for this project when we won the research contract. At the time I was already on the Policy Advisory Group for science.*

**C:3**

He also considered that not being seen to be representing any particular group within technology education was important both to his selection and ability to carry out the job.

*Also I didn't belong to one particular interest group and was therefore seen as outside of those groups with a vested interest. This was especially important during the writing process as it made it easier to bring people on board who had quite different agendas and may otherwise have felt defensive if I had belonged to a group they saw as threatening in some way.*

**C:3**

## **Purpose of the group**

Tim's perception of the purpose of the group was that of developing a curriculum statement which was not only educationally sound, but robust enough to withstand pressures from particular groups that he perceived posed a threat to its survival. He acknowledged the importance of ensuring a balance between people developing a level of ownership conducive to supporting its development without attempting to 'hijack' the area. He was aware of these issues at the time, and they provided the rationale for many of the group's practices.

*We had to deliver something of a high standard, which many people had ownership of. A new curriculum area does not have a home and the reason for having so many people involved was to develop that sense of ownership should anything happen.*

**C:2**

*There is always a chance a new curriculum area will be hijacked if it does not belong to a wide range of people, eg the England experience of technology and the engineers. Ownership was vital, which meant various interest groups were brought on board and represented...I suppose I see it now as much the same, getting a job done, knowing that if we stuffed up that could be the end, particularly with the Business Round Table, PPTA and NZEI all taking pot shots at the idea of the curriculum.*

**C:3**

## **Group interactions/Role in the group**

The interactions between group members varied, dependent on the level of the members' participation. As can be seen from comments above, interactions between the more influential core group members were very positive and equal in nature. In contrast however, Tim considers that his own, and many of the Team Leaders' interactions were often developmental in nature - focused on encouraging other members to further develop their concepts of technology and accept technology as a curriculum area in its own right.

*I helped the writers with their concepts of technology. We spent a lot of time talking about what technology is - making sure the learning experiences reflected the objectives, trying to get them to see technology as an area in its own right, convincing them technological knowledge is essential. The team leaders were also developing the writers concepts. For example at a meeting with Shona's group we talked at length about it not being applied science.*

**C:1**

*Moving groups away from CDT was something else I tried to do. This was essential as otherwise the material being developed would have remained focused on quite narrow concepts of technology... this still happened to some extent... and meant that much of the material developed had to be changed in order for it to fit with the wider objectives we were attempting to get established. That's way the final editing group was so important...*

**C:2**

However, Tim perceived this to be only one of his roles as a member of this group. He considers he participated fully throughout the development, working across a number of levels. He was involved in the day to day logistics of 'getting the job done' as well as providing the overall leadership for the development. He provided support to the other writers and encouraged the development of relationships between different sectors. At times he felt this role led others to perceive him in a negative light. He was also, as described earlier, a member of the core group that had the major determining role throughout, and in the final outcome.

*As the coordinating writer and director of the writing contract much of my time as part of the writing group was spent making sure that things happened within a particular time frame. We had developed a framework in the policy papers and my role for 10 of the 12 weeks, was to make sure the groups of writers wrote to the objectives or adapted them accordingly. I acted as a link between all the groups and the main writers... I spent considerable time travelling and visiting the various groups and linking with Ann in terms of checking the objectives.*

**C:1**

*So my overall role in this group was just to make sure the job was done in minimal time, to manage the process and make things happen... even if they got grumpy with me.*

*...I think it has been essentially about trying to make things happen and trying to include people along the way. It has been building up relationships, although some people do not think I am very good at this.*

**C:2**

He also worked at a national and political level to support the development process, viewing these aspects as crucial to the success of the writing group.

*I also met with the Minister during the writing of the draft and had a brief discussion about how it was going and the importance of balancing knowledge, and capability and society and the importance of technological areas.*

**C:1**

### **Group impact on the participant**

Tim considers the whole development was overtly political and this coloured many of the interactions as well as the outcomes. He perceived that this had an effect on how he was perceived at times, both during the development and since that time.

*Essentially the whole development of the technology curriculum was highly political in the sense that we did not have an established culture at the time. I feel things have been fairly political and I have not always been the most popular person.*

**C:3**

The political nature has also had an impact on his perception of the value of other things that have been important to technology education, such as the process and results of research and teacher development.

*Having someone here, or who was here, to bounce ideas off was vital. It is amazing what has evolved just from talking and shows the importance of developing research and development teams.*

**C:5**

*Curricula are essentially political, and I have tried to see this development as essentially political, but the research has been good and this can only enhance development in the area. I am still amazed as to what has been achieved over the last few years. It is not bad really.*

**C:5**

Being a member of this group has allowed Tim to develop knowledge, and an appreciation, of other people working in the area.

*Being a part of the writing group... I think that it made me realise other people wanted similar things in technology education. I have been amazed at the commitment other people have had for this area and I guess I have got a lot of strength from that. I continue to meet people who were part of the development. They still talk about the effect that it has had on their professional and personal lives.*

**C:3**

He also considers his own understandings of technology and technology education were further developed by being a member of this group.

*I guess my views of technology are better articulated now, rather than undergoing any substantive change, I am happy in that it is an area of learning in its own right and can articulate this. Early on I felt it was something like this but could not articulate it very well. The concept was evolving rather than a radical change. The writing group, and things that I have been involved in since, were important and my ideas of technology have become more focussed over the years. I am very confident on the direction we are heading in terms of technology education and the link with technological practice.*

**C:4**

### **Influences on technology education**

Tim perceives the people responsible for writing the draft curriculum, particularly the core group, have had a major influence on the development of technology education to date. Their subsequent involvement in the final curriculum statement served to reinforce this. As these same people have been involved in research and teacher development in the area he sees their influence as being ongoing and long term.

*In terms of technology education... how it has developed and the direction it will hopefully continue to go in... probably some of the most influential people to date are those of us involved in this writing group. By producing what I think is an innovative and workable curriculum statement, which has been validated by many teachers, I think we have had a major influence on technology education.*

**C:5**

*Most of us also had a role in the development of the final document as well... and have also trained facilitators and been involved in other forms of teacher development - including the development of the package... This package will provide long term teacher development for many years to come as the Ministry has authorised it as forming the basis of most of its teacher development programmes from now on. So - I think we have been pretty major players...*

**C:5**

He considers the development of technology education has been affected by the level of teacher acceptance of the concept of technology education as a new learning area. He also mentions the importance of the thirty trained facilitators nationwide to technology education's development to date and their ongoing role.

*I think the number of people who have been important in the development of technology education is huge, there is a lot of good will out there. This is essential if technology as a new learning area is going to survive. In primary schools in particular many teachers feel positive towards technology education as an idea - as a new curriculum area, and this is reflected in the numbers of primary schools who are actively implementing technology to date....*

**C:4**

*The training of the facilitators contract allowed the setting up of groups of people who were informed. This was very important - where there is so little idea of what the curriculum is and what it may mean - these well trained people have played and will continue to play a huge role in the development of technology education in this country.*

**C:5**

Tim believes that both the Minister of Education at the time - Dr Lockwood Smith, and particular people within the Ministry of Education, have been important in the development of technology education. He considers Dr Smith's willingness to listen to a range of views was of primary importance.

*You would have to go back to Lockwood Smith in terms of giving the political shove. Paul Black for putting the Minister on the right track in England or otherwise I don't know what we would have had. I think Pete was important in terms of actually having a concept of technology education in its own right - rather than it being a subset of something else. I think in the early 90s we had some enlightened people in the Ministry who have now gone - and that was vital.*

**C:4**

*Lockwood was actually influential in making technology a Government priority. Initially he did not have a clear idea of what it was but he was prepared to listen and that was the difference. He overrode the MAG once in terms of their report and was keen to get it out into schools. He convinced Upton that we were on the right track. Curricula are essentially political and this curriculum may not have happened in a different climate. As Paul Black said, I may not like his politics but he does listen to ideas about curriculum, the only one who has.*

**C:1**

## **Comments on technology education**

Overall Tim is pleased with the direction in which technology education is going at present although he recognises its fragile nature. His comments reflect his belief that high commitment can be a double-edged sword with personal agendas possibly taking over from the overall good of technology education.

*I think technology education in New Zealand at the moment is evolving in the right direction, but a cosmic ray through one piece of DNA can make a huge change, so who knows. As Ken said, a lot of people are trying to make a name for themselves in this new area and that can create its own problems, but also some good. It results in a high level of commitment to the area - people are prepared to go the extra mile - but sometimes it also leads to people viewing things too much at a level of personal gain rather than focusing on the bigger picture - on what is good for technology education.*

**C:5**

## **Present and future directions**

He views himself as continuing to play a leading role in technology education's future development.

*I still see myself as providing some leadership role in technology education in New Zealand. I guess it is about making sure that things can happen, like TENZ, new courses, setting up B.Tech degrees, working through other professional groups like Royal Society. I am also continuing to write and develop ideas in technology education. Part of my job is getting D.Phil, Masters students through to take leadership roles, raising the profile of technology education internationally from a New Zealand perspective, and creating international collaboration for research in technology education. These are all present and future goals.*

**C:6**

## **Tim's Description**

The material presented above provided the basis for a description of Tim as a MAG member, using the descriptors presented in Section 3.5 - Step 2.

## **Level of Participation in the CWG**

Tim's participation as a member of this group can be described as being at a high level or intensity. Tim can be thought of therefore as a full group member who was central to both the functioning of the group and its outcomes.

He planned, coordinated and provided leadership for the majority of group activities, and oversaw subgroup activities. His level of participation saw him operating as a mutually constituting member of the CWG, whereby his membership served to play a major role in defining the practices of the group throughout its existence.

### Tim's Habitus

The dispositions of relevance to Tim's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Confident in ability to undertake leadership role	Provided leadership across a number of levels of practice. Made decisions when necessary, even if these resulted in others perceiving him in a negative light.
Ambitious	Looks for and takes opportunities for career advancement.
Politically astute	Recognises the importance of the political and develops strategies accordingly.
Committed to technology education	Continually working to ensure technology education survives.

### Levels of Capital

Five forms of capital were identified as important within the CDG – see Section 3.5. Tim is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Tim's perception of his level of capital.

Form of Capital	Level
Educational	High
Cultural	High
Symbolic	High
Political	High
Linguistic	High

### **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Tim perceived he had in the group, as well as his present and future roles in technology education generally.

Role in group:	Provide leadership in terms of day to day practices and overall vision.
Present role:	Provide national leadership. Provide professional development opportunities for students. Develop own and others' ideas in technology education.
Future role:	Continue to provide leadership in technology education generally, and at a student level. Continue to develop own and others' ideas in technology education.

### **Activity/ies resulting from the Overall Purpose/s of the CWG**

Tim viewed the purpose of the group resulted in the following activities:

- develop the draft curriculum in technology education;
- devise political strategies to support the draft curriculum;
- provide others (including members of the group) with information regarding the nature and potential of technology education as a new learning area.

## **4.5 Shona – Member of the Contract Writing Group**

As outlined in Section 3.3, Shona was the Team Leader for the technological area group - biotechnology. She was a preservice lecturer at a College of Education at the time of the development. Previously Shona was a secondary school teacher, and had completed a masterate in biotechnology in the United Kingdom.

### **Shona's Story**

#### **Description of the group**

Shona describes the biotechnology writing group as being made up of a number of people all of whom had at some stage been involved in teaching biotechnology. She also commented that she had worked with many of them prior to the formation of this group. She viewed this group as a cohesive subgroup of the wider writing group.

*The biotech writing group, a subgroup of the larger writing group, was assembled by me and I chose people who had been involved in my biotechnology education diploma of education course at ACE. So most of them had been exposed to my view of biotechnology education which was an applied science view at that stage. Another person who had done work on biotechnology in a course at Otago University was also there. The composition of the group were teachers (2) science advisors -primary and secondary (2) and me. We all had some experience of attempting to teach in a biotechnological context.*

**D:1**

### **Basis of personal selection**

As with the people she selected for her own group, Shona felt she was chosen to be a member of this wider group because of her background in biotechnology education.

*I was selected to be a part of the writing group because I had some experience in the field of biotechnology education. Having written a couple of books and also enrolled at Waikato in biotechnology education.*

**D:5**

### **Purpose of the group**

The purpose of her group was to generate biotechnology education ideas and write these up as learning experiences. She felt it was crucial these reflected the biotechnology industry in New Zealand and provided her group with opportunities that would allow for strong links between the industries and the learning experiences to be developed.

*We tried to find out how biotechnological activities were carried out so that we could develop some biotechnological activities for classroom. We were trying to think of ideas that had a technological capability context, and to think of new learning experiences that could be used in classrooms. I expect we were influenced by the way that contexts and learning experiences were developed for the science curriculum but the main focus was to reflect what happened in the biotechnology industry.*

**D:1**

*We went on field trips and spent time discussing what we had seen. These formed a rich source of ideas.*

**D:4**

Shona also perceived this group - being primarily women, as important in terms of ensuring a 'woman's voice' was a part of this development. She also worked to see this coming through in the experiences as well, although feels on reflection, this did not happen to the extent she would like.

*Also we were quite adamant that technology education was not going to be a place for the chaps...*

**D:5**

*I did have some interaction with you when you consulted me about her adaptations of some ideas to include women's views and more socially inclusive ideas in biotechnology. On reflection that aspect should have been given greater attention but I needed someone to talk to about the technology and society strand. I think that was a lost opportunity in the technology curriculum development.*

**D:3**

### **Group interactions**

Shona considered the interactions in her subgroup were collaborative and hardworking. Shona describes her interactions with her own subgroup as very positive and feels they developed and maintain a strong bond of friendship, which she obviously values.

*It was a really happy group, we all just worked like hell and hoped that it would be okay. I suppose there wasn't time for a profound change to occur but we certainly felt that we were all developing a broader view of biotechnology. As a group the interactions were honest and friendly - we ate lots of delicious food, drank good wine, a great sense of urgency but also great excitement.*

**D:4**

*The group have stayed friends and we continue to feel this strong bond of friendship.*

**D:6**

*The biotech group have stayed close...I know that everyone shared the same feeling of excitement as me... we often talk about it. Most of these people have stayed in contact and I feel comfortable with the ideas we generated then even though most of us have moved on. Many of them into technology education and/or higher management jobs.*

**D:7**

*Each member of the group was responsible for setting up a contact... we interspersed trips with writing... because most of the group had lots of other commitments we did most of our writing in the weekends I tried to make it a special time. Lovely food, really pleasant environment however it was not a rest camp! All of the group shared with me the sense of urgency... we generated heaps of ideas...*

**D:4**

*We would come back and share these at morning tea... then more ideas would bubble up... and often I would just have to shut people up because we needed to move on to another topic. It was so exciting and everyone felt on a real high. I think that is why the time in Waikato was such a contrast!*

**D:6**

The wider writing group she describes as a group of individuals with whom she never felt she worked collaboratively. She did not perceive this to be a coherent group and felt there was little discussion between those involved which she saw as a sharp contrast to her own group. She saw this group as being central to the process of both her own group's developments and the overall writing of the draft curriculum. The purpose of this group was to ensure that the material included 'fitted' with what they saw as appropriate for inclusion.

*The week of rewriting the ideas was one of the worst weeks of my life. I felt isolated and judged. I felt I had to produce the goods but I really didn't know what they were. Every now and again my ideas were looked at and judged. I know I had to produce 50 or so every day. I was in the room of writers... It seemed that they all had people to bounce ideas off. I had Morley there for one day.. but the rest of the time I was on my own. Every day I knew I had to produce another 50.. so consequently I was often working in this room till 3 or 4am... No-one else there... most people were living in Hamilton.. so even though the course was stated as a live in course, it wasn't like that at all. There didn't seem to be any sharing of ideas and a developing view of technology. Just people working on their own tasks and every now and again Tim or Ann judging whether they fitted.*

**D:2**

### **Role in the group**

Shona saw her role in terms of the biotechnology subgroup as that of facilitator. This included the provision of a positive environment conducive to collaborative work which would get the most out of the group whilst ensuring they felt valued.

She felt she played a central role in this group, and had the effect of encouraging in the group a sense of excitement for the area of biotechnology.

*My role in the biotechnology group was to provide the environment for people to generate ideas. This involved giving people a chance to debate, feel valued and also go out and research communities of practice.*

**D:4**

*I don't think I was totally responsible, but I think I might have been able to foster a feeling of excitement in the exploration of this new area.*

**D:5**

Her role in the wider writing group was significantly less, very functionary and undertaken with an air of uncertainty.

*My role in the wider group was to collate these ideas to the 'writing team' and hope like hell that it was what they wanted.*

**D:4**

Shona saw the core group as particularly significant in determining the philosophical direction of the curriculum and recognised that this went through many changes during the development time. Groups such as hers were reliant on communication from this group to be able to keep in step with the thinking and she often felt isolated and frustrated because of this.

*However the thing that really drove these ideas were Tim's phone calls which reminded me that there needed to be a purpose for the development of learning activities and assessment examples.*

**D:1**

*I always thought that I was trying to guess what Tim wanted and at times I felt that this was changing. Being away from Hamilton made it quite difficult as I, and therefore the group, were not privy to the evolving conception of technology education. I got the impression that ideas were changing in Waikato and I was trying to keep up with those developments. That information came via a phone conversation from Tim about once or twice a week.*

**D:2**

*That's really where we gleaned what we had to do... also examples that I put before Tim to see if it was 'right'.*

**D:4**

This frustration was compounded when she arrived for the final wider group meeting to discover that what her group had achieved had to be reworked to 'fit' a different focus.

*However they were in a raw state and I didn't really give the group the chance to work on these ideas... probably because I really didn't know what Tim was thinking and what I needed to do... At the time therefore I suppose we achieved what we set out to do... but then when I brought all of these examples down to Hamilton for that week where we rewrote them because the focus had changed again... or perhaps I wasn't privy to the focus... well then I realised that we had only got half way and I was left to turn them into something that was useable.*

**D:2**

### **Impact on the group**

This core group became the main writing group after the wider group writing weeks were over, and Shona felt even more excluded during this time, and felt her contributions were undervalued.

*After that there was a group who worked on the curriculum and I felt completely ignored. I remember once coming down to do some adjustments of some examples... I was given a lap top to work on... couldn't manage it. Felt powerless... had a mini tantrum... and felt more than inadequate.*

**D:3**

*I got the impression that my input wasn't that valuable.. only that I could produce classroom examples and assessment activities for biotechnology education. I felt very insignificant and not privy to the developing ideas and conception of tech ed... I think I had minimal input to the overall development. I wrote a definition of biotechnology - well my group did... and then the final definition in the final publication was nothing like I had developed. Far too wordy and in an attempt to explain the area made it even more inaccessible.*

**D:5**

### **Group impact on participant**

However her comments as to her interactions with the wider group and the core group in particular suggest she felt very uncomfortable with her position as part of this group. This was reflected in feelings of inadequacy and dis-empowerment.

*The week of rewriting the ideas was one of the worst weeks of my life. I felt isolated and judged. I felt I had to produce the goods but I really didn't know what they were. Every now and again my ideas were looked at and judged.*

**D:2**

*I really didn't know... sort of guess what was in their heads at that time. However this information was got from brief moments of conversation.. rather than in depth discussion. I felt inferior.. not privy to the inside story and someone who was desperately trying to turn these excellent ideas (and I and the group were really proud of them) into something that would be accepted...So in fact I felt like a party functionary... is that right? Someone who was there to do the bidding of the bosses... but I didn't know the overall plan!*

**D:5**

Shona considers her involvement in this development had an effect on her concept of biotechnology in terms of widening her contextual focus and increasing her awareness of industry/education links.

*Being a member of this group broadened my dimensions of biotechnology and I realised how easy it is to explore industry and that there is a host of biotechnological contexts...Yes this experience was very rewarding both intellectually and professionally. We all realised the wealth of information that is available for accessing. It really formed the basic idea of one aspect of my thesis... these ideas that teachers might be able to translate work principles and practices and knowledge into the classroom. Also I hadn't realised the proliferations of biotechnology industries that were available.*

**D:6**

She also feels her concepts of technology were developed, specifically her understanding of technological problem solving. She had viewed technology primarily as applied science, and feels this continued to be the case throughout the development time.

*My view of technology and technology education before I was a member of this group was definitely a TAS view. I had little conception of the influence of society on technological solutions and I had a very functional view of technology education with a problem-solving view that was teacher-imposed and directed, also capability formed the main component of the experience. I think this view continued and the only change was the perception that there were many other contexts in biotechnology than those that were carried out by microscopic/cellular agents.*

**D:6**

Her understanding of technology education was also broadened although she acknowledges she doesn't have a depth of understanding in some of the other technological areas.

*I hope I now have a broader and more theoretical view of technology education, however there are whole areas that are a blank to me.. whole areas of design, hard materials and I would need to know lots more about systems and processes.*

**D:7**

### **Influences on technology education**

Shona considers that whilst many people have contributed to technology education to date, members of the core group and the Ministry of Education person involved in the development, have had a significant impact. She comments however that those involved in implementation will become more influential from now on as they interpret the curriculum into practice.

*Technology education has been influenced by many people. Pete was more important than one realised at the time. He listened and also took on board lots of people's ideas. He wasn't just a Ministry Wallah. Of course Tim and of course You. But I expect the next tier is going to be even more influential as they will interpret their ideas no matter how much you push the package.*

**D:7**

### **Comments on technology education**

Shona expresses some concerns over the future direction of technology education due to this interpretation - especially as she sees the 'Know How 2' teacher development package has fundamental weaknesses in terms of allowing teachers to develop a philosophy of technology education in keeping with that of the curriculum writers.

*When advisors and specialists are given this job... they develop things that work in their PD programmes. When these things work they form a reinforcement of a particular viewpoint even though it may not be what the writers thought. This is the problem with the package.. feedback is limited...and the nature of knowledge and programme development means that a particular line will be followed...You know that I am anti a package. I think that some of the examples of teachers exploring the industry are useful... but the worksheets and directions cannot ever replace a facilitator... the time with the facilitator is so short... so superficial, that I wonder what sort of message about technology is going to get transferred?*

**D:7**

She also has concerns with some of the content of the package in that it could stifle creativity due to its step by step layout of classroom activities. Some of these concerns she felt could have been alleviated if others - including herself, had been given an opportunity to have some input.

*For example in the package early examples are quite easy to follow... but then the classroom examples are pedantic... and will kill any creativity.. in particular the biotechnology programme... it is too detailed... I would have shown it diagrammatically and provided space for teachers to fly. So many i's are dotted that one gives up reading...*

**D:7**

*I think that package should have been given more of an airing to other people... Like me. I think it would have been important for people to comment who had experience in classroom situations as well as tertiary education... however this may just reflect that I felt I had no opportunity to have any input into it. Except I was asked to suggest a person who was teaching biotechnology education. This I did.. and her programme was written up (unacknowledged?) however the way that it was written up really killed the exciting way it was presented. Nobody reading that description could get inspired.... The careful step by step approach was used. I would have loved to have suggested other ways of presenting this material so that teachers would have read it!*

**D:8**

Shona considers that whilst there are some people in New Zealand who have an indepth understanding of technology education, many teachers especially in Intermediate and Secondary schools are not committed to implementing it in their schools.

*Technology education in New Zealand at this time appears to me to reflect that a few people know quite a lot, but there are a lot of techies in intermediate schools that are waiting for this to pass. Secondary schools haven't really thought about the issues and it just might be too hard for them to tackle.*

**D:8**

She also considers that there is still a perception of technology education as non-academic, which she sees as having implications for biotechnology, in particular.

*It still has a non-academic ring - which doesn't hold out too well for biotechnology education which is being claimed by the scientists... especially in the Senior biology curriculum.. and then it will continue to be taught as applied science.*

**D:8**

### **Present and future directions**

Shona is presently involved in teaching technology education to pre-service teachers. She has recently completed her doctorate in professional development in Biotechnology and is keen to continue in both biotechnology and technology education in the future. She has a particular focus on the relationship between science and technology and classroom implementation of technology.

*Presently I teach technology education at a tertiary level and to teachers in in-service courses. The sad thing is that I haven't had a chance to teach biotechnology education, only two years and since then the classes have been under subscribed. I don't know why, but I have a real sense of frustration at that. I have also finished a Ph.D on professional development for biotechnology education.*

**D:6**

*I want to write about and research technology education and in particular investigate the links between science and technology education. Also the dynamics of classrooms when these programmes are being implemented. Lots more to do... as I find this area fascinating.*

**D:6**

## Shona's Description

The material presented above provided the basis for a description of Shona as a MAG member, using the descriptors presented in Section 3.5 - Step 2.

### Level of Participation in the CWG

Whilst Shona's participation in the biotechnology subgroup can be described as being central to both the functioning of this group and its outcomes, participation as a member of the overall MAG can be described as fluctuating. She felt excluded from the decision making throughout the development and did not consider her input was valued. Her level of participation was therefore never at that of a mutually constituting member of the group, as she never felt she was a full group member and she had no role in defining its practices. She felt the practices of the group were determined by the core group within the wider writing group. Whilst there were times therefore when Shona was functioning at a medium level of participation in the overall process (that is when working with her biotechnology subgroup), the majority of the time saw her functioning at a low level with regard to the overall development.

### Shona's Habitus

The dispositions of relevance to Shona's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Enjoys collaborative working environment	Found the non-collaborative environment of the wider working group difficult. Ensured own group felt valued and supported.
Sensitive to exclusionary practices	Became resentful and frustrated at her lack of inclusion.
Able to work within set boundaries	Became frustrated when boundaries changed - but continually modified material to try and meet new criteria.
Socially aware	Attempted to incorporate a range of perspectives into material developed (Women, environmental, industry)

### Levels of Capital

Five forms of capital were identified as important within the CDG – see Section 3.5. Shona is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Shona’s perception of her level of capital.

Form of Capital	Level
Educational	High
Cultural	High
Symbolic	Low
Political	Low
Linguistic	Low

### Past/Present and Future Roles in Technology Education

The following is a summary of the specific roles Shona perceived she had in the group, as well as her present and future roles in technology education generally.

Role in group:	Facilitator of subgroup. Collator and provider of specified information in wider group.
Present role:	Pre-service technology education educator
Future role:	Researcher - specifically regarding the relationship between technology and science, and classroom implementation of technology education.

### Activity/ies resulting from the Overall Purpose/s of the CWG

Shona viewed the purpose of the group resulted in the following activity:

- develop a curriculum statement in technology education reflective of New Zealand's technological industries and technology education theorising as represented by the core group in this development.

## 4.6 Ann - Member of the Contract Writing Group

As outlined in Section 3.3, Ann was the joint coordinator of the contract writing group, and team leader of the primary focus group. She was a preservice lecturer at a College of Education at the time of the development. Previously Ann was a primary school teacher.

## **Ann's Story**

### **Description of the group**

Ann describes the membership of the writing group as being made up of a number of subgroups which had different strengths, and therefore, different roles. For example she describes members of the primary writing group in terms of their general primary background and the other groups in terms of their particular technological area background, rather than having a background in Technology Education generally.

*Much of this was due to the fact that no other members of this group had a background in technology education. They were selected for their expertise/experience in primary teaching/education.*

**E:2**

The core group of four was seen as a group who in contrast did have a background in Technology Education and all came from the same basic philosophy.

*One of the great strengths was that our skills were complementary - each had something different to contribute to the task, but all of us were working in the same direction.*

**E:3**

### **Basis of personal selection**

Ann considered she was a member of the development team, especially the core group of four, specifically because of her background in technology education, and her additional expertise in the area of primary education.

*I feel I was involved in these groups because I had been involved in writing the policy papers, had visited the UK to see programmes of work in technology ed. at the request of the Ministry of Ed., I had a primary teaching background and was involved in tertiary teaching as well.*

**E:3**

### **Purpose of the group**

Ann's view regarding the purpose of the whole writing team can be summarised as that of developing a curriculum statement which was cohesive and reflective of all sectors involved in its development.

Whilst she saw separate groups as being responsible for providing particular perspectives, it was the core group which assumed the responsibility of ensuring the end document met all the requirements set out in the contract yet retained the ideals of technology education as much as possible.

*I considered the purposes of this group (the primary subgroup) at the time was to generate appropriate material for primary school usage/programmes of work and to a lesser degree, to examine primary related material from other writing groups...The purposes of this group (the core writing group) was to co-ordinate the writing of the whole document, to organise and communicate with the various writing groups dotted all over the country, to work with the Ministry of Ed. person responsible for the contract and respond to feedback from the Ministry and Minister's groups.*

**E:1**

*...we were constantly responding to outside requirements and balancing these with our own beliefs.*

**E:3**

### **Group interactions**

Ann considers that the interactions amongst all the people she worked with were very focused and professional.

*This group worked together effectively and efficiently, completing the task in time. Much of the material from this group was utilised as it stood in the draft, compared to other material from other groups that needed a lot of extra work as it did not fit the strands of the draft curriculum. Interactions were professional and focussed...We swapped and changed roles as needed in this group. Different people had different areas of expertise to call on and this is probably why it worked so well. This was how it was from the beginning of this group - because it was reasonably fluid to start with. We were all clear I think about our own areas of expertise but could also contribute/ask questions of the others involved and be involved in the team effort. We all worked together amicably, professionally and in a focused manner.*

**E:2**

She comments specifically about the positive and equitable nature of the interactions within the core group and viewed this as an important factor in its success even though it was in the difficult position of catering for numerous and varying perspectives under extremely tight time constraints.

*I felt that all members of this group had the opportunity to present their ideas, to have them discussed etc ... and that we didn't really operate in a hierarchical manner.*

**E:2**

*There was never any panic despite the horrendous timeline we were given. In fact it's a wonder we managed to get the task completed without any major tantrums because it was such a tight timeline and we were constantly responding to outside requirements and balancing these with our own beliefs.*

**E:3**

### **Role in the group/ Impact on the group**

She considers the overall purpose was set down by the Ministry of Education contract guidelines, with the purposes of specific writing groups, and details of what actually was finally presented at the contracts completion, being determined by the core group but guided by numerous other people/groups involved. What was finally presented as the draft curriculum however was determined by the Minister of Education, his advisory groups and his Ministry.

*What happened in the overview group was probably determined by a number of people/groups; the Ministry of Education, the Minister's Advisory group (have forgotten it's title), the Ministry's Advisory group, pressure groups or people as we were often in the position of reacting to the responses given to material submitted to the Ministry...The primary writing group's purposes were probably determined primarily by the overview group of four - it was one of the many groups set up around the country to generate appropriate material for the curriculum.*

**E:2**

*As far as the primary writing group is concerned - I think I probably determined a lot re. what happened in this group, using guidelines from the overview group...The main influence on this group however came from the Ministry in its requirements/contract requirements. Within this however the members of the group had the freedom to determine what I would call 'second level' details (the Ministry determining 'first level' details).*

**E:2**

Ann's own role in the development process combined that of professional leadership and being an integral part of a team, generating ideas and strategies, and coordinating and editing other peoples' material.

*My own role within the primary group was that of coordinator of material, facilitator of ideas, and editor of material. I also consider I was a provider of staff development for the members of the team during the initial stages. My overall role remained unchanged over time but different aspects of the roles identified above came into play at different times of the process...In terms of the overview group I played the role of coordinator of the primary material, contributor of ideas, editor of written material, typist - part of the total team.*

**E:2**

Through out the development Ann felt comfortable with her own role and considers this to reflect her understanding, and acceptance of, the overall direction the development process was heading.

*I always felt focussed and on task in these groups... Probably because I had a clear idea on where we were going.*

**E:3**

### **Group impact on participant**

Being involved in this development process enabled Ann to develop a better understanding of both technology and technology education, and the political nature of curriculum development generally.

*Being involved in the writing groups I learnt a lot about technology and technology education which I would not have gained otherwise. I learnt about what it is like to work on a Ministry contract, the degree of control that the Ministry exerts over such a contract and the content of the curriculum, and the politics involved in the whole process...Before I was a member of the writing group I had a reasonably broad concept of technology, having worked on the policy papers. It was not restricted to computers, manual training curriculum areas etc... but probably focussed more on the process. I was aware of the range of technological areas and the degree of knowledge involved in each. The view didn't change but it probably got broader and I refined and consolidated a lot of my ideas... I also probably realised with more clarity that it was going to be a huge challenge for schools to put this into practice..*

**E:3**

*My view of technology education was also reasonably broad, having worked on the policy papers; that it encompassed the three aspects of knowledge/understanding, capability and society. I gained a greater understanding regarding the nature and role of technological knowledge and the complexity of the relationship between society and technology.*

**E:4**

*Also familiarity with the notion of technological literacy - this became clarified near the end of the work re. the self directed package. My view of technology education is therefore much the same, however it's probably firmer, more certain and I have a more in depth understanding.*

**E:4**

### **Influences on technology education**

Ann considers there are a range of people who have influenced the development of technology education to date, including the core group of writers and the facilitators trained at Waikato. In the future she sees those with training and/or involved in organisations such as TENZ as having a strong influence.

*Those who have had the most influence on technology to date are probably the coordinating writing team of Tim, you, Mike and myself plus Pete as he had an almost veto like authority over the material. Also the people who have completed the facilitator training at Waikato in 1995 and 1996 as they experienced an intensive course with an academic backbone and then went into positions where they could facilitate future developments...In the future the main influence will come from the facilitators as above, and possibly people who complete qualifications in the area (through Massey and Waikato) and possibly those involved in the Technology Association - TENZ.*

**E:5**

### **Comments on technology education**

Ann has some concerns regarding the implementation of technology education in New Zealand, specifically in terms of the issue of National consistency and consistency with the curriculum aims.

*Technology Education in New Zealand at the present time is still struggling. I'm particularly concerned about the integration issue - particularly as schools are taking single achievement objectives from the strands and considering this as 'technology'...*

**E:4**

*It lacks clear leadership across the country as a whole (from within the Ministry) and will be dependant on the strength within the local regions areas. I feel that this will reflect the 'stance' taken in the local areas (i.e. leadership from Waikato Uni, Massey Un etc...) Programmes will reflect regional perspective(s).*

**E:5**

*These are probably similar in a number of respects but not the same, but this is not necessarily a negative thing - possibly a healthy approach.*

**E:5**

### **Present and future directions**

Since her involvement in the curriculum development process, Ann has played a significant role in the implementation of technology education due to her coordination of the 'Know How 2' teacher professional development resource package. She also initiated preservice teacher training courses in her institution.

*Although after the work on the curriculum I initiated a course for primary students at ACE in technology education and this became the basis of the present compulsory paper and from there a Centre for Technology was created in line with the NZ Curriculum Framework (all of our Centres are based on the NZCF learning areas). I opted out after initiating the first courses at ACE as I had other more pressing commitments...*

*I also coordinated the then self-directed package or technology/technology education staff development package of material for trial after the development of the draft curriculum.*

**E:4**

Due to other commitments however she is no longer involved in technology education to any great extent at present, although she retains an interest in its development.

*At present I don't have any role in technology education...Technology education will always be an interest but I need to concentrate on one thing at a time rather than many. I hold a positive view of technology and technology education however.*

**E:4**

### **Ann's Description**

The material presented above provided the basis for a description of Ann as a MAG member, using the descriptors presented in Section 3.5 - Step 2.

### **Level of Participation in the CWG**

Ann's participation as a member of this group can be described as being at a high level. She was central to both the functioning of the group and its outcomes.

She coordinated different subgroups and provided leadership for many of these groups' activities. She was also integral to the functioning and outcomes of the core group. Her high level of participation saw her operating as a mutually constituting member of the MAG, whereby her membership served to play a major role in defining the practices of the group throughout its existence.

### Ann's Habitus

The dispositions of relevance to Ann's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Confident in ability to undertake leadership role	Provided leadership across a number of levels.
Aware of own and others strengths.	Recognised own and others' strengths and coordinated roles accordingly.
Committed to professionalism	Maintained professional working relationship with other members even in the face of philosophical differences.
Sets realistic and manageable goals	Provided well thought out guidelines for self and others to work to reflective of time and other constraints.

### Levels of Capital

Five forms of capital were identified as important within the CDG – see Section 3.5. Ann is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Ann's perception of her level of capital.

Form of Capital	Level
Educational	High
Cultural	High
Symbolic	High
Political	Medium
Linguistic	High

### **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Ann perceived she had in the group, as well as her present and future roles in technology education generally.

Role in group:	Team leader of the primary subgroup - provided facilitation and professional development. Integral member of the core group jointly responsible for overall monitoring, coordinating, and final editing - specific expertise in primary education.
Present role:	Involved in the development of the 'Know How 2' package and its subsequent introduction into schools.
Future Role:	No planned role.

### **Activity/ies resulting from the Overall Purpose/s of the CWG**

Ann viewed the purpose of the group resulted in the following activities:

- develop a curriculum statement that was cohesive and reflective of all sectors involved in its development;
- develop own understanding of technology education and providing guidance to others;
- meet the requirements of the Ministry of Education contract.

## **4.7 In Summary**

The experience of being a member of any group is perceived differently by individual members themselves, as dependent on a large number of interacting factors. The material presented in Sections 4.2 – 4.6 clearly shows this was the case for both the members of the MAG and the CWG. This supports the assertion that historical accounts provided by individuals are necessarily partial.

The complexity of the experiences presented in this chapter will provide the basis for the further analysis in terms of the Curriculum Development Group (CDG) presented in Chapter Five. This will be used to develop a description of this group in terms of a 'community of practice' (Lave and Wenger, 1991).

# Chapter Five: The CDG as a Community of Practice

## 5.1 Introduction

This chapter provides a further analysis of the findings from Chapter Four (as per Section 3.5, Step 3), through interpreting each of the participants in terms of their interactions as part of the wider Curriculum Development Group (CDG). I then employ the descriptive potential of Lave and Wenger's community of practice ideas in order to discuss the CDG as a collective, that is, as a community of practice. The key feature of this stage of the analysis is that it provides an opportunity to progress from understanding the individual-in-action (Minick, 1985), within the respective subgroups of the CDG (the MAG and the CWG), to understanding the CDG itself as a collective.

In Section 5.2 each participant's level of participation through the time the group was in existence is depicted on the template provided in Section 3.5. In Section 5.3 the participant's overall way of being in this group is described, and each participant's 'profile' is presented. Presenting this information visually aids the description of each participant, as well as provides a mechanism for comparisons to be made between them in Section 5.4. Also compared in Section 5.4 is the participant's view of the activities resulting from the purpose of the groups. Section 5.5 summarises the findings from this comparison through an explanation of the CDG as a community of practice (Lave and Wenger 1991).

## 5.2 Levels of Participation

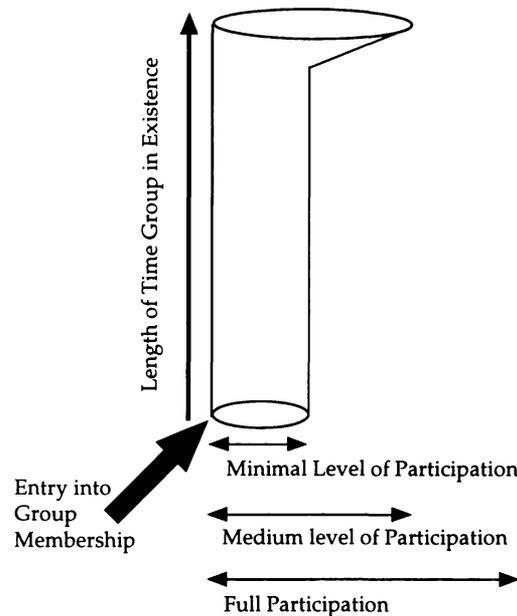
The following figures provide illustrations of each of the participant's level of participation over the period of their membership. As explained in Section 3.5, full participation was denoted by the individual-in-action (Minick, 1985), being a mutually constitutive member of the CDG. That is, their interactions were impacted on by the practices of the CDG, as well as being determinative factors involved in the establishment and/or ongoing development of these practices. Minimal levels of participation reflected the participant's active membership was of a low intensity and did not impact on either the structural or functioning practices of the group. In other words they were often 'silent, and in some instances, 'silenced', within the CDG discourse.

Medium levels of participation reflected those members who participated actively and comfortably within the CDG interactions, but for whom the practices of the CDG defined the nature of their interactions, as opposed to their participation having a determining influence on the nature of the CDG practices.

### Wayne's Participation

The illustrative account of Wayne's participation in the CDG is presented in Figure 5.2.1.

**Figure 5.2.1: Diagram of Wayne's Participation**

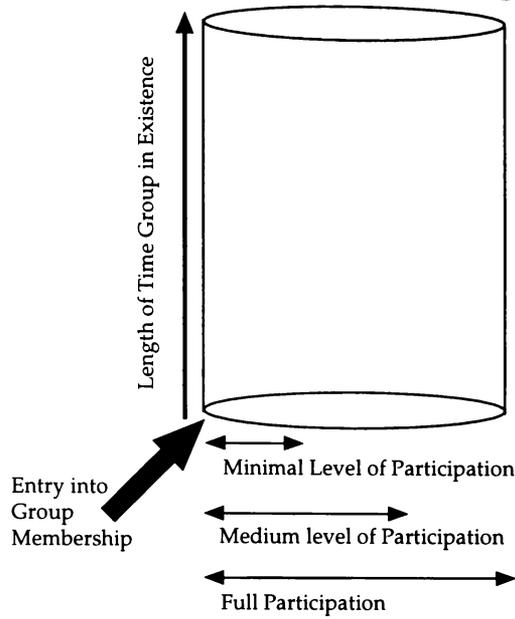


This figure shows that Wayne entered the group as a participant interacting at a minimal level. He attended meetings and read material as required, but existed as a largely 'silent' group member in terms of his interactions. His interactions remained at a minimal level for the majority of the time the CDG was in existence. Near the end of the time however, the focus of the group interactions turned towards school implementation. At this stage of the development Wayne's participation intensity rose to that of being at a medium level.

### Pete's Participation

The illustrative account of Pete's participation in the CDG is presented in Figure 5.2.2.

**Figure 5.2.2: Diagram of Pete's Participation**



This figure shows that Pete was, from the moment of his entry into this group, operating as a mutually constituting member. He remained at this level for the time the group was in existence.

### **Tim's Participation**

The illustrative account of Tim's membership in the CDG is presented in Figure 5.2.3.

**Figure 5.2.3: Diagram of Tim's Participation**

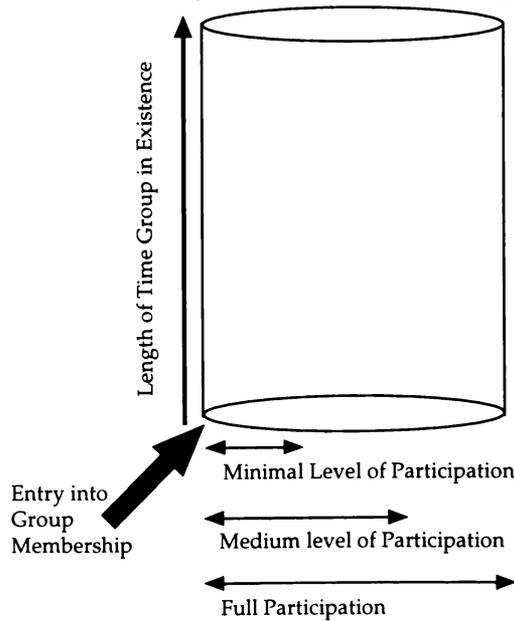
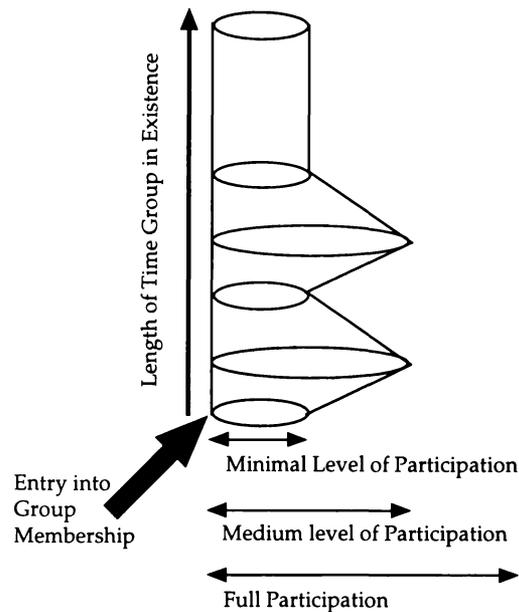


Figure 5.2.3 shows that Tim, like Pete was operating as a mutually constituting member from the moment of his entry into the group. He remained at this level for the time the group was in existence.

### Shona's Participation

The illustrative account of Shona's membership in the CDG is presented in Figure 5.2.4.

**Figure 5.2.4: Diagram of Shona's Participation**

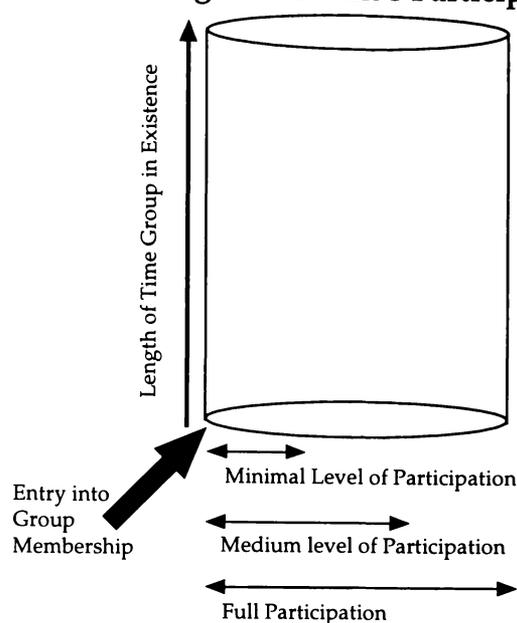


This figure shows that Shona entered the community as a participant interacting at a minimal level of participation. During the times she was leading the work of her biotechnology working group her level of participation rose to a medium level of participation in the overall actions of the CDG. That is, when with her own group, Shona participated actively and comfortably, but the practices of the CDG still defined the purpose, if not the nature, of her group's interactions. However, as she left her biotechnology working group and interacted 'on her own' within the CDG, her participation dropped back to being at a minimal level. During these times she felt she was often silenced due to the perceptions of others that played a more determinative role in the CDG, and her interactions subsequently lost intensity.

### Ann's Participation

The illustrative account of Ann's membership in the CDG is presented in Figure 5.2.5.

**Figure 5.2.5: Diagram of Ann's Participation**



This figure shows that Ann, like both Pete and Tim, was operating as a mutually constituting member from the moment of her entry into the group. She remained at this level for the time the group was in existence.

All nine participants held a common view that the Ministry of Education official within the MAG, and a core group of four writers within the CWG determined the overall direction of the CDG. In terms of the everyday directional input and ongoing practices, it was considered the core group of writers had the primary determinative role within the CDG, however they were constrained to some extent by the criteria as set out in the Ministry of Education contract. The Ministry of Education official held the primary determinative role within the MAG, and often worked in collaboration with the core group of writers. Other members of both the MAG, and the CWG, were reflected as having minimal determinative input in terms of the overall process of development, and the resultant draft curriculum statement. Their participation was more in terms of providing feedback, and material for use, respectively. That is, their interactions were compliant with the CDG practices as opposed to directly influential on the nature of these practices. The illustrative accounts provided above support this view with the participants Pete, Tim and Shona showing consistent full participation in the CDG, being the Ministry of Education official, and two members of the core team within the CWG.

### 5.3 Participant Profiles

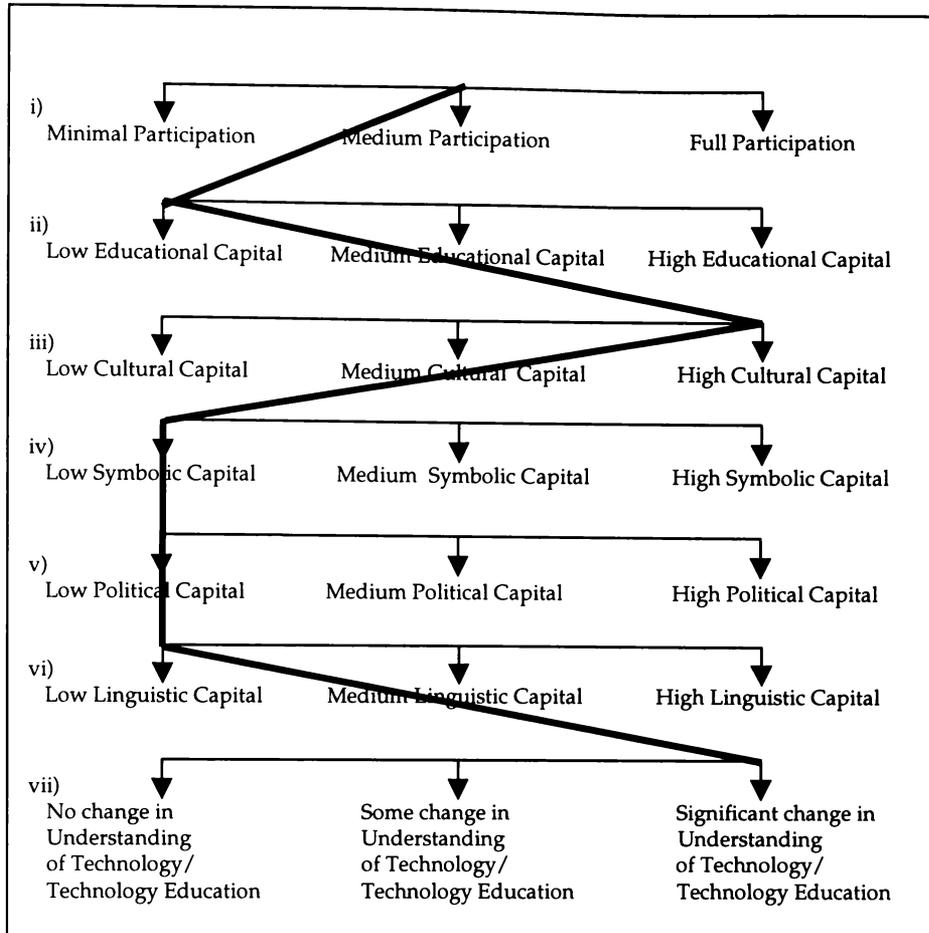
Each participant's overall way of being in the CDG is summarised from Chapter Four, (Sections 4.2, 4.3, 4.4, 4.5 and 4.6 respectively), and their 'profile' presented. These profiles provide a basis for exploring what it was to be a fully participating member of the CDG in Section 5.4. The level of participation used when plotting each participant on the first dimension is the highest level each participant exhibited during the group's existence.

After a descriptive summary of each participant is presented, their respective data is plotted on the continuum of dimensions (as presented in Section 3.5) in order to construct an overall profile. This is presented in Figures 5.3.1, 5.3.2, 5.3.3, 5.3.4 and 5.3.5 respectively.

#### Wayne's Profile

The nature of Wayne's membership in the CDG reflects the areas in which he held the greatest and least power. That is, a high level of cultural capital in terms of contemporary knowledge of New Zealand primary schooling and that of technologically related classroom practice. His low levels of educational, symbolic, political and linguistic capital translated into low levels of power in areas perceived to be important within the CDG, and this effectively excluded him from full participation. Wayne's habitus was described in terms of the dispositions of being ambitious, pragmatic, cautious, and suspicious. These influenced Wayne's participation both in terms the overall low intensity of his interactions for the majority of the time, as well as his assumption of the role of providing expertise in the area of school and classroom curriculum implementation. That is, the realisation of the potential 'power' of Wayne's capital reflected his habitus as it interacted with the discourse of the CDG. For example, his ambitious nature led him to remain a member of the CDG whilst acknowledging his minimal participation membership status. This, combined with his pragmatic disposition, allowed him to make the best of the opportunity, including the furthering of his understandings of technology and technology education. It also enabled him to make the most of his membership within alternative areas to further his career.

**Figure 5.3.1: Wayne's Profile**

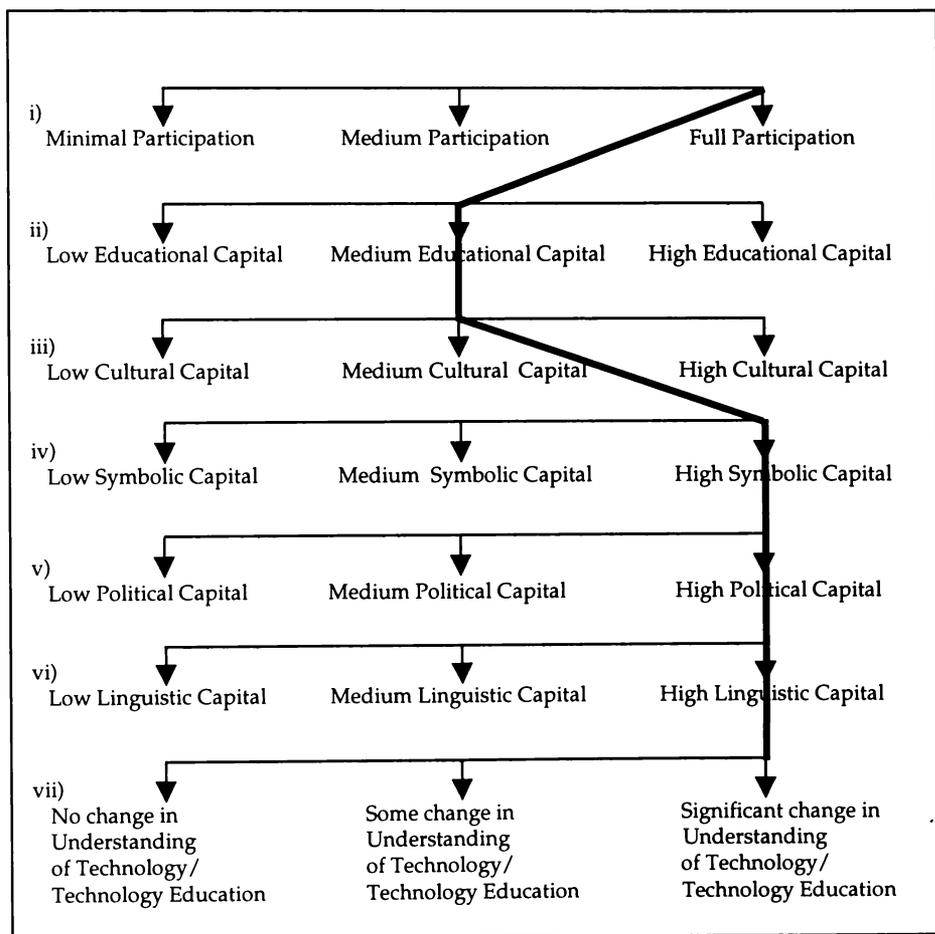


**Pete's Profile**

The nature of Pete's membership in the CDG reflects the areas in which he held power. Pete's habitus was described in terms of the dispositions of being politically astute, resolute, collaborative and having a tendency to become personally involved. His resultant actions and reactions reflected the ways in which these dispositions interacted with his level of power and the needs of the situation at the time. The roles he assumed in terms of coordinating meetings and material for members between meetings, facilitating discussions, mediating feedback to and from the groups, and providing of rationales for decisions made, reflect primarily the high level of political capital Pete held. However, he would not have been able to carry out these roles successfully if he had not held high levels of symbolic and linguistic capital also.

His disposition toward collaboration, and personal involvement was a dominant in discussions with the CWG members, where his level of educational and cultural capital encouraged a more equitable style of interaction as he recognised opportunities to develop his own conceptual understandings of technology and technology education. In these interactions he held a similar or lower level of power and thus the nature of his interactions in this situation were more collaborative than was the case in the MAG where power struggles were a constant feature of the group interactions. When working with the MAG, Pete felt the need to exert his positional power (political capital) in order for the group to meet what he saw as its primary goals. Thus his dispositions towards resoluteness and personal ownership dominated that of collaboration.

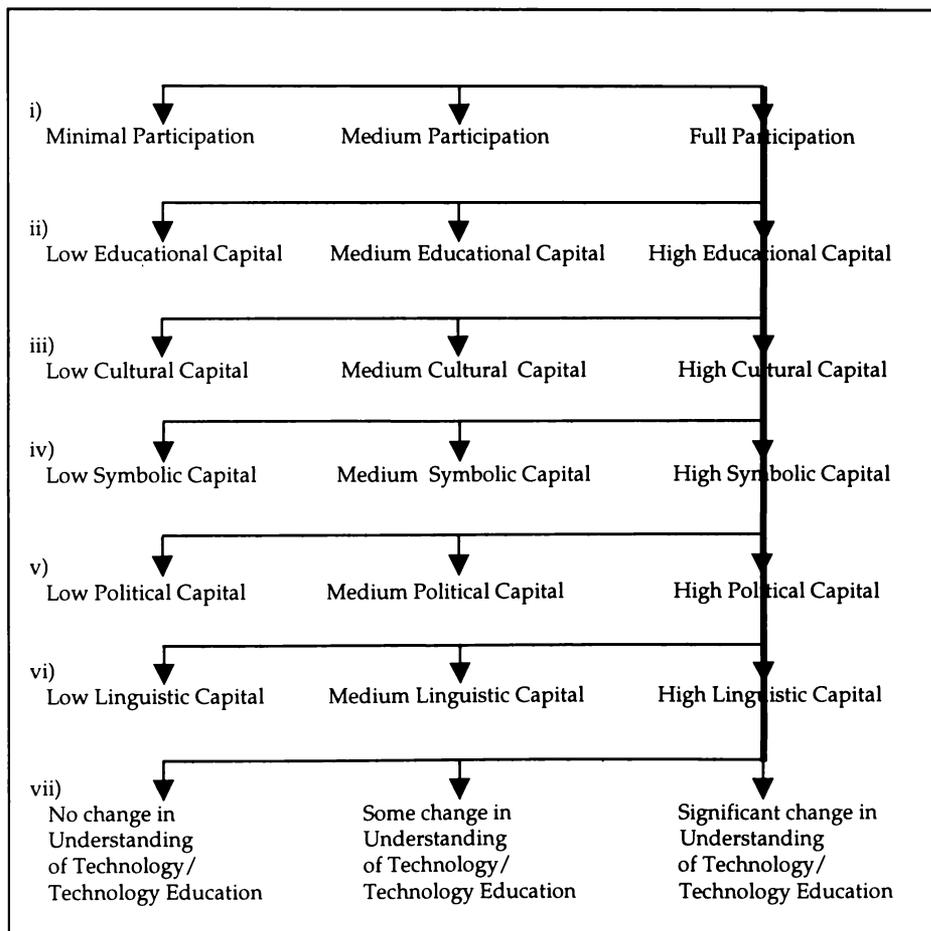
**Figure 5.3.2: Pete's Profile**



### Tim's Profile

The nature of Tim's membership in the CDG reflected the high level of capital that he held in all areas perceived to be of importance in this group. Tim's habitus was described in terms of the dispositions of being ambitious, politically astute, confident and committed to technology education. His resultant interactions reflected the ways in which his level of relative power in specific settings mediated these dispositions. For example, his leadership role within the CWG tended to prioritise technology education over the personal needs of the other group members in order to move ahead in the development. This often made him unpopular as he was forced into making decisions due to time and political constraints which others in the wider CWG were not aware of, and may not have supported. However, due to his high levels of educational, symbolic, linguistic, and particularly political, capital, he was able to push these decisions through without the full support of the other members. However when interacting with the other core members, and Pete, who between them held similar levels of power, his interactions were more collaborative in nature.

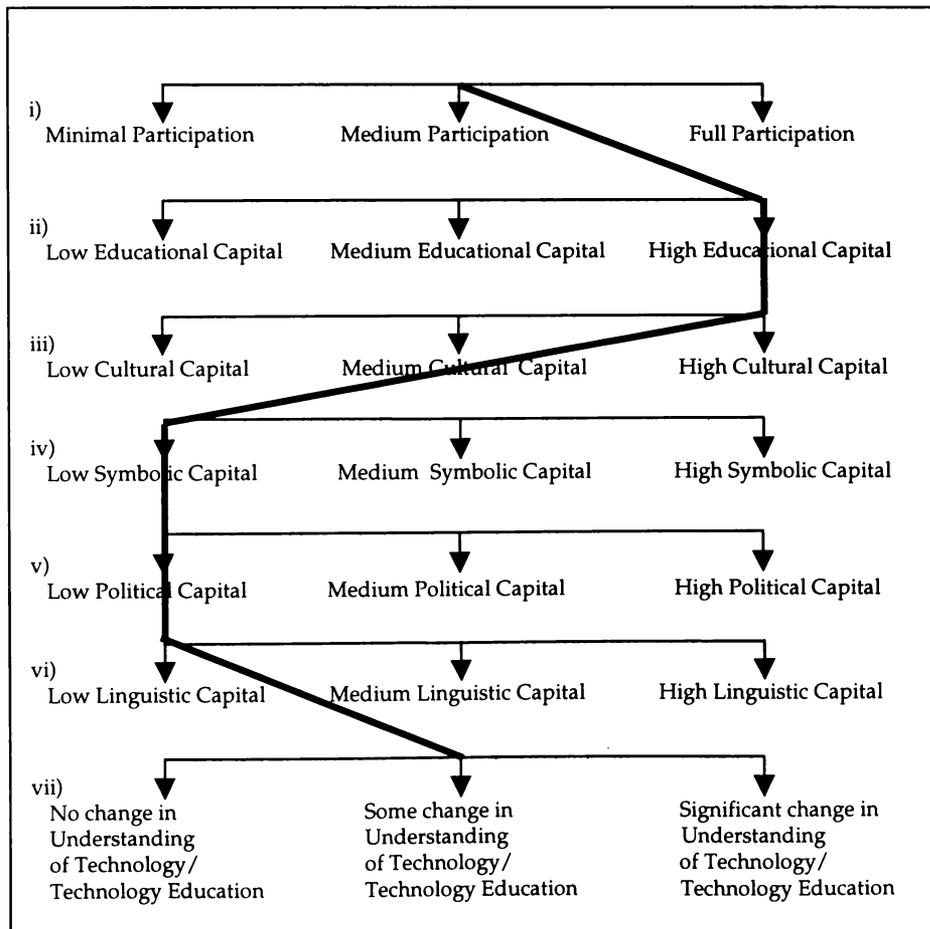
**Figure 5.3.3: Tim's Profile**



### Shona's Profile

The nature of Shona's membership in the CDG reflected the low level of power that she held in the form of symbolic, political and linguistic capital – all areas perceived to be of particular importance in this group. Shona's habitus was described in terms of the dispositions of being socially aware, sensitive to exclusionary practices, most responsive to collaborative working environments but able to work within set boundaries. Her resultant level and nature of participation was strongly influenced by the interactions between these dispositions and her relative power in different situations. For example, Shona assumed the role of facilitative leader within her own working group, and collator and provider of specified information within the wider CDG. The role assumed in the wider CDG was a direct reflection of the level of power she felt she held. This effect was augmented by her dispositions regarding exclusionary practices and her dislike of non-collaborative working relationships. Her potential power from a high level of educational and cultural capital appeared to fall victim particularly to her low level of symbolic capital, as she viewed what she had to offer was not valued by other members of the group - particularly those in the core writing group.

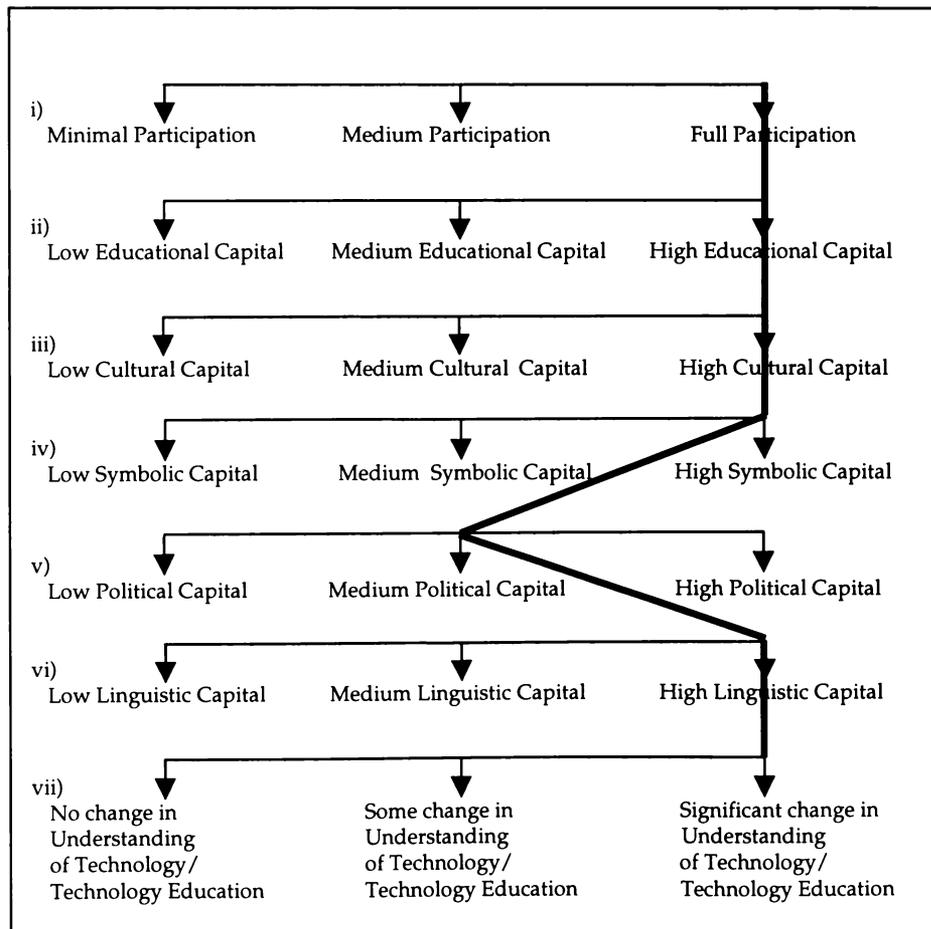
Figure 5.3.4: Shona's Profile



## Ann's Profile

The nature of Ann's membership in the CDG reflected the high level of capital that she held in most of areas perceived to be of importance in this group. Ann's habitus was described in terms of the dispositions of being confident, committed to professionalism, aware of own and others strengths and due to this was able to set realistic and achievable goals. Her resultant roles as team leader of the primary subgroup - provided facilitation and professional development and an integral member of the core CDG jointly responsible for overall monitoring, coordinating and final editing consistently reflected these dispositions. Her focus on setting manageable tasks and working in a highly professional manner allowed Ann to function in a leadership role within the wider CDG. As she was not primarily responsible for the political decisions that needed to be made, she could fulfil this role slightly removed from the issues which arose from these decisions, and thus was seen in a more neutral light than Tim by other CDG members. Her awareness of her own and others' strengths helped develop a collaborative working environment within her primary sector working group and the core CDG.

**Figure 5.3.5: Ann's Profile**



## 5.4 Being a Member of the CDG

From the data presented in Section 5.2 it can be determined that it was possible to be a member of the CDG and operate across a range of participatory levels. However, those that did not participate at a full constituting level were unhappy with their level of participation and their group membership per se. They felt they did not achieve in the way they would have liked, and were often uncomfortable and frustrated throughout group interactions. The data presented in section 5.3 illustrates a definite relationship between the perception of the level of different forms of capital held, its realisation in terms of power, and how this interacted with the participant's habitus. This was shown through the types of roles resulting from these interactions and the level of participation the participants felt were open for them.

### Comparing Profiles

In the MAG it would seem that political capital, was of most importance. Educational, symbolic, and linguistic capital appeared to be valued by most group members, and appeared to be important to participation levels within group interactions. However, in terms of providing for determinative influences on the overall process these forms of power could not compete with political capital. Cultural capital by way of school and/or classroom experience and background was perceived to be less valuable. This appeared to be have provided a basis for selection into the MAG, rather than providing a basis for participation within it, with the exception of discussions on implementation that occurred near the end of the groups existence. Economic capital could also be interpreted as providing a basis for selection into this group, but did not appear to play a major role in either discussion participation, or overall determinative effect and thus was not a feature of this analysis.

In the CWG it would seem linguistic, and symbolic capital were particularly important to the members' ability to participate at a determinative level. Political capital was also important. However, as long as people had access to this form of power through others with whom they were collaborating, it was not necessary to have a high level personally. Educational and cultural capital could only be transformed into actual power if they were combined with high levels of linguistic, symbolic or political capital.

One aspect mentioned on numerous occasions in the participants' reflections, is that of the significant personal development in terms of their conceptualisations of technology and particularly technology education. These developments resulted in the participants being positioned very favourably for future roles in technology education as they could be described as having an 'inside running' for future development initiatives in technology education.

The ways of being a member of the CDG can therefore be described as reasonably extensive. However, if 'successful' is interpreted as having fulfilled one's own and others' expectations of membership, the possibilities of 'successfully' membership were more limited. By placing the profiles presented in section 5.3 alongside each other, the relationships between 'success' and the selected dimensions of being a CDG member can be clearly seen. This is presented in Figure 5.4.1.

**Figure 5.4.1: Comparing CDG Profiles**

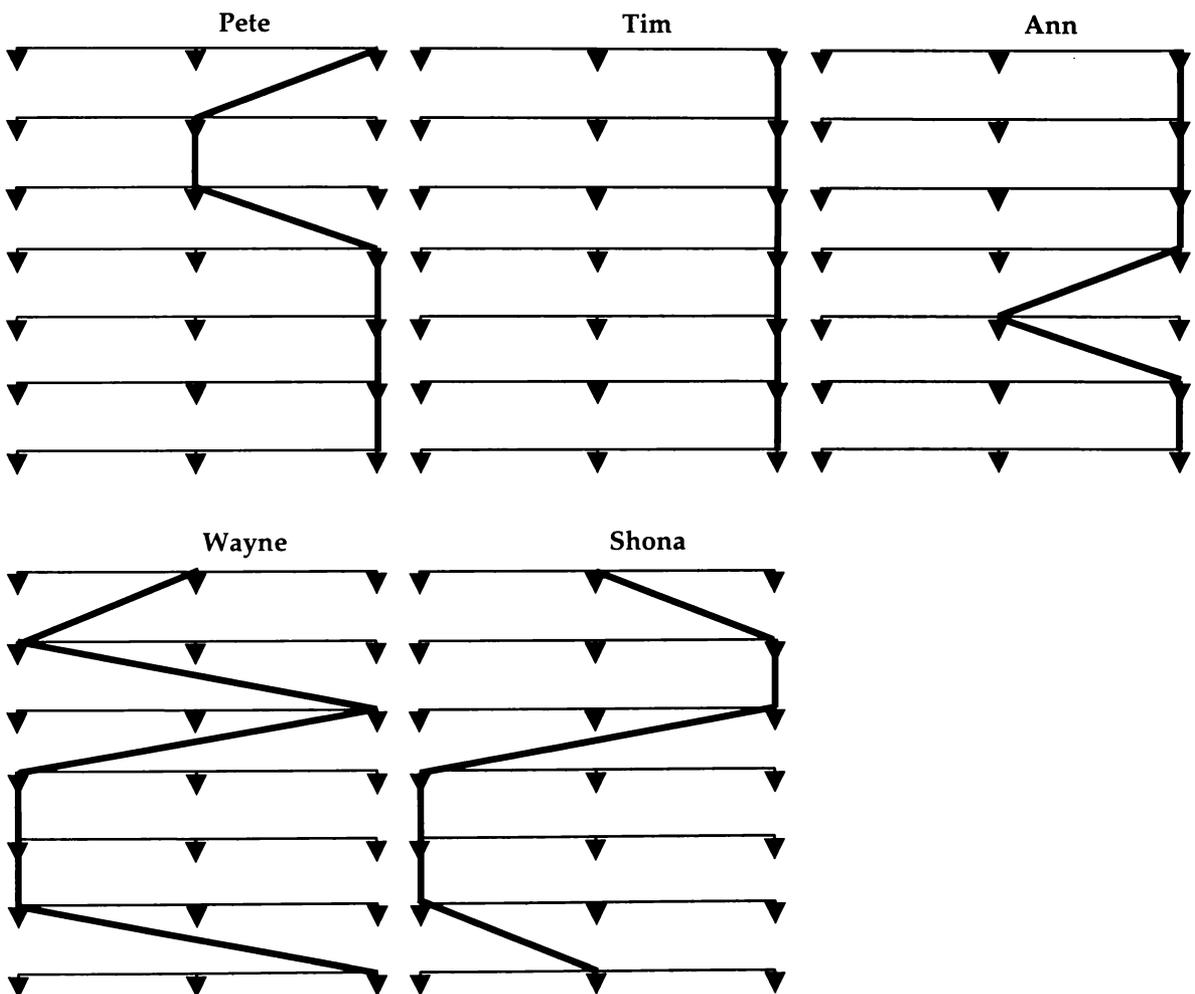


Figure 5.4.1 shows that 'successful' CDG members, that is, Pete, Tim and Ann, have profiles positioned on the middle-to-right hand side of the continuums, particularly on the dimension continuums showing levels of participation, and symbolic, political and linguistic capital. Shona and Wayne in contrast have profiles positioned on the middle-to-left on these same dimensions.

### **Comparing Views of Purpose**

The activities resulting from the perceived purposes of the CDG were identified by these five participants as follows (as taken from Chapter Four, Sections 4.2, 4.3, 4.4, 4.5, and 4.6):

- make recommendations for the content and structure of Technology in the New Zealand Curriculum; (Wayne and Pete)
- make recommendations regarding material drafted; (Wayne and Pete)
- evaluate draft curriculum in terms of whether it represented a 'good' curriculum; (Wayne and Pete)
- make recommendations for supporting the implementation of technology education in New Zealand schools; (Wayne)
- develop a curriculum statement that was cohesive and reflective of all sectors involved in its development, and New Zealand's society. (Tim, Shona and Ann)
- meet the requirements of the Ministry of Education contract. (Ann)
- devise political strategies to support the draft curriculum (Tim)
- provide others (including members of the group) with information regarding the nature and potential of technology education as a new learning area. (Tim, Ann)

These activities can be summarised into a collective view of the purpose of the CDG as to:

- develop a curriculum statement that was cohesive and reflective of all sectors involved in its development, and New Zealand's society, through consultations and ongoing evaluations;
- develop mechanisms to support the curriculum's implementation in schools;
- provide others (including members of the group) with information regarding the nature and potential of technology education as a new learning area.

Links can be drawn between the participant's view of their personal role in line with these activities, and their view of their membership as 'successful' as defined above. That is, those members who did not participate at a high level did not feel they personally achieved success to their satisfaction with regards to these purposes.

## 5.5 Description of the CDG as a Community of Practice

The CDG can be described as a community of practice that came into existence for a relatively short period of time. In terms of a community of practice, members of the CDG can be viewed as a collective that both sought to practice in ways to uphold the purposes of the CDG. In addition such practices sought to further define the nature of these and subsequent activities and interactions, in order to extend the possibilities of the purposes.

Membership in a community of practice is defined by the dispositions of the members, and practices and relations between its members. The above Sections 5.2 through to 5.4 provide an account of five instances of such 'memberships' within the CDG. These accounts provide support for the notion that members of any community are not homogenous in nature. However these accounts also suggest that in this community, particular dispositions, levels of relative power and different situations, all interact in varying ways to determine the level of participation each member exhibited. The nature of this community was complicated in many respects as it was called into being by individuals and agencies outside of the CDG itself. For example, the Minister of Education and his Ministry initially set many of the CDG's structuring and functioning practices. However, one of the Ministry officials and four core members of the CWG can be viewed as playing a major determining role on the ongoing nature of these practices, thus drawing the practices back into the community itself.

Whilst the way of being a member of this community of practice can be considered to be broad in some respects, those members who could be considered to have been fully constituting members, showed a level of commonality across a number of dimensions as discussed in Section 5.4. High levels of cultural capital in terms of past teaching and classroom experience, even when combined with educational capital, did not allow members to become full participants in this community of practice without high levels of linguistic, symbolic and political capital. This would seem to reflect the nature of the community as its dominant members determined it. The development process was a political process, as commented on numerous times by many of the research participants. Political capital however, is not enough when working in the field of education to sustain development and achieve educational purposes. There must also be a high level of symbolic and linguistic capital and adequate level of educational capital if the development is to have credibility outside the discourse of educational politics.

That there was credibility within the institution of education and the discourse of educational politics was crucial to the development of this new educational field of technology education if the development were to be successful in achieving its goal.

The members of the CDG identified three purposes as reflecting their shared understandings of this goal. That is, what they were doing and why - as presented in the summary in Section 5.4. The first of these purposes focused on the development of a draft technology curriculum statement and therefore can be viewed as having been achieved. The second and third however, were concerned with the implementation of the curriculum into schools and professional development. Both of these are ongoing by nature and could realistically be only begun in the timeframe during which this community of practice was in existence. These remaining two purposes have been picked up by a variety of other groups since this time, many of which include members from this community of practice.

It appears that membership in this community of practice served to increase its member's level of linguistic, symbolic and political capital, almost irrelevant of their participation level within the community. This can be linked to the general perception within New Zealand generally, and within education specifically, that being seen to have been part of a high profile community increases one's status in the eyes of those outside of that community. This, combined with the fact that all members had a unique opportunity to develop their own understandings of technology and technology education, has resulted in many of the community's overall membership presently holding key roles in the developing field of technology education.

In terms of communities of practice being defined as sites of dialectical interactions whereby members and the community are mutually constitutive, it could be argued that the CDG was dysfunctional for a large number of its members. That is, for the majority of CDG members (including Wayne and Shona), the descriptors developed by Lave and Wenger would not seem to apply. That is, if legitimate peripheral participation is viewed as a 'descriptor of engagement in social practice that entails learning as an integral constituent' (Lave and Wenger, 1991, pg. 35) it would seem that for these members such engagement was minimal. Rather than participating in a process of enculturation, these members instead seemed to be actively excluded from learning as a process of participation either through their own withdrawal or perceived rejection. This being particularly so in terms of their lack of participation in decision making and other determinative practices.

Being a 'new' community it could be argued there were in fact no 'oldtimers' to support such an enculturation process, and those who did tend to participate fully were themselves newcomers to a community set by others' rules. Thus their practices and interactions were focused more upon increasing their own understandings through practices both within, and outside of, the CDG in order to complete a difficult job within a short time frame, rather than on setting up or 'designing' a community responsive to and for all its members. These few members (including Pete, Tim and Ann) may therefore be described in terms of having learnt through legitimate peripheral participation within the community and transformed the community in doing so. However to say they were 'enculturated' into the community as the means by which this occurred is difficult to argue.

The material presented in this chapter is discussed further in Chapter Eight, and the usefulness of the notion of a community of practice in terms of the CDG is discussed further in Chapter Nine.

# Chapter Six: 1995 Facilitator Training Group (FTG)

## 6.1 Introduction

This chapter focuses on four participants from the Facilitator Training Group (FTG). (See Chapter Three, Section 3.3 for further description of the participants selected).

### Facilitator Training Group

The FTG comprised of fifteen people who were selected to participate in a national professional development programme. The programme was part of a Ministry of Education contract awarded to the Centre for Science, Mathematics and Technology Education Research, at the University of Waikato. As outlined earlier (see Section 1.3), this contract was directed by Dr Alister Jones, and I was employed as the Project Officer.

The stated aim of the programme was to train a group of fifteen people as technology education facilitators, to a standard from which they could work effectively in any school setting and carry out school based and individual teacher development. The programme was developed to aid the implementation of technology education as a new learning area in New Zealand. The programme was based on a model developed from the Learning in Technology Education Project (LITE) (Jones, Mather, and Carr, 1994). The key aspects of the model employed in this programme focused on the importance of the facilitators developing:

- a robust concept of technology and technology education in keeping with the national technology curriculum statement;
- their own technological knowledge in a number of technological areas - including those outlined in the national technology curriculum statement;
- their own technological skills in a number of technological areas - including those outlined in the national technology curriculum statement;
- an understanding of technological practice in a variety of contexts;
- an understanding of the way in which people's past experiences both within and outside of education, impact on their conceptualisation of key principles in technology education;
- an understanding of the way in which technology education can become a part of the school and classroom curriculum. This must be based on a sound pedagogical base in keeping with the concept of technology education as supported by the national technology curriculum statement.

The programme also acknowledged the strengths of an ongoing school based model of teacher development, and the importance of facilitators developing appropriate facilitation skills appropriate for technology education.

The FTG members were selected from applications received in response to a national advertisement placed in the New Zealand Education Gazette. Criteria for selection included national representation, eligibility to enroll in graduate courses, teaching experience, interest/understanding of technology as a learning area, and personal attributes indicative of effective facilitator potential, for example good communicative skills. Another group of facilitators was selected for a similar programme the following year, however, data in this thesis focuses on the 1995 group only.

The Director of the contract brought the FTG into existence. All of the members were involved in education at some level in New Zealand, and thus the group can be thought of as being located within the institution of education. However being a part of a Ministry of Education contract, as with the CDG, the educational politics discourse was a strong influencing factor. Whilst many of the members of this group still remain in close contact with one another, and are involved in similar activities, the specific nature of the membership and practices is quite different to that which existed during the training programme. Therefore the FTG will be viewed at this stage of the analysis as no longer being in existence.

In the following sections, data from the four research participants selected from the FTG is presented, as discussed in Section 3.5.

Each of the following four sections is focused on a specific participant's interview transcript. Section 6.2: Ken, Section 6.3: Sally, Section 6.4: Leah, and Section 6.5: Dianne. The data used is that taken from the interview transcripts F, G, H, and I respectively. The 'story' for each participant provides the documentation of their reflections on what it was to be a member of the FTG. The 'story' is structured around the category labels given in Section 3.5 – Step 1. After each 'story' has been presented, the participants are further described as explained in Section 3.5 – Step 2.

As discussed in Section 1.5 and reiterated in Section 3.5, and Section 4.1, the initial component of each section focuses on the participants' voice with my own analysis becoming progressively more dominant in the participant description, and on into Chapters Seven and Eight. Section 6.6 provides a brief summary.

## 6.2 Ken – Member of the 1995 Facilitator Training Group

As outlined in Section 3.3, Ken has a background in secondary school science education. Originally from Scotland, he attained a chemical engineering degree in 1971, and a Diploma in Teaching in 1973. He came to New Zealand to teach in 1976.

### Ken's Story

#### Description of the group

Ken describes the central fifteen members of this group in positive terms, recognising the wealth of experience and enthusiasm they had between them with regard to education generally. He comments that although the group's understanding of technology education was limited, they perceived it in a very positive light.

*The fifteen 'selected' teachers were a disparate group of competent, experienced and enthusiastic educationalists, across all levels of the school system... some with a history of classroom innovation, some experienced professional leaders within existing subject areas... but all with a realisation of the potential benefits which the technology education curriculum could bring to the classroom.... but I think all of us were equally unsure about the exact nature of technology education.*

F:1

He also perceived that other people involved in the programme could be thought of as part of the group, and commented that many of these people still work together in some way.

*However I think you could also add into the group not just You and Tim but all the mentors who were brought in at some stage to provide an 'input' to the training process. All of these people would have been changed in some way by the interaction involved and should be considered as part of the 'group'... Officially as a group we were in existence for one school year... but I am still in regular contact with nine of the 14 other teachers and a considerable number of the 'others'.*

F:1

### **Basis of personal selection**

Ken perceived he was selected to be a member of this group because of his prior professional experience and qualifications, and his political background in, and commitment to, the area of professional support networks for teacher.

*I had met and worked with Tim before... he was aware of my teaching background and professional experience and saw this as being potentially useful in future 'developments'. My degree qualification was in the Engineering field and while working with BP in Scotland had taken part in their 'link' scheme with schools.*

**F:2**

*I have a passionate belief in the importance of developing strong professional support networks and had been active in the New Zealand Science Teachers Association for a number of years including a spell as national President, then as Executive Officer. Tim had a clear understanding of the importance of developing a network to support Technology Education and, at an early stage, had seen the need to involve people with skills and experience in this area...They weren't exactly thick on the ground and I would have fitted the bill in part.*

**F:3**

He also saw his extensive experience in secondary school science teaching, which included linking in with community groups, and incorporating 'technology' modules, as being an important strength he brought to the group.

*I saw potential for me to add an 'experienced' secondary science perspective in group discussion. There were areas of technological practice in which I had practical experience and I contributed this experience where relevant. When I came across to teach in New Zealand I promoted the benefits of this type of contact between school science courses and 'industry'. I brought CREST into a school I taught at, developed a sixth form certificate course in 'Technology' in the mid 1980's and introduced 'Technology' modules into the Form 3 and 4 science programmes.*

**F:2**

Ken's realisation of the importance of his networking background to his inclusion in this group developed as the year went on.

*At the time of signing up for the facilitator training I didn't rate this 'networking' experience as a contributing factor to my inclusion in the programme, I saw my teaching experience as being more critical... but as the year progressed and I was made more aware of the developing need, I was 'encouraged' by Tim to adjust my goals and take a more active involvement in the networking process.*

**F:3**

### **Purpose of the group**

Ken originally perceived the purpose of the group to be in terms of providing opportunities for each group member's own professional development, and therefore, gains for their own schools. On reflection however he views the purpose of the group was much wider than this, and sees it as having served to provide a nationally coherent network of professional development expertise. He saw this purpose as having been a key part of the overall plan for technology education.

*Originally I viewed things more from an individual and 'own school' perspective...looking to the programme to benefit me as a teacher and advantage my school in implementing the new area for the benefit of our group of students. The make-up of the group didn't strike me initially as being all that significant. I now look at the group and the training process more globally and with an understanding of the underlying strategic goals. The 'training' process provided a strict 'work out' for the nature of the curriculum statement and the school based curriculum development model - and the individuals involved 'seeded' the ongoing professional development process in a way which has been crucial in establishing a measure of national uniformity' in the PD process.*

**F:1**

*I think that the development of the group was seen as a key part of the national implementation process by the personnel within the Ministry at that stage...and that this development followed on logically from the policy papers.*

**F:2**

## **Group interactions**

Ken describes the interactions of the group members as 'very positive'. His comments suggest he felt all of the central group members communicated in an equitable and supportive fashion and many of the networks set up during this time are still in existence.

*I would describe the interactions of the group as very positive.... not much breaking into cliques... everyone was prepared to be fairly frank in discussions... very little discord... we enjoyed each others company socially. My own interactions were fairly reserved... but I was happy to fit in and contribute as required.*

**F:4**

*The fact that the group stayed together to the end of the year and that most, if not all, are still communicating with the directors and each other.... and playing a leadership role in the on-going implementation process, must be of encouragement to those who set the goals.*

**F:2**

## **Role in the group/Impact on the group**

Ken felt he personally played an active role in the group environment as a whole.

*...I feel that there was a definite climate of mutual support and that I was able to play my part in this area. I also feel that I provided a perspective that was sufficiently different to enhance group discussion and group activities.*

**F:2**

However, his comments reflect that although the group of trainee facilitators were supported and valued as professionals, they did not influence the overall direction of the group's practices and goals. Instead he saw that the people who developed and controlled the programme determined these.

*Professional experience was recognised and valued... and individual contributions were encouraged all through the process... but it was clearly driven by both Tim and You... at no stage did I feel that the original goals were being hijacked , or even significantly 'modified' by the group.*

**F:2**

Ken perceived that his own role within the group changed as he became more confident of his membership, and more aware of the larger purpose of the group and his potential ongoing role in the future. Initially he played a low key role - essentially using his membership in the group for his own development. He continued to learn from the group, but as opportunities arose he took on a more supportive role in the group interactions.

*However I was certainly in the initial stages, very unsure of my theoretical background and reluctant to 'stick my neck out'. I adopted a role of listening carefully to individual stances and clarifying any issues on a one-to-one or small group basis to effectively use the group interaction to enhance my ability to achieve personal and institutional goals. This didn't really change... I became more confident and willing to contribute as the year progressed, particularly as the differences being experienced in the school based development began to surface. In particular I found I was able to be of more support to the other secondary teachers.*

**F:2**

*I felt I was supportive of others when it was helpful - willing to listen and offer the benefit of personal experience... and also willing to accommodate aspects of the programme which didn't suit my learning style...*

**F:3**

He considered he provided a level of leadership in some areas - particularly leading by example, and attempting to support people through often difficult times during the initial demands of the masters course.

*I found the constant format of chunks of readings followed by what seemed to be pretty much unstructured discussion, difficult to adjust to. I know that some others were equally uncomfortable and I would have appreciated a bit of variety in the way the material was presented... but this appears to be the 'academic way'... and was one of the major adjustments which had to be quickly made. I don't think I was able to make it as quickly as most!! I'm sure that not being negative and backing away from adding any weight to other expressions of negativity had some sort of positive influence on the group. The nature of the programme meant that those involved were continually being taken out of their comfort zone - sometimes frustrations would bubble to the surface.*

**F:3**

His comments suggest that he perceived his moderating role was important to the overall aims of the programme, and thus he became a central part of what happened in the group.

*If a 'critical mass' had been allowed to develop relatively small issues could have been potentially damaging to the major goals of the programme. This type of problem quickly surfaced at the summer school but I believe the experience of one or two of the 'older' members of the group helped to put some of the issues which inevitably arose into perspective and help others to take the time to work around the perceived problems.*

**F:3**

### **Group impact on participant**

Ken considers that being a part of this group has had a significant effect on him both personally and professionally. He feels he has developed confidence in his academic and teaching ability.

*I'd say it was the most professionally challenging and rewarding interaction I'd had in my teaching career and one which will have the longest lasting range of benefits. Being a part of this group has had a considerable influence on me. The willingness of others to admit to feelings of inadequacy in theoretical activity helped to get me over the huge academic hurdle. It was a long time since I had done this type of paper and I found that it was really challenging my effectiveness as a classroom teacher. My background, particularly in learning theory, was distant and on reflection woefully inadequate and I had to absorb a lot of new material... try to make sense of it in terms of my body of classroom experience... and then be prepared to discuss issues in open forum - a fairly challenging and potentially threatening experience. I found the opportunity to talk informally one-to-one or in small groups outside the formal tutorials invaluable in that I found that others were facing a similar challenge and that we could help each other to come to terms with difficulties being encountered.*

**F:4**

He also considered it enabled him to provide professional development support in technology education, in a wide range of situations.

*Fitting my personal experience into the whole J1 - F7 continuum was also an invaluable experience and one that has enhanced my PD facilitation skills immensely. Being able to 'foot it' with some pretty sharp operators was good for the confidence.*

**F:4**

*Originally I considered that not having what I considered to be true technology education in the curriculum was a serious deficiency ... but this was at a secondary level... I hadn't even thought about the situation further down the school system before I was part of this group. My perception of technology education covered the existing three strands... but there wasn't enough of an understanding about the integration of the three in classroom programmes.*

**F:6**

*My view of technology before becoming a member of this group was a bit broader than the average teacher... but still coming very much from an applied science angle!! This changed very definitely during the time I was part of this group...it broadened out considerably...enough to comfortably accept the curriculum definition. Definitions don't concern me too much... and I think it's becoming less of an issue in the PD work... people seem comfortable with a broader view and that's usually enough to start working productively on the concepts of technology education.*

**F:6**

### **Influences on technology education**

Ken considers there have been many groups who have influenced technology education to date. He suggests groups who have been involved in providing professional development as part of Ministry of Education contracts have had a major influence in how technology is being implemented.

*There are lots of groups that have had an influence on the way technology education is developing in classrooms around the country. Contract facilitators have had a big part to play in this first stage... advisory services have put their two pennyworth's in... College of Education lecturers have had a captive audience.*

**F:7**

He perceives the Ministry of Education has had a significant influence on the development, both positively and negatively.

*The personalities within the Ministry have been particularly important... and this has influenced developments in both a positive and negative manner. It has been important that technology education has been championed from within the Ministry. This has happened and these 'champions' have been able to move things along very quickly and in a way that has been quite different from other traditional learning areas.*

**F:7**

*I believe that the positive influence of the individuals concerned deserves to be recognised. However this type of hands-on involvement can be a two-edged sword and can equally well hold things back when we should be capitalising on gains and moving forward.*

**F:7**

Whilst recognising there were times when outcomes were positive, his comments reflect an unease with the way in which personalities of people in power within the Ministry of Education have been allowed impact on the speed and direction of development, often for reasons outside of the central issues concerning technology education.

*From an external perspective I've got to say that it looks like a 'control' issue...with individuals reluctant to give up a position of power...or trying to establish a position of relative power. The mechanisms to promote resource production and to deliver effective on-going professional development to teachers are being caught up in this power play.*

**F:7**

Another area of influence Ken mentions is that of possible producers of curriculum support materials. He discusses problems associated with such production and suggests that collaboration between interested parties will be essential in order for this influence to be positive.

*Some resource producers have begun to target this new area, but generally things are moving pretty slowly at this stage. Partly because of the political uncertainty - partly because the commercial resource providers are aware that 'technology' is different to other areas and they are reluctant to take a risk... they may even be unsure about exactly what is required anyway.*

**F:9**

*The small size of the market is always a disadvantage...and they probably see little likelihood of extending the market with international spin-offs. This may be helped by working with established international providers to 'modify' existing resources for our classroom environment - a slow steady 'safe' process. Maybe collaborating with the technology community to produce targeted resources reflecting New Zealand's community of practice. This could be a by way of major projects along the lines of the FIBEC resource...or smaller scale 'Alpha' - type material. Educationally, we've got quality people already involved at all levels... but we need to attract a few 'champions' from within the technology community. At top tertiary level and from 'industry' - these are the people with the contacts to attract the necessary funding.*

**F:9**

## **Comments on technology education**

Ken is critical of the lack of communication between these groups and sees this as having had a detrimental effect on the area's development. He also suggests other groups have not taken the opportunity to become involved.

*However, even when these three groups have been operating within the same establishment there has been little evidence of open lines of communication and uniformity of message in a particular region. All three groups are working in the same area - technology education... but that's where the similarity usually ends!! Academic background and professional experience tends to be different in each area...priorities are different... their ability to carry out the job which is expected of them is often different. Because they are working in the same area professional jealousies often intrude. There are usually few natural in-built lines of communication - so if they are to exist someone has to go out of their way to set them up... a process which takes time and effort and the motives of the person taking the initiative can sometimes be misinterpreted. This lack of effective on-going communication means that when the inevitable 'divisions' occur their effect is compounded. Hence someone looking in from the outside sees chaos, division and very mixed messages.*

**F:7**

*Tertiary institutions with the exception of Waikato and Massey have been conspicuous by their absence of active involvement at this early stage...*

**F:8**

Ken's comments regarding the state of technology education in New Zealand show a number of concerns he has with recent developments, or lack of development in the area. He links this to wider educational issues and suggests that what is needed is collaboration between interested parties. He sees the TENZ association, of which he is national coordinator, as an important player in dealing with these issues.

*The new curriculum framework had almost universal support from the wider community when it was established but its implementation has been put under some threat recently. This together with the fact that senior qualifications are back in the melting pot again points to the need for coordinated action from strong professional support groups...the establishment of TENZ may prove the catalyst to promote this collaboration.*

**F:5**

Ken sees distinctive difference between primary and secondary sectors in their response to technology education, and reiterates the need for a consistent message across sectors.

*Experience within the PD programme has shown the relevance of technology education in the curriculum from J1 upwards. The speed of pick up by the primary teachers has been particularly encouraging and this will have major implications for their less enthusiastic secondary counterparts. The view of technology education that contract facilitators are projecting and which classroom teachers are absorbing is nowhere near uniform... but is moving a good way towards a common shared perception of what is involved meeting this requirement will only come from coordinated contact at a national level. From a personal point of view... I'm looking at the pragmatic requirements of the classroom and am happy to accommodate 'interim' perspectives ...but with a realisation that we must work towards moving them onto a model that relates more closely to technological practice.*

**F:6**

He recognises the difficulties associated with a new association such as TENZ - including the reactions of other groups, and sees the need for skilled handling.

*Attitudes of other subject associations have been interesting up to now....and this will begin to assume even more significance as things develop over the next year or so. Any attempt to attract teachers into a new support network will obviously be viewed with suspicion by the existing professional support groups, most of which have firmly established 'territory' and see a new group as a potential threat to this territory. Some have quickly moved to form an accommodation with the new learning area - and some have ignored it all together. Distinctly different reactions, but I think both are deliberate defense mechanisms.*

**F:8**

### **Present and future directions**

He views his past experiences and contacts as important in his ability to handle this situation, and identifies other organisations which are supportive of his future work directions.

*It has made it easier for me to make the initial connection, which have been immensely helpful in the formative stages of TENZ.*

**F:8**

*I am experienced in the workings of the bureaucracy and am very aware of the nature of the minefield in which we are now treading!!*

**F:8**

*... some related organisations such as RSNZ and IPENZ have seen the political opportunities and have started to make a play for the high ground. Technology education doesn't have a natural 'professional' parent body, like Science Education for example, which naturally comes under the umbrella of RSNZ. IPENZ could take on this role but it has been the traditional support network for professional engineers and hasn't really worked out its position in relation to the wider group of 'technologists'. There is a real opportunity here, but despite its willingness, the organisation hasn't really shown the ability to respond appropriately. RSNZ is undergoing structural changes and is looking to extend its influence in the 'Technology' area. This is being supported by the Government, through MoRST.*

**F:8**

*However the culture of the place is slow to pick up on the need for change and there is a strong measure of resistance from traditional 'science' groups towards any moves to open the doors to 'technology'. Despite active encouragement from the administration of RSNZ, which has been quick to see the political advantages of Science, Maths and Technology education groups coming under its umbrella, it cannot be denied that Technology Education is caught in this climate of suspicion..... and TENZ will have to be alert to the potential dangers if it moves to go down this affiliation track.*

**F:8**

Presently Ken is involved in technology education in a full time capacity. He is still facilitating in schools directly, and provides support for others to do the same within his own region.

*I'm still facilitating the implementation process in my four original schools. I'm collaborating with the City Business Development Board to co-ordinate a regional Technology Education Network. In the first year I established a broadly representative implementation group in my own school. This group has continued to function in the two years since its formation and the enthusiasm within the group is developing as their confidence grows. I've remained a part of the group and am still viewed as a major driving force by most of the members of the group. The other schools have taken more responsibility for their own development and my role has been more of a mentor..... a sounding board as ideas come forward from the group... and a gatherer of information which will help the group to make the most appropriate decision.*

**F:4**

As stated earlier, Ken is also working nationally to provide leadership and vision in the area of technology education generally through developing and maintaining formal networks.

*I am also National coordinator of Technology Education New Zealand. The national coordinator role is one that is developing...almost daily....as the implementation process proceeds. Coordination occurs at three levels - National, Regional and Locally. On a National level - you've got to liaise effectively with the big players.... Ministry of Education, MoRST and other Ministries as appropriate...RSNZ, IPENZ .....Universities, Polytechs, ITOs etc .....NZQA, ERO...existing subject professional associations to quickly establish a national profile.*

**F:5**

*At a regional level the task has been to try and 'seed' the development of a regional support structure through regional coordinators. My role here is to keep these people informed on what's going on in other regions and to help them where possible start the process of developing a measure of regional coordination. At a local level things are happening...but they are not often publicised. I've tried to identify local support models and promote them to others. I have worked in my region to set up one of these models. I've also got to liaise with individuals... and my Email address and fax numbers are quickly becoming a help line for people... my task being to flick them on to others who can help with the particular problem.*

**F:5**

Ken has a very high level of commitment to establishing a 'national identity' for technology education, and sees this as crucial for its survival in the future.

*The major goal is to try and establish a national identity...and given the regional nature of most educational activity, this is always a difficult task! I got involved in this area because I believe that if we do not have an effective national support network in place....and in a very short time frame...Technology Education will not develop in a way which retains the integrity of the original vision.. Instead it will quickly fragment and its potential to enhance the curriculum will never be realised.*

**F:5**

This commitment is reflected in his perception of his possible future roles in the area. He acknowledges the uncertainty surrounding technology education in New Zealand at the moment, but his comments reflect that he sees himself working in the area whether it is at a national level or in the classroom.

*It is difficult to predict my role in technology education in the future because the future for technology education is so uncertain... who knows how things will move on from here....and there's always the challenge of getting back to the classroom and showing that it can work!!*

**F:6**

## Ken's Description

The material presented above provided the basis for a description of Ken as a FTG member, using the descriptors presented in Section 3.5 - Step 2.

### Level of Participation in the FTG

Initially Ken's participation as a member of this group can be described as being minimal, however he soon became more involved in group interactions and began to see himself in an important supportive and moderating role, that is participating at a medium level. This in turn led him into becoming a more central person in the group's functioning. This high level of participation then developed into him operating as a mutually constituting member of this group, to the extent in which the fifteen facilitators had some level of determination. This level of determination was limited due to the overall structure and direction being controlled by the programme developers. Therefore Ken's ability to influence the practices of the group were limited to the way in which the group responded to the situations in which they were placed.

### Ken's Habitus

The dispositions of relevance to Ken's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Generous with his time	Provided encouragement and support for those around him.
Conciliatory	Put the well-being of the group ahead of his personal concerns in order to encourage and support harmony.
Politically astute	Recognises the importance of the political, and develops strategies accordingly.
Values past experience	Recognises the importance of, and places significant value on, practical experience.

## Levels of Capital

Five forms of capital were identified as important within the FTG – see Section 3.5. Ken is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Ken's perception of his level of capital.

Form of Capital	Level
Educational	Low/medium
Cultural (classroom experience)	High
Symbolic	Medium
Political	High
Linguistic	Medium

## Past/Present and Future Roles in Technology Education

The following is a summary of the specific roles Ken perceived he had in the group, as well as his present and future roles in technology education generally.

Role in group:	Develop his own expertise in the area of technology education generally, and professional development specifically. Provide support and guidance for other group members.
Present role:	Provides national leadership through TENZ. Provides professional development support at a local, regional, and national level.
Future role:	Continue to provide network support and leadership. Maybe move into the area of classroom implementation.

## Activity/ies resulting from the Overall Purpose/s of the FTG

Ken viewed the purpose of the group resulted in the following activities:

- provision of personal professional development opportunities;
- provision of professional development opportunities for specific schools;
- development of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development.

### **6.3 Sally – Member of the 1995 Facilitator Training Group**

As outlined in Section 3.3, Sally was a fulltime adviser with a College of Education prior to and during the training programme. Sally had recently worked as an advisor in science education, and had been involved in exploring biotechnology. She was also a member of the biotechnology technological area subgroup of the CWG.

#### **Sally's Story**

##### **Description of the group**

Sally describes the central fifteen members of this group as a mixed group of people who came from different technological area backgrounds, different levels of educational practice and provided for a national coverage.

*This group was a mixture of primary, intermediate and secondary teachers and one Adviser, with backgrounds in different technological areas who came from all over New Zealand. It seemed to me that people had been selected to cover the seven technological areas. I think there was also a spread of people from primary, intermediate and secondary backgrounds.*

**G:1**

Whilst acknowledging the original group is no longer in existence - she perceives that for some members there is still a continuation.

*It was in existence from January 1995 to December 1995, although it is partly in existence today although not with all of the original members.*

**G:1**

##### **Basis of personal selection**

Sally perceived she was selected to be a member of this group primarily because of her prior involvement in the technology education, specifically through the area of biotechnology.

*I think I was selected to be a part of this group most probably because of my involvement with Biotechnology - being on the writing party for Biotechnology and the exploratory studies. And possibly because I had already started to develop quite a good understanding of technology and technology education.*

**G:2**

She also felt that her general disposition to educational change was a factor in her selection.

*Hopefully because I was open minded and positive about the curriculum and the direction it could go. I think it is an important trait for a change agent to have - and I think I am like that.*

**G:2**

She felt her general experience in facilitation may also have been a factor but was less sure of this.

*I may have been selected because of my expertise in this area possibly, but it didn't appear to be recognised.*

**G:2**

### **Purpose of the group**

Sally originally perceived the purpose of the group to be in terms of providing a pool of people able to competently facilitate teacher development in technology education across a number of technological areas.

*At the time I saw the purpose of the group as being to develop expertise in facilitating Technology in the New Zealand Curriculum by developing a clear understanding of technology and technology education, understanding the curriculum and how to implement it, and start to develop expertise in more than one technological area.*

**G:1**

Looking back she now considers that providing for national consistency was also an important purpose. She considers the group achieved both of these purposes.

*On reflection I see it was as above, but also to develop networks throughout New Zealand of people who had a similar philosophy about the curriculum and its implementation. I was aware about the national links from the beginning - it was pretty obvious to me. It was important for networking for the future, which has proven to be correct. Also for a similar message to be given by people throughout New Zealand. Makes people work together rather than against each other. I felt that we achieved these goals.*

**G:1**

### **Group interactions**

Sally describes the interactions of the group as positive overall, and as resulting in an ongoing mutual support network.

*The group interactions were very positive - especially with those who lived in together. I felt I got on really well with all people in the group (bar one). Because of the rapport developed I feel comfortable about ringing up any one of them at any time. I am sure the rapport developed because we were living and working together, you get to know people very well under those circumstances. I think it was important as it helped to develop national links. It was also important for each person so that they could develop in confidence to take on the role of facilitator.*

**G:3**

### **Role in the group**

She feels the Ministry of Education personnel and the contractors determined the purposes of the group, and felt this was appropriate. She felt that how the group functioned was determined by the group itself in consultation with the contractors.

*I feel that Tim, and you, and some people from the Ministry determined these purposes. I didn't have a problem with this as I agreed with the thinking behind it. Ministry involvement gave status to the whole process. Tim, you and the people within the group all worked to determine what happened.*

**G:1**

Sally perceived her role in the group to be that of a fully participating member, with which she was very comfortable.

*I would describe my role within the group as a group member... a learner, developing and sharing understanding. I feel comfortable that I accomplished this role.*

**G:2**

*I really enjoyed being in the role of the learner.... felt humble at the extent of expertise within the group.*

**G:3**

### **Impact on the group**

On some occasions however, Sally felt that her own expectations and those of the group were not being met by the programme.

*People wanted me to share with them how to facilitate but I did not see that as my role although I had expertise but felt that that should have been organised by Tim and you. I didn't really feel uneasy about taking a more active role in sharing ideas on facilitation, but when I mentioned it to Tim and you, I was told to back off and not make any suggestions to people about how to facilitate in their schools and possible strategies to use. I felt this should have been a more formal part of the training. People need to be given some basics on how to facilitate. The 'facilitators' told me they were feeling inadequate about working with people on their staff and that would have given them more confidence.*

**G:2**

Sally considered she did, however, provide the group some of the benefits of her past experiences in teacher professional development - although this was in an informal manner.

*I felt I had an impact on this group through the sharing of my own expertise - especially facilitating and working with teachers. I discussed this mainly on a one to one basis.*

**G:3**

### **Group impact on the participant**

Sally also considered that this sharing was mutual with other group members providing her with alternative experiences to work from.

*There were other areas where I benefited from others' past experiences and expertise. For example; I discussed intermediate food and manual issues, materials and graphics and design, secondary issues, and biotechnology issues with other group members as appropriate. The main reason why I discussed these issues was to do with the work that I was doing with schools and developing my own knowledge so that I could respond to questions more confidently.*

**G:2**

Sally also perceived that her membership in the group allowed for the further development of her own concepts of both technology and technology education.

*Before I was a member of this group I already had a good idea of technology through my work on exploratory studies but it was mixed up with technology education. I wrote 'identifying a need or opportunity and developing a product or system to meet that need or opportunity. This involves people and society, historical influences, knowledge of developing the product or system and problem solving' in my personal reflective diary at the beginning of the year. Basically during the programme I built on what I previously knew and extended it. The main area that I was interested in was how history can develop your understanding of technology - looking at the past present and future. For example I wrote 'In understanding the history of technology and its development you can then appreciate and understand it more and value it.*

**G:3**

*I had most difficulty with developing a definition for technology education before the year... I wrote ' Technology education emphasises strong links between what is happening in the classroom and industry and uses contexts that are relevant to the students. I would hope technology education would develop in students the skills necessary for them to contribute successfully to the 21st century workforce and society. Technology education crosses all curriculum areas and uses the essential skills.' This continued to be hard for me... I think I saw technology education as teaching what the definition of technology was... Now however I see it as definitely developing technologically literate people - those who have the knowledge, capability and understanding of society to make informed choices.*

**G:4**

### **Influences on technology education/Comments on technology education**

Sally felt the Ministry of Education has had, and will continue to have, an important role in this area of development. She also saw the 1995 facilitator group as influential in the development of technology education, both in general terms and in terms of what was in the curriculum. However, she felt that much of what happened was determined for political reasons, or by Tim and myself, and she felt her input in these areas was minimal.

*I think the Ministry and Minister have the most important role in the direction tech goes in New Zealand. They are the ones who make the decisions and can make it legal.*

**G:4**

*I guess the group was used as a springboard for ideas and to consult about what might happen in the future. The Ministry and Tim and you had the final say. When it came to the final document there are things that we suggested that did not happen eg statement saying that any technology unit should include all three strands.*

**G:1**

She also saw all teachers using the curriculum as influencing the development of technology education, as well as education groups and other people in the community.

*People that have influenced technology to date would include all teachers who are teaching technology education, businesses and people outside education who support the curriculum as well as Royal Society,...The Royal Society can help to improve the status of technology and can influence business as well. Teachers - especially the P.P.T.A. at the moment need to endorse this curriculum and the workshop teachers who are reluctant to change.*

**G:4**

The influence of the present lack of legal status continues to impact on the development and Sally views this as reflected in the 'wait and see' attitude of many schools.

*Technology education in New Zealand at this time is - poised. Secondary schools are waiting to see if the curriculum is going to be gazetted before making yet another change that may or may not come to fruition. Intermediate schools have had no change made to specialist positions until the gazetting. Primary schools are starting to put in place programmes so that they can implement. Teachers are extremely enthusiastic it is the legislation that is stopping progress.*

**G:5**

### **Present and future directions**

Presently Sally is very active in technology education but considers that she may have to move out of the area in the future to further her career.

*At present I am Coordinator of TENZ in my region, and am on the steering committee of this. My present job is District Adviser - Technology Education. I was also Convenor of a workshop to introduce the Know How II package, and am Director of a small follow-up contract to support teachers' professional development in technology education. I may have to go more into management instead in order to further my career.*

**G:3**

## Sally's Description

The material presented above provided the basis for a description of Sally as a FTG member, using the descriptors presented in Section 3.5 - Step 2.

### Level of Participation in the FTG

Sally's participation can be described as being of a medium intensity upon entry into this group and quickly moved to a high level early on in the group's existence. That is, she was a mutually constituting member of this group, to the extent in which the fifteen facilitators had some level of determination. This level of determination was limited due to the overall structure and direction being controlled by the programme developers. Therefore Sally's ability to influence the practices of the group were limited to the way in which the group responded to the situations in which they were placed.

### Sally's Habitus

The dispositions of relevance to Sally's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Generous with her time	Provided encouragement and support for those around her.
Open minded	Took on, and enjoyed, the role of learner.
Focus on professional relationships	Recognises, values, and supports the development of professional relationships. Often focuses on individuals within the group.
Values past experience	Recognises the importance of, and places significant value on, practical experience.

### Levels of Capital

Five forms of capital were identified as important within the FTG – see Section 3.5. Sally is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Sally's perception of her level of capital.

<b>Form of Capital</b>	<b>Level</b>
Educational	Medium
Cultural (facilitation experience)	High
Symbolic	Low/medium
Political	Low
Linguistic	Medium

### **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Sally perceived she had in the group, as well as her present and future roles in technology education generally.

- Role in group:        Develop her own expertise in the area of technology education generally, and professional development specifically.  
                               Provide support and guidance for other group members specifically in the area of facilitation/working with teachers.
- Present role:         Provides regional leadership through TENZ.  
                               Provides professional development support at a local, regional and national level.
- Future role:         May move out of the area for career advancement.

### **Activity/ies resulting from the Overall Purpose/s of the FTG**

Sally viewed the purpose of the group resulted in the following activities:

- provision for the development of facilitators competent across a range of technological areas;
- development of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development.

## **6.4 Leah – Member of the 1995 Facilitator Training Group**

As outlined in Section 3.3, Leah was fulltime primary teacher during the training programme and had also done some work in the area of biotechnology. She has an undergraduate degree in science, and had relatively recently retrained as a primary school teacher.

## **Leah's Story**

### **Description of the group**

Leah described other members of this group in positive terms, recognising the wide range of backgrounds they came from. She comments that they had in common leadership and innovative qualities, were very capable and motivated, and supportive.

*The group of teachers was diverse, capable and very supportive. They showed leadership qualities and appeared to be doing innovative things in their classrooms. They were dedicated and very hard working. They appeared to be achievers and set high standards for themselves. I have a lot of admiration for them. It was neat that they all had a variety of strengths and interests. They came from all over the country from a variety of fields and strengths - science, graphics, art, workshop, home economics, intermediate and primary. They were a group to feel humble within.*

**H:1**

### **Basis of personal selection**

Leah considered she was selected to be part of this group because of people she knew, although felt perhaps her science degree may have been a factor also.

*I have no grand ideas that I got in because I had something special, I got in because I happened to know the right people. Few primary teachers have a science degree. The Team Leader for the biotechnology subgroup knew me and worked with Tim, and you knew me.*

**H:9**

### **Purpose of the group**

Leah's view of the purpose of the group was that it was not made clear to her at any stage and consequently this was something that she found difficulty with all year.

*We were never actually told the purpose of our group. I felt I was training to be a facilitator... it didn't take me long to realise I was wrong.*

**H:1**

She concluded her own purpose was that of passing the masters course, and suspects this may have been the case for other group members.

*It took me ages to find out the purpose of what I was struggling to do... that was I decided it was to survive the Masters Paper and then I would be trained.... I don't think anyone enjoyed the masters paper training. We did it. We enjoyed working with others. Many found it beneficial for a variety of reasons. It was a good reflective time. But the paper itself - I'm not sure. I think most people doing the paper did it because they had to. It was a matter of doing it as part of the training. I know it was my sole purpose, and I think it was others' too. It was difficult to do the research and assignments and be full time teaching. I stuck with it because I had to. I don't know if I would if I didn't have to. I may have because it cost so much money but I would have thought carefully because of the toll it took on me, professionally and personally .*

**H:3**

*I was told the masters paper was to give us credence. I accept that it did give me some credence with stroppy principals - mainly Secondary as Primary tend to accept your degree. They wouldn't appreciate the training and yet it was the most valuable part. It wouldn't put letters behind your name.*

**H:3**

However, on reflection she considered the wider purpose of the group, as set by the contractors and the Ministry personnel, was to train the members as facilitators and achieve some level of national consistency through this.

*On reflection, I hope the purpose was to train us as facilitators. National consistency wasn't seen by me as the major reason for the training. I became more aware of the importance of this though nearer the end of the training...I feel the purpose of the group was determined by Tim and the Ministry...*

**H:3**

She felt that national consistency appeared to be the primary purpose of the contractors and the Ministry of Education personnel involved. However, she raises some doubts as to the carrying through of the national consistency purpose by Ministry personnel.

*I think you had that purpose all along though. I would like to believe that the Ministry wanted a unified view of technology and technology education and thus these trained facilitators went out and spread the same message nationally. However, as other contracts were won by people who had not had the training, I am unsure if this is just a nice theory.*

**H:3**

## **Group interactions**

Leah described the interactions of the group as very positive. Beginning as a group of individuals, by the end of the year she feels that most group members had become part of a strong supportive group, and remains so still. The importance of the strong bonds between many of the group members is a recurring theme.

*We met for the first time at summer school 1995. Many people knew or had heard of others but we basically were strangers. Most of us have kept in contact and have such a strong bond that anyone could ring the other and we would do anything for them.*

**H:1**

*It was important that we built up a strong rapport with the others and this definitely happened. We are a group that cares about each other and that is a wonderful achievement. It was the first fifteen who clung to each other to 'survive'. I believe that true friendships are developed when people struggle to achieve a common goal. If they are put under stress they bond much quicker. We supported each other to understand the terms/philosophies etc. We went out in the evenings and talked shop and also built up respect for others' obvious talents. It was spending this time out of class time that built up the relationships. Living together was imperative. The other people who didn't socialise or didn't sleep in the dorms didn't gel as we did. Having to spend so much time together meant we really got to know one another really well. Eating, sleeping, working, partying together was the key.*

**H:4**

*The group realised we needed each other to get through the course and also the following year. For this reason we made time for each other. We were struggling and decided to pool resources. We split readings and had meetings to tell the others what it was all about if there was time the others read that reading if not we had some idea. We covered for each other etc. I think opportunity was given to develop as a team and we made it happen. Those that wanted to become involved did and those that didn't... didn't.*

**H:4**

*People opened up and started confiding in each other about difficulties and when you support some one it actually supports yourself. I remember the first night, going into the toilet block and telling this woman how my room seemed like a cell and how nervous I was about it all.*

**H:6**

Leah felt the social bonding was particularly important in the development of positive group interactions.

*Other people seemed to know each other and how I didn't really know anyone. She was the same and from then on we gelled - that was Julie and from that day we haven't stopped supporting each other and confiding in each other. The people who traveled together in the planes had an advantage also as they had all those hours to sit and bond. It may seem trivial stuff but it's those chats that make a friendship. A friendship that you can ring someone up and say 'have you got any info on....?' The games of ten pin bowls or the movies together or the drinks in the pub were vital. Now I feel I have a lot more to contribute and can offer support to others - all those involved in tech ed., but especially those who were in our group.*

**H:8**

*A couple of people didn't fit in well. I feel sorry for the 1994 people because they never really fitted in. They always came across as if they knew the answers and we were struggling with the questions. Otherwise we got on well, and used each other's strengths. We rang each other or wrote to each other but mainly we were pleased to see each other each time we met. I guess I have basically described the interactions already, that of support and friendship. Initially I was shy and feeling like I was the only one who didn't know what was going on and I was a fake, but later I realised that I wasn't the only one feeling inadequate. I feel like I got on with everyone.*

**H:9**

### **Role in the group**

Leah often felt as though she was at a different level to many of the other group members. Her perception of this did not change throughout the year, but her feelings of being part of the group did. As the year progressed she felt far more comfortable being a part of the group.

*I do feel I was part of the group, I just don't put myself on their level. They all had so much experience and ability. I'm not saying I had none but I wasn't at their level. Look at the others - I am a realist, I have some experience but nowhere near as much to offer as any of them.*

**H:1**

*I think others may have had a better idea of the big picture. They were aware of bizarre things other people were saying. I had only heard about two others ideas in relation to Technology, and by the end I had more confidence to know who was right and wrong.*

**H:3**

*I often felt like the little girl lost. I often felt in awe of the others. They were so capable and had done so much. Possibly because of my age too. I felt a bit of a fraud. Thinking that at some stage someone was going to find out I was really only a fourth year teacher and didn't really know much about all of this. At times I can sound pitiful but that was how I felt. Humble and unsure of myself and where this was all leading to.*

**H:7**

This perception is also reflected in her view of the impact she felt she had on the group being in terms of support and friendship. Although she also felt she provided an important primary perspective, and could have had more input in implementation discussions if the opportunity had arisen.

*My role was to help keep a Primary perspective on things. As I was in a multicultural school with behavioural and special needs children in my class I could add a lot to any discussion on implementation within a Primary school. However we didn't discuss implementation until the very end of the course when the document was out and we were more interested in that issue.*

**H:8**

Leah also raised a number of queries re the contractors' fulfillment of the purpose of training facilitators. There appears to be a mismatch of purpose with the contractors assuming the group already had facilitation skills and therefore training focusing on technology education specifically, where as Leah felt they needed training in facilitation as well, and as it wasn't part of the programme. Leah felt they had to do this themselves 'on the job'. This situation is reflected on numerous occasions throughout the interview.

*We were given a lot of theory. Not everyone was teaching so teaching styles for many couldn't be changed. They may have been able to be reflected on, but out of the classroom - I would question that. I thought we would learn about group dynamics, but we just discussed the importance of aspects of the curriculum. I felt it was as abstract as teachers' College. Lots of theory about the topic but minimal hands on and nothing about what is actually happening in the classrooms or what could happen or what we have done or looking at resources available to help with the teaching.*

**H:1**

*Whilst I agree parts of it were important I guess, it didn't prepare us to be facilitators let alone technology facilitators.*

**H:2**

*Remembering most of us had never run courses before let alone actually know what a facilitator was. I guess I would have liked some training as a facilitator generally in the course. Just like a new teacher, most of my learning was doing it. However it was a matter of sink or swim. I just felt I did most of my learning about facilitating in tech ed. on the job (alone ) not on the course as I had expected.*

**H:2**

*I was lucky I had the support of my regional team I would have hated to be isolated. I really value the release we were given and the expectation of courses to run. I learnt most by running the courses and working with my staff. They taught me the most. They told me what they hated about courses and why things had worked or hadn't eg. if a person seems anti don't face them for the whole course it is demoralising. You come away thinking the course was a disaster, when really that person may have personal problems and is using the time out, to think about it all and doesn't want to be made to think and definitely not pushed out of their comfort zone . So it is important to monitor the general group but face someone who is enthusiastic and positive. Your enthusiasm is infectious, if given time, so you must stay positive and facing a stick in the mud won't achieve this.*

**H:2**

Whilst Leah questioned the 'learning facilitation skills through facilitating' approach, she also saw it as very valuable personally.

*We got the Masters paper and therefore the credence. I feel we were not trained as facilitators but we where given time to trial ideas. We were told about tech ed. but not trained as facilitators. If we were meant to be facilitators before we came why was it facilitator training? I spent a lot of time at school learning what good facilitators do and don't do. I learnt what people like and don't like about courses. They don't like writing on big bits of paper or sitting on the floor or playing icebreaker games. They like to be treated like adults. They want info to use directly in their class as well as info to take back to the staff. They want their work load lessened by going on the course not increased unless they can see a purpose for it. These are a few things I was told and things like don't give out a handout and then read it etc. I didn't know these things...We were meant to be good facilitators... yes in a sense we were people who listened , didn't have one right way, were helpful etc all the things a facilitator needs to be to allow the learning and support the growth of the other person, but there are basic skills in running courses and that can make or break a cluster. Many had these skills many didn't. It would have been a difficult tasks to split the two.*

**H:5**

*Whether it is better to learn on the job is also debatable. I realise you only had so much time and the group's needs were very diverse. Many of the facilitators I worked with did not run courses. I ran a course, refined it and ran another for different teachers and then ran a third for cluster schools and by then I had learnt a lot and knew what worked, what to take to heart and what to ignore etc. ... I learnt a lot from having to spread the word for me this was a very valuable task.*

**H:5**

### **Group impact on the participant**

Leah considers the group had a significant impact on her, developing her confidence both personally and professionally.

*I think it had a huge impact on me. It gave me confidence in who I am and where I am, where I want to go and the fact that I can change my destiny. I knew that if I can survive this, I can survive most challenges. It gave me confidence that I am not totally thick. Having a lot of time away with people who were of similar minds was great too. I guess it started a friendship that has helped me professionally and personally. In chatting, I gained personally, professionally and socially. I made friends, got colleagues who will help me with technology. But those same colleagues also will offer advice and support me in my job and life as I will them.*

**H:9**

*I guess our job was to learn from others to become more confident in ourselves and more capable. Working with such a hand picked lot you couldn't help but grow. I must admit I have grown personally and professionally in the last few years. I don't feel like the little girl lost any more. I relaxed and enjoyed the course more and was able to feel part of the group.*

**H:8**

*There was a hardened core that always went out and I enjoyed being part of that. I guess in that role I was team player. The social parts helped overcome my shyness. We got to talk about the kids, school, houses etc. It all lessened the barriers.*

**H:8**

Many of her facilitative practices were based on her own personal experiences through her membership in the FTG, in particular the strong benefits she found on the development of social interactions as a basis for professional growth.

*It sounds like all the gains are social and personal but this reflects in my profession too. We provide lunch which makes the group feel valued but also gives them time to work as a team. We also give them time to talk and share with each other.*

**H:9**

*I feel I achieved my role. I am a lot more confident person and am more aware that I can take control of situations instead of just being a part of them. I love supporting colleagues and now spend a large part of my time in schools listening to problems before we start the technology. I understand what a facilitator is now - it took a while. I don't go in with answers - I go in with a variety of strategies and they can pick and choose, and mix and match until they come up with something that suits them.*

**H:8**

She felt being a part of this group also enhanced her ability in, and understanding of, technology education.

*I had worked on the biotechnology exploratory studies so had some idea of what Technology entailed. This did change during the year, although not as much as some others. I learnt about other technological areas. I learnt about incorporating the society strand that I hadn't touched on. I learnt the global, political side of it. I learnt more of the theory. I started questioning myself and what technology actually was and that I found very difficult because it was early on and we weren't as supportive at that stage. I remember having great chats about what was and wasn't tech. This was a turning point for me.*

**H:10**

Leah considered the release time that was built into the programme was extremely valuable in terms of allowing time to trial different things, however, it also caused a range of problems for her students and her colleagues.

*Whilst I appreciated the release time that went with the training, I had a difficult class and had already had so much time out I struggled taking time for preparation and it ended up using evenings etc. It wasn't only my class that suffered so did the other teacher in the Syndicate because she didn't have the senior teacher to send her naughty kids to. The whole syndicate had to take up the slack. It sounds a drama but with that class that year it was.*

**H:2**

Leah considers the group, in conjunction with the contractors, determined what actually happened during the year. In particular the contractors were aware of the importance of developing a strong network.

*What happened in the group was determined by Tim, you, and the group itself. You realised it was important to build a group. The accommodation, wine, meals etc. We were treated like someone special.*

**H:4**

She considers that as this was the first year such a programme was run, this group of facilitators served to provide opportunities for growth for all people involved.

*I think our group was part of a learning curve for all involved and so the next group were more focused, however I feel our group was not told where we were going and why. So it is difficult to say whether we achieved our goals as I don't really know what they were. We were often told to read a reading to argue a case but never for a purpose for example, people will come to you and say 'Technology is about using modern tools' - read this reading and argue the case.*

**H:6**

*The political situation was one aspect. I felt that I didn't know the big picture and I guessed you did but I wasn't always sure. I think part of it was teaching style we were learning about a dynamic document and being told how important it was to take part etc and yet we were in a lecture. No one I know has used the same method on their teachers. It was poor modeling and I felt this may have been because it was decided the night before how to run the next day and the easiest way was to get into groups discuss and write it on newsprint. This didn't happen to the same extent in the next group this also shows that things changed. No one really knew what exactly was going to be in the document or would say if they did know, so we were unsure about content and emphasis... that wasn't your fault. You couldn't help us with contracts or tell us a lot in that respect other than encourage us - which you did.*

**H:6**

### **Influences on technology education**

Leah also considered that the curriculum writers and early researchers had an influence on these early stages, but this influence will lessen as technology becomes established in schools.

*The writers of the curriculum initially had a reasonable amount of influence on technology education, although I realise that the Ministry, critics, and Publishers had a large influence also. Writers, hopefully based their text on their findings in the classroom because they had worked with a lot of teachers from a variety of levels and these teachers said what worked and what didn't and why. From this writers were able to add ideas. Often if these ideas were accepted was out of their hands. Once schools have trailed ideas from the curriculum and most schools seemed to have used the units at the back of the curriculum at least once. Once schools have confidence and a basic understanding hopefully they will be able to stand alone and use the curriculum to support their teaching and not tie their teaching to the curriculum. As a summary I guess the writers have less influence now and that influence will continue to decrease as teachers gain confidence. In the ideal world teachers will use the curriculum to support the teaching to their kids needs and not find objectives in the curriculum and make up activities to suit them - thus driven by the curriculum.*

**H:11**

Leah felt this group had, and continues to have, a major influence on the development of technology education in this country, both through working by providing practical feedback to the curriculum developers, and working with schools generally.

*Our group I guess did have much more impact on the development of technology education. As a group we were trialing things. We were actually putting the theory into practice and could say what worked and what didn't, how much importance is needed to be placed on certain areas, difficulties with staff and communities, children's prior knowledge and what they gained. Many of these results were more than just related to Technology. Seeing " difficult children come to life ", seeing how important developing group skills is. Seeing teaching styles changing or being assessed, assessment being questioned. We had to address many issues when we introduced Technology into our schools, These issues that we had to address were the issues the country would be raising in a year or two's time. For this reason we assisted with Tech development. We also assisted be helping teach in the tech areas, what works and doesn't. We were able to give feedback to the writers and to the documents.*

**H:6**

*We also got our school and neighbouring schools further down the track. They started thinking about tech and what it entailed. This may not have meant teaching big units but most schools we worked with moved forward. This benefited them and also other neighbouring schools as the word spreads.*

**H:7**

*When we went through the programme everything was in its infancy. I think our reactions may have challenged the Waikato team to confirm their ideas as we constantly questioned reasons and feasibility etc... Many of the team had other roles in tech ed...*

**H:7**

Leah sees other educational organisations and professional development providers as also influencing the development to date.

*TENZ, other people running courses independently, for good or bad... they have affected Tech Education. HETENZ etc and other organisations that are trying to inform members. At times the message has been confused but if people get all fired up and excited about a topic then maybe that isn't a totally bad thing.*

**H:11**

### **Comments on technology education**

Leah mentioned that the second group of facilitators experienced a different situation and therefore did not have the same opportunities to influence the early stages of technology development as the final curriculum had been released.

*I think the next group were much more focussed. The next group seemed to take things a bit more lightly. That may have been because they knew where they were heading. They were working with the final document and they had jobs. They had the big picture. In this way the pressure was off. If they failed the paper it wasn't a big deal if we did we felt we had let people down, and lessened our chance of a job.*

**H:7**

Leah 's perception of technology education in New Zealand at present is that it is developing well.

*Technology education in New Zealand at this time is progressing well. The teachers this year as a whole are much further down the track than last year's teachers. Principals still have a way to go however. Schools need development in the Technological Areas now but generally are coming to grips with it well.*

**H:11**

## **Present and future directions**

Leah's present role in technology education is as a facilitator of professional development. She feels she is achieving well in this role, and would like to remain doing this in the future.

*Presently I am a facilitator within schools. They are keen to interact but have no time or energy. I believe I have had an impact on them. Not directly, but by challenging their systems and empowering staff with a little confidence. I believe that there is too much rubbish preventing the teachers from teaching... I give them time to talk and then they achieve something to lighten their load in work time. Some quiet teachers now are applying for senior teacher jobs or taking leadership roles due to an increase in self-confidence etc. I have challenged some teachers' teaching styles and a lot have made great steps forward if only in the area of teaching technology. I felt useful and valued. I have felt like I have made a difference to some teachers, and schools. Hopefully I have been a supportive body. Many of last year's schools ring up for chats. I would love to continue with this in the future although this year's model does need to change as I don't feel I am catering for the schools well enough.*

**H:10**

## **Leah's Description**

The material presented above provided the basis for a description of Leah as a FTG member, using the descriptors presented in Section 3.5 - Step 2.

### **Level of Participation in the FTG**

Leah's initial participation can be described as being of a minimal level. However, as she became more involved in group social interactions, she became more comfortable in terms of her membership. At this stage her level of participation can be described as being at a medium level. At no point during her membership to she interact as a full member in terms of determining the 'professional' practices of the group. However she can be described as being central to many of the 'social' practices of the group.

### Leah's Habitus

The dispositions of relevance to Leah's membership in this group, and their subsequent effect are given below:

Disposition	Effect
Generous with her time	Provided encouragement and support for those around her.
Professionally insecure	Perceived she had little to offer the group professionally.
Critically reflective	Openly critiques both her own and others' actions.
Focus on interpersonal relationships	Recognises, values, and supports the development of strong personal relationships. Often focuses on individuals within the group.
Distrustful of academic position.	Felt uncomfortable with the extensive theoretical demands and placed little value on theoretical component of training.

### Levels of Capital

Five forms of capital were identified as important within the FTG – see Section 3.5. Leah is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Leah's perception of her level of capital.

Form of Capital	Level
Educational	Medium
Cultural (past relevant experience)	Low
Symbolic	Low
Political	Low
Linguistic	Low

### **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Leah perceived she had in the group, as well as her present and future roles in technology education generally.

Role in group:	Develop her own expertise in facilitation generally and in the area of technology education specifically. Provide support and friendship for other group members. Provide a primary school perspective - especially in terms of implementation.
Present role:	Provides professional development support at a local level.
Future role:	Unsure of future job possibilities in the area.

### **Activity/ies resulting from the Overall Purpose/s of the FTG**

Leah viewed the purpose of the group resulted in the following activities:

- pass the Masters course;
- provision for the development of facilitators competent across a range of technological areas;
- development of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development.

## **6.5 Dianne – Member of the 1995 Facilitator Training Group**

As outlined in Section 3.3, Dianne was a specialist home economics and textiles teacher at an intermediate school prior to and during the training programme. She was an active member of HETANZ, and had been following the political debates over the future of specialist teachers closely.

### **Dianne's Story**

#### **Description of the group**

Dianne considered that the 1995 facilitator training group was still in existence, and describes it in terms of the strong bonds that were formed amongst most of the members.

*The facilitator training group, of which I was a part, is very difficult to describe to people who weren't a part of this group. We spent a great deal of time together during 1995 and a real bond was established among many of us...I feel this group still exists.*

**I:1**

### **Basis of personal selection**

She considered she was selected to be a part of this group due to her prior interest in technology education, her specialist subject background, and regional location.

*I was selected to be a part of this group because my application to be accepted as a part of the facilitator programme showed that I had a keen interest in technology education and was supported by my Principal and Board of Trustees. In addition they needed to have a facilitator from the Hawkes Bay area and being a 'specialist' teacher from an Intermediate school I also provided a school and subject representative.*

**I:4**

### **Purpose of the group**

Dianne perceived the purpose of the group to be that of providing people across New Zealand, and across a range of subject backgrounds, who held and could articulate, a common understanding of technology education.

*In my opinion we were trained to be 'disciples' as it were. There were so many diverse opinions about what was technology education it was essential that a group was trained that projected technology education with a common understanding and philosophy. With such a lot of adverse and controversial material bombarding us from overseas it was important that the New Zealand Curriculum be projected as having different and better features to that of the United Kingdom Curriculum, in particular. The research indicated the diverse opinions held by teachers of what technology education could be. It also indicated that making changes would be difficult if training and professional development didn't take account of teacher's existing subject subcultures. The group was selected to represent not only regional districts within NZ but also a variety of teaching backgrounds.*

**I:2**

She perceived the contractors determined this purpose, and felt that it was soundly based on research.

*The writers of the curriculum at the Centre for Mathematics and Science research at Waikato University determined the purpose of the group. Their research indicated professional development would have to be undertaken across all sectors of the teaching profession and they were obviously successful in convincing the Ministry of Education that their money would be well spent in training suitable facilitators to lead teacher development programmes. The programme was based on the best educational research available at the time and the experiences and findings from both the Learning in Science Project (LISP) and the Learning in Technology Education Project (LITE).*

**I:3**

On reflection, she is confident that the goals derived from this purpose were achieved.

*I feel we achieved our goals. The ground work was well laid and already a chain reaction has been set in motion. Two years later I can now say without any doubt what-so-ever that the goals were achieved. There were times when I had doubts about the constructivist approach but those fears have proved baseless. In fact, I now know I would never have achieved the personal growth that I have had with a more traditional approach to learning.*

**I:3**

### **Group interactions**

Dianne described the formation of strong bonds between members and considers this has led to the ongoing nature of support. She considered the interactions were, and continue to be, positive and professionally valuable.

*Even though we have gone off in different directions when we get together the bond is still very strong. Those that are missing are still remembered and discussed and we are interested in how everyone is making out. The group still has a role to play at the present time and is very supportive of one another....I can now honestly ask others in the group quite up front for their opinion and help, I have a high regard for all of them.*

**I:2**

*Because I have been isolated somewhat, (the others in 1996 all had people to work with and share planning and workshop facilitation), the group was extremely important to me. The group provided me the means to keep in touch with what was happening in other contracts, the group enabled me to confirm what I was doing was on the right track.*

**I:2**

Dianne highlighted the importance of the social bonding of the group to her professional development.

*When I asked for assistance, or the opportunity to visit as part of my professional development, I was never turned down. If strong bonds had not been developed during our training I would not been comfortable to ask for assistance.*

**I:2**

### **Role in the group**

Dianne describes the interactions of the members in positive terms. However, she comments that she often felt tentative in her own interactions and suspects this may have been the case for many others as well, as reflected by a reticence to debate some issues.

*The group interactions were positive, friendly and supportive. My own interactions were tentative but willing. Maybe others in the group felt just as insecure. Perhaps that is why I sometimes felt surprised at the lack of strong debate on some of the issues. Maybe there were others too who felt their knowledge was not deep enough to enter the 'fray' as it were, and like me were soaking up all the information to get to a position where their contribution would have some validity.*

**I:5**

Initially Dianne was very insecure in terms of her membership of this group. Whilst she felt more comfortable by the end of the year, these feelings had not completely disappeared.

*Initially my role in the group was that of a very insecure member who, although accepted, I didn't feel I had any part in a leadership sense. I don't think my feelings of insecurity dissolved until I actually started facilitating and supporting other teachers in the classroom.*

**I:3**

*I never strongly came out and stated my opinion. I just soaked everything up, filed it all away, until I could honestly say well I've considered everything that has been said... I needed the time to reflect. The way the discussion papers were required to be researched and written helped this process considerably. Having to debate the issues with my In-School facilitators, write workshop activities etc to clarify issues for others, has also assisted in forming my own conclusions/ opinions as well as reinforcing the theoretical base.*

**I:1**

*The first two weeks of our training were real hell for me and at the time I felt extremely insecure and overwhelmed by the programme and the expectations. I suppose when one is venturing into new and untapped territory this is not unusual. I considered myself as intellectually inferior and had difficulty accepting that I could meet the course requirements as well as my compatriots. By the end of the course although I felt comfortable with the group I still felt it necessary to disguise my feelings of insecurity....*

**I:1**

### **Impact on the group**

Dianne considered her major impact on the group was that of providing a 'specialist' viewpoint. This was important given the political situation at the time, and she was able to keep the other members up to date with the issues they would have to deal with in schools, as well as provide feedback to other interested groups.

*My impact on the group was that I provided a 'specialist' viewpoint. When the MRG linked the implementation of the technology curriculum with staffing and revoked the 'specialist' status I was extremely upset and just about threw the whole course in. I was invited to attend the MRG meetings to discuss interim procedures for manual teachers and had some idea of the effect in schools.*

**I:4**

*This whole procedure had the effect of reinforcing the idea that technology would not require skills, knowledge and skilled teachers to teach this new subject. The repercussions of this misinformation has been very difficult and slow to combat. It was not only a perception that teachers jumped to, but so did parents. I was able to explain this misconception to the MRG group.*

**I:5**

### **Group impact on participant**

Dianne perceived that being a part of this group has resulted in considerable professional growth - both in actual achievements and in confidence to achieve.

*My own professional growth has been immense during the last 2 years and I have surprised myself in what I have been able to achieve. With this professional growth I feel I have at last achieved a feeling of being equal and I can now more freely ask for assistance without feeling 'God they'll think I'm thick'.*

**I:2**

*The impact on me of being a member of the facilitator group was enormous. I was determined to use the time we had together to my best advantage and actively questioned others constantly, I was like a dry sponge, soaking up everything they could give me. I hope they didn't think they were being interrogated. The wealth of learning I obtained through this social interaction has made me very conscious of building that reflective and discussion time into my workshops.*

**I:5**

She also saw her membership as resulting in a significant change in her understanding of technology and technology education.

*My view of technology before becoming a member of this group was extremely limited. My perceptions were really embedded in my subject subculture and I couldn't articulate or explain clearly to anyone what technology was. You know I am very conscious of this and it is one thing that should have been addressed initially at our course at Waikato. Do you realise that you can read all those academic readings without really having your perceptions challenged or expanded? I feel if in the first 5 minutes of our course we had to brainstorm and share our initial ideas my progress would have been weeks ahead after those 5 minutes.*

**I:6**

*I now have a much wider view. When I pick up a newspaper now technology jumps out at me everywhere. In the past I would read the paper and it never occurred to me that many of the articles referred to were technological developments, or examples of technology in action. They were just things that 'happened'. I can remember thinking hard about the impact of technology on society and wondering how difficult this strand would be to consider in my lesson planning and outcomes. Now they occur to me automatically. I find myself becoming more politically aware of the adverse effects or unexpected effects of technology.*

**I:6**

*When training I can remember thinking that I would never understand what 'technological practice' was or how to apply and define technological principles. I now see the links between technology in the classroom and technological practice in the community outside school - the skills that are reflected in both camps - the co-operative and collaborative requirements, the purposeful nature, the innovative and creative requirements, the different roles that individuals can play towards the success of the tasks. It is now all so clear. Do you know it never occurred to me that there were technological systems and environments? I have no difficulty at all in relating to the difficulties other teachers have.*

**I:7**

### **Influences on technology education**

Dianne considers that a range of people have been important to the development of technology education in New Zealand - including Ministry of Education personnel, curriculum writers.

*When I think about people that have been important to technology education to date there are a number that come to mind - Pete, Tim, you, and the team at Waikato. ...all the teachers who took part in the development of the draft document and the final document release.*

I:7

She considers those people involved in sharing their experiences of technology and technology education through a range of different media has also had an influence on the development.

*The 'Know How' production team and the people who shared their initial experiences of teaching Technology Education. The pioneers - Welby Ings, Mark Treadwell, Tony Mander, Derek Wenmoth, Shona etc etc.*

I:7

Dianne views both her own facilitator group and the 1996 group as having had an influence also, and feel they in particular will continue to have a major influence on subsequent development.

*I think that the facilitator groups have, and will continue to have a big impact on technology education in New Zealand.*

I:7

### **Comments on technology education**

Dianne considers technology education is developing very well in primary schools, but sees difficulties in implementation in intermediate schools. She is unsure of the position of secondary schools but suspects it could be similar to intermediate.

*I think Technology education in New Zealand is progressing strongly in Primary schools with teachers enthusiastic after trialing and experiencing success and seeing the advantages to their students. In Intermediate schools there is difficulty. The timetable structure is one of the impediments, together with a lack of urgency.*

I:7

*With a final pronouncement of the timeline for full implementation from the Ministry, and dates for revoking workshop craft in particular, I hope we will see more urgency and application to implementation.*

**I:7**

*I don't have any major contact with secondary schools (except my husband teaches in one) but my impressions are that their structure also presents difficulties. Whether they are worse than Intermediate schools remains to be seen.*

**I:8**

She is convinced the key to successful implementation is clear Ministry messages and quality whole-school teacher development focusing on teaching and learning, as well as technology education.

*In working with 'specialists' they have been extremely grateful for the opportunity to receive teacher professional development. The majority of teachers I am working with have not had the opportunity of planning with other teachers in their whole teaching career. (25 years in one case) The one thing that is holding back these people is the lack of child-centred teaching techniques. I am confident that I will see some big changes with the teachers I am working with by the end of this year.*

**I:8**

*With teaching and learning having such a big impact on classroom outcomes in technology it won't be until we have these skills in place that I think teachers will fully appreciate the benefits to their students. I feel success would be achieved with intense whole-school teacher development. I can't see that ever happening though. How can teachers talk about implementation unless they have an understanding of their role, and when their perceptions of technology may be limited and tenuous?*

**I:8**

Dianne also feels it is important for people to continue to debate philosophical and theoretical issues in an attempt to move forward and maintain consistency.

*It's interesting, but I think others have more confidence in me than I actually do. I do have a lot more confidence these days... I really take my responsibility very seriously, I want to do this job right, I want tech ed. to succeed, and in order for that to happen the message must be consistent and when you are isolated somewhat then it is a little scary.*

**I:1**

For this to happen she would like to be involved in ongoing debates and initiatives particularly now she has had more experience of implementing technology in schools and has a better understanding of the needs and issues involved.

*I would still like the opportunity of discussing with someone else, whose opinion I value, the formats and writing of units of work etc as we really never touched on this during our training.*

**I:1**

*I would like to have the opportunity now to follow up this course, or at least get the group back together for a week. It's only now, with practical experience of working with teachers and the curriculum document that I could feel confident enough to really debate some of the issues. I think now, as a group of people who are working with teachers to implement technology education into the classroom, it would be of value to have a more in depth look at classroom practice in relation to the theoretical and research that we received earlier in our training.*

**I:5**

### **Present and future directions**

Dianne is presently involved in providing such teacher development programmes in the Hawkes Bay region. She enjoys this, feels she is having a positive impact, and would like to continue in this role.

*Presently I am the Head Facilitator of a teacher development contract, which sounds more impressive than it is, at least there are two of us this year.*

**I:6**

*I now appreciate that in fact I am a very competent teacher. I thought every teacher had the skills I had. At a recent course for 'specialist' teachers I was reluctantly persuaded to show the video taken during the teaching of my first technology unit. The reason I showed it was because it demonstrates clearly many of the teaching techniques 'specialists' are having trouble with. For example, questioning techniques... encouraging reflection and evaluation, bringing the group together to provide their own answers and support through social interaction. It also shows small techniques like grouping/furniture placement etc which can put barriers up and make the learning environment difficult.*

**I:3**

*As a facilitator I think I am achieving very good results. I now feel that I can contribute in a more effective way as a result of my increased knowledge and my feeling of achievement as a facilitator has enabled me to see myself as a colleague of equal standing with a role to play somewhere in Technology Education. There are times when I think I am not making a difference. Yesterday at a workshop I was really worried about a school team of facilitators then out of the blue I got a phone call in the evening which clearly indicated the huge amount of progress one of these facilitators had made. I still use Beverley Bell's book on Teacher Development and that helps me to refocus on the process my teachers are going through. I also re-read many of the readings issued during training.*

**I:4**

After the need for whole-school teacher development has been fulfilled she would like to re-enter the classroom teaching technology across a number of technological areas.

*I am a strong convert and disciple of the benefits of teaching technology in our schools. I find the stresses of being a facilitator and the time required difficult but I don't see myself going back to the classroom until the implementation process is finished. I love teaching but as long as the role I play is important I will continue to work outside the classroom. Ideally I would like to go to a school where I could teach in a variety of technological areas. After all, if I can run a course on plastic thermoforming for 'specialists' and having attended a number of 'electronics' courses why couldn't I teach these too. It's funny, I have never seen myself as a 'risk taker' but I guess I have under-estimated myself.*

**I:6**

### **Dianne's Description**

The material presented above provided the basis for a description of Dianne as a FTG member, using the descriptors presented in Section 3.5 - Step 2.

### **Level of Participation in the FTG**

Dianne's initial participation can be described as being of a minimal level. Although she became more comfortable as a member throughout the year and could be described as participating at a medium level, she was never operating as a mutually constituting member of this group. Since then however her confidence has grown to a point that she could now be seen as a full participant in the group as it exists today, but not as it existed during the time of its 'official' existence.

Dianne considered that primarily the contractors determined the practices of the group.

### **Dianne's Habitus**

The dispositions of relevance to Dianne's membership in this group, and their subsequent effect are given below:

<b>Disposition</b>	<b>Effect</b>
Politically astute	Recognises the importance of the political and actively worked to aid the development of technology through the use of appropriate sharing of information.
Insecure and lacking in confidence	Felt unable to partake in group discussions - preferring to listen to others instead.
Focus on interpersonal relationships	Recognises, values, and supports the development of strong personal relationships
Seeks others' feedback	Feedback from others important to perception of achievement/self-evaluation.

### **Levels of Capital**

Five forms of capital were identified as important within the FTG – see Section 3.5. Dianne is described in terms of having a low, medium or high level of each of these in the table below. These descriptions are based on my interpretation of Dianne's perception of her level of capital.

<b>Form of Capital</b>	<b>Level</b>
Educational	Low
Cultural (past relevant experience)	Low/medium
Symbolic	Low
Political	High
Linguistic	Low

## **Past/Present and Future Roles in Technology Education**

The following is a summary of the specific roles Dianne perceived she had in the group, as well as her present and future roles in technology education generally.

Role in group:	Develop her own expertise in the area of technology education generally, and professional development specifically. Provide guidance for other group members re the political situation regarding specialist teachers.
Present role:	Provides professional development support at a local, and regional, level.
Future role:	Continue to provide professional development support. Move back into the area of classroom implementation.

## **Activity/ies resulting from the Overall Purpose/s of the FTG**

Dianne viewed the purpose of the group resulted in the following activities:

- development of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development.

## **6.6 In Summary**

As in the case of Chapter Four, the material presented in Sections 6.2 – 6.5 reinforce that the experience of being a member of any group is perceived differently by individual members. Whilst it could be argued the members of the FTG had more in common than those of the CDG, and had more time to interact, they too described their experiences differently and perceived roles and practices in ways reflective of other impacting factors.

The complexity of the experiences presented in this chapter will provide the basis for the further analysis in terms of the Facilitator Training Group (FTG) presented in Chapter Seven. This will be used to develop a description of this group in terms of a 'community of practice' (Lave and Wenger, 1991).

# Chapter Seven: The FTG as a Community of Practice

## 7.1 Introduction

This chapter provides a further analysis of the findings from Chapter Six (as per Section 3.5, Step 3), through interpreting each of the four facilitators in terms of their interactions as part of the 1995 Facilitator Training Group – the FTG. As in Chapter Five, I employ the descriptive potential of Lave and Wenger’s community of practice ideas to discuss the FTG as a community of practice in order to progress from understanding the facilitators as individuals-in-action (Minick, 1985), to understanding the FTG as a collective.

In Section 7.2 each participant’s level of participation through the time the group was in existence is depicted on the template provided in Section 3.5. In Section 7.3 the participant’s overall way of being in this group is described, and each participant’s ‘profile’ is presented. Section 7.4 compares the facilitator’s way of being a member of the FTG as well as their respective views of the group’s purpose. Section 7.5 summarises the findings from this comparison through an explanation of the FTG as a community of practice (Lave and Wenger 1991).

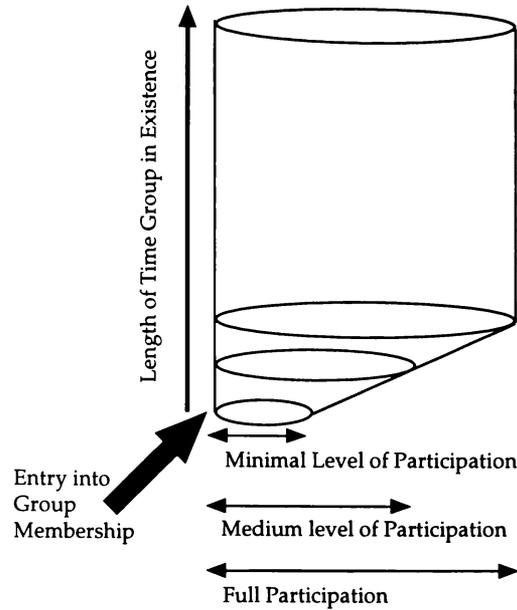
## 7.2 Levels of Participation

The following figures provide illustrations of each of the participant’s level of participation over the period of their membership. As explained in Section 3.5, full participation was denoted by the individual-in-action (Minick, 1985), being a mutually constitutive member of the FTG. That is, their interactions were impacted on by the practices of the FTG, as well as being determinative factors involved in the establishment and/or ongoing development of these practices. Minimal levels of participation reflected the participant’s active membership was of a low intensity and did not impact on the either the structural or functioning practices of the group. Medium levels of participation reflected those members who participated actively and comfortably within the FTG interactions, but for whom the practices of the FTG defined the nature of their interactions, as opposed to their participation having a determining influence on the nature of these practices.

### Ken’s Participation

The illustrative account of Ken’s membership in the FTG is presented in Figure 7.2.1.

**Figure 7.2.1: Diagram of Ken's Participation**



This figure shows that whilst Ken entered the group as a participant interacting at a minimal level, he relatively quickly increased his level of participation to medium intensity, and then on to that of being a full mutually constituting member of the FTG. He remained at this level for the time the group was in existence.

### **Sally's Participation**

The illustrative account of Sally's membership in the FTG is presented in Figure 7.2.2.

**Figure 7.2.2: Diagram of Sally's Participation**

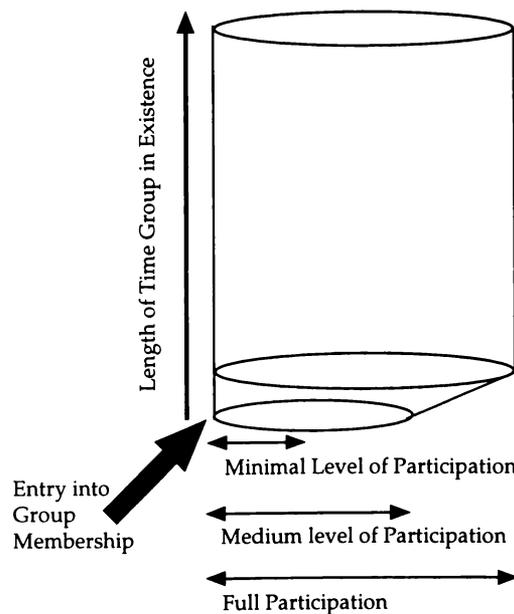


Figure 7.2.2 shows that Sally was operating at a medium level from her entry into this group, and quickly increased this level to a high intensity, that is, full participation, whereby she was operating as a mutually constituting member. She remained at this level for the time the group was in existence.

### Leah and Dianne's Participation

The illustrative account of both Leah's and Dianne's membership in the FTG is presented in Figure 7.2.3.

**Figure 7.2.3: Diagram of Leah's and Dianne's Participation**

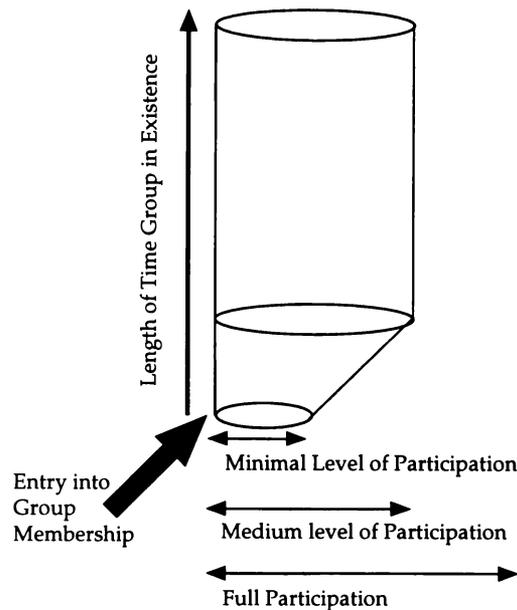


Figure 7.2.3 shows that Leah and Dianne both entered the group as participants interacting at a minimal level. As time progressed and they were more involved in group activities, they became more comfortable with their membership, but never felt they reached the level of full participation in terms of determining the group practices. They did however support and participate in these practices and can therefore be described as operating at a level of medium participation. They remained at this level for the time the group was in existence.

In all cases, the participants held a common view that the Ministry of Education and the contractors – that is Tim and myself, determined the initial practices of the FTG. In terms of the ongoing development of the FTG practices, it was considered the contractors continued to hold a primary determinative role. This is not surprising given the group was formed as the result of a Ministry of Education contract whereby Tim and I were required to fulfil contractual obligations to the Ministry of Education.

The facilitators therefore recognised and accepted they realistically could only have a limited determinative role within the wider structure of the overall programme. However this role was critical as it included influencing the 'everyday' interactions of the FTG and how, (and in fact if) the purposes of the FTG would be met. Thus whilst some of the more structural practices of the FTG were not open for negotiation, the functional practices were.

### **7.3 Participant Profiles**

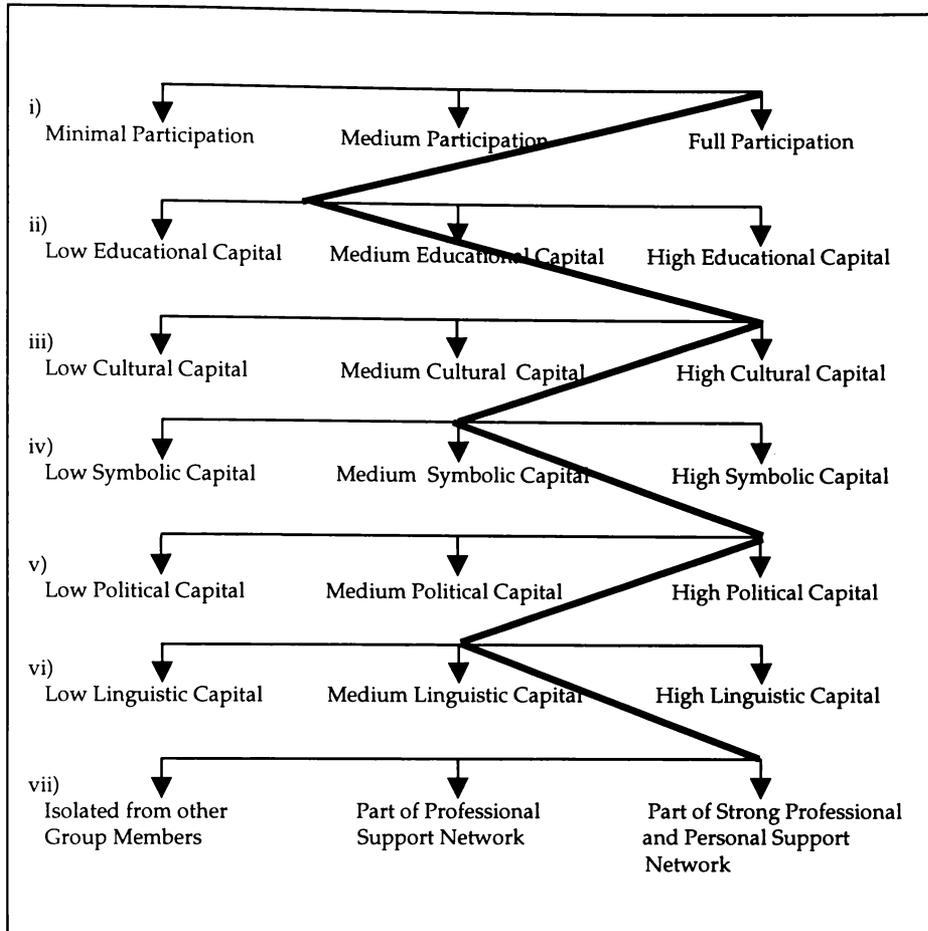
Each participant's overall way of being in the FTG is summarised from Chapter Six, (Sections 6.2, 6.3, 6.4, and 6.5 respectively) and their 'profile' presented. These profiles provide a basis for exploring what it was to be a fully participating member of the FTG in Section 5.4. The level of participation used when plotting each participant on the first dimension is the highest level each participant exhibited during the group's existence.

As in Chapter Five, a descriptive summary of each participant is presented and their respective data is plotted on the continuum of dimensions (as presented in Section 3.5) in order to construct an overall profile. This is presented in Figures 7.3.1, 7.3.2, 7.3.3, and 7.3.4 respectively.

#### **Ken' Profile**

The nature of Ken's membership in the FTG reflects his high levels of political and cultural capital, medium levels of linguistic and symbolic capital and medium/low levels of educational capital. Ken's habitus was described in terms of the dispositions of being generous with his time, conciliatory in nature, politically astute and as valuing past experience. The interaction of his habitus and his levels of capital within the group setting provided a strong basis for the role he took within the FTG. For example, his high level of cultural and political capital along with dispositions towards being generous with his time, conciliatory, and politically astute allowed him to assume, and continue to undertake, support and networking roles both within the group and at a National level. Holding an adequate level of educational, symbolic and linguistic capital was also crucial in supporting such interactions as was his valuing of both his own and others past experiences. Once he established the role he could play, he developed greater levels of participation until he became a fully participating member within the FTG.

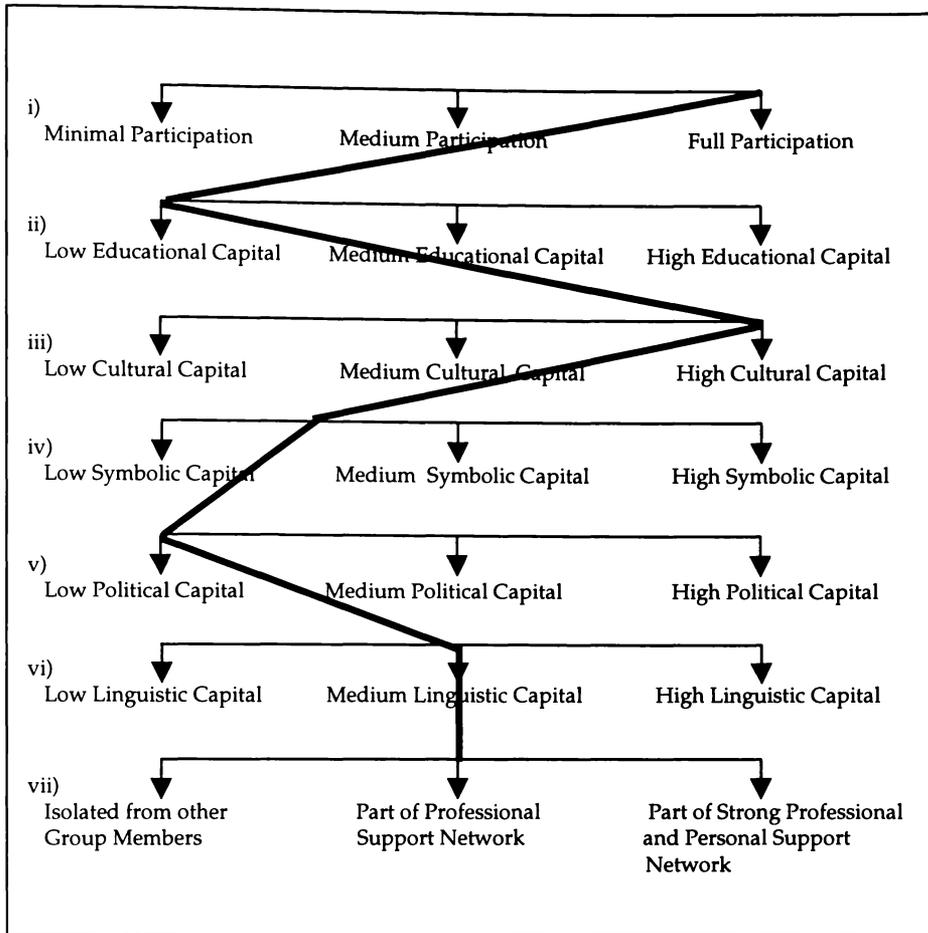
**Figure 7.3.1: Ken's Profile**



**Sally's Profile**

The nature of Sally's membership in the FTG reflects the areas in which she held the most, and least, power. She held a high level of cultural capital in terms of past facilitation experience, medium levels of educational, and linguistic capital, medium/low levels of symbolic and low levels of political capital. Sally's habitus was described in terms of the dispositions of being generous with her time, open minded, focused on professional relationship , politically astute and as valuing past experience. The interaction of her habitus and levels of capital within the group setting provided a strong basis for her the nature of her participation within the FTG. For example, her high level of cultural capital along with dispositions towards being generous with her time, valuing past experiences and focusing on professional relationships, enabled her to assume an informal facilitator tutoring role with other participants 'after hours'. Her lower levels of educational and political capital meant she was comfortable with many aspects of the group's functioning being determined by people she perceived as having a high level of power in these areas.

**Figure 7.3.2: Sally's Profile**

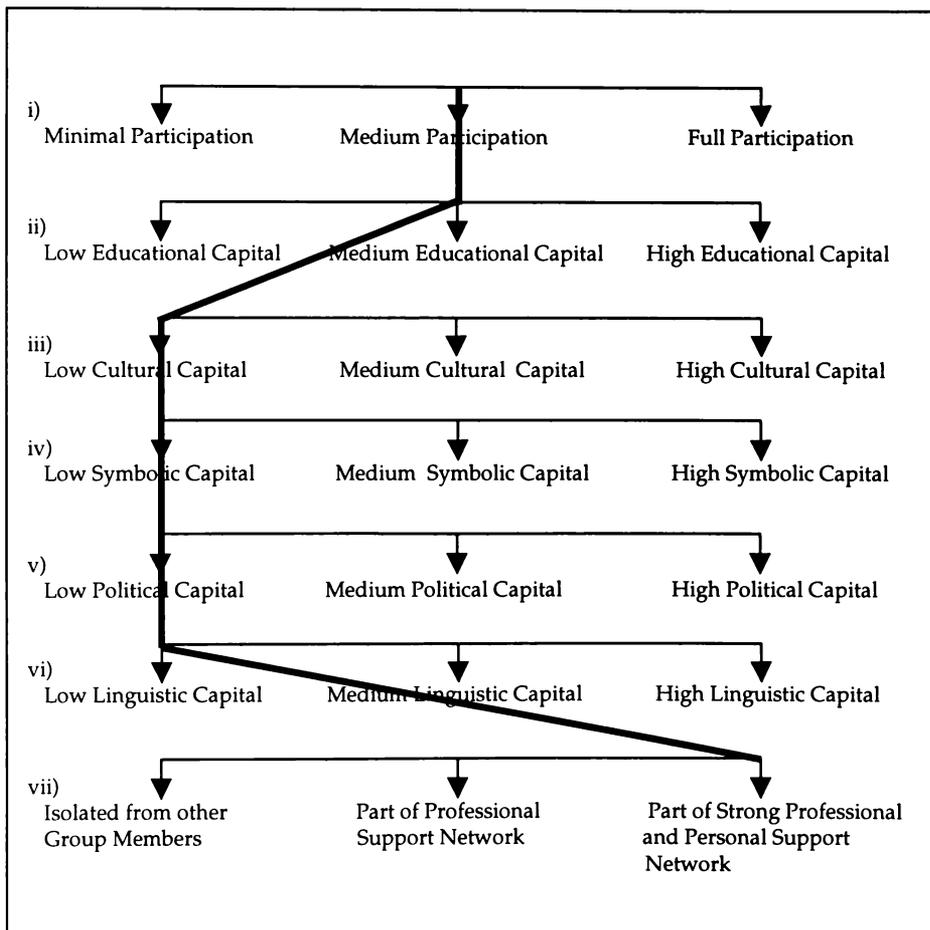


### **Leah's Profile**

The nature of Leah's membership in the FTG reflects her overall low level of capital. She held a medium level of educational capital, but low levels of cultural (which she perceived in terms of past relevant experience in technology education leadership) symbolic, political and linguistic capital. Leah's habitus was described in terms of the dispositions of being generous with her time, focused on interpersonal relationships, professionally insecure, critically reflective and distrustful of academic values. The interaction of her habitus and levels of capital within the group setting was strongly reflected in her attitudes and the nature of her participation within the FTG. For example, feeling she held little power in terms of cultural, symbolic and linguistic capital further intensified her feelings of insecurity and self doubt. This, along with her focus on interpersonal relationships, reflected in the more social role that she felt she could assume within the group. She used her social relationship to then build a professional support network.

Leah's distrust of the worth of an academic focus during the initial phases of the group's existence worked against her ability to gain some confidence from her educational capital, and in fact, appeared to encourage her to view this as inadequate even though her academic qualifications were comparatively high. During the group's existence her criticisms of both herself and others were often not voiced within the group, but surfaced in more one to one situations such as evaluation interviews, and interviews she participated in for this research. This is a further reflection of her low levels of capital and the perception of the roles open to her within the group. Her disposition towards developing strong professional, social and personal relationships with many of the group members however allowed her to feel more comfortable being a member of the group and interacting within the FTG practices.

**Figure 7.3.3: Leah's Profile**



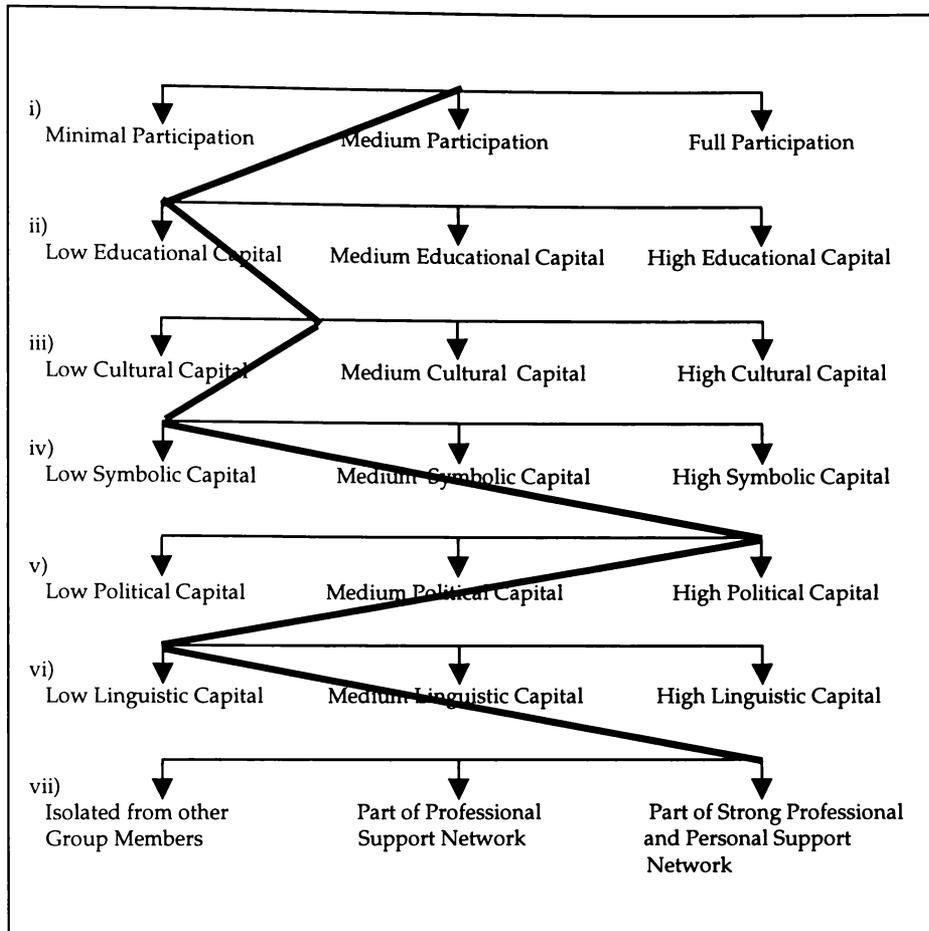
### **Dianne's Profile**

The nature of Dianne's membership in the FTG also reflects her overall low level of capital. She held low levels of educational, symbolic, and linguistic capital, and low medium levels of cultural capital. Whilst she held high levels of political capital this was in terms of her industrial relations background and general understanding of the political nature of technology education, and she did not perceive it could be transformed into power within the FTG setting.

Dianne's habitus was described in terms of the dispositions of being politically astute, insecure and lacking in confidence, focused on interpersonal relationships, and eager to gain feedback. As with Leah, the interaction of her habitus and low levels of capital in areas she considered critical within the group setting, was strongly reflected in her attitudes and the nature of her participation within the FTG. For example, feeling she held little power in terms of cultural, symbolic and linguistic capital further intensified her feelings of insecurity and self-doubt, and served to maintain an initial minimal level of participation. Her low level of educational capital was particularly devastating in this respect. However, she valued this component of the programme and being disposed to make the most of the other group members feedback to aid her understanding, began to build confidence in her ability to succeed academically.

Later in the group's existence her level of political understanding allowed her to contribute to the group on a crucial issue, and this served to increase her level of comfort regarding being a group member. She subsequently felt able to begin participating within group' practices at a medium level of intensity.

**Figure 7.3.4: Dianne's Profile**



## 7.4 Being a Member of the FTG

From the data presented in Section 7.2 it can be determined that it was possible to be a member of the FTG and operate across a range of participatory levels. All the trainee facilitators completed the programme successfully, suggesting the level of participation in this group was not directly reflective of the participant's ability to meet the contractors criteria for 'graduating' as successful teacher development facilitators in technology education. All the participants continued on in the area of teacher development facilitation, with Ken, Leah and Dianne working very successfully in the area in a full time capacity at the time of their interviews. The data presented in section 7.3 illustrates a definite relationship between the perception of the level of different forms of capital held, its realisation in terms of power, and how this interacted with the participant's habitus. This was shown through the divergent roles that the participant chose to take within the community as resulting from the level and/or nature of participation.

## Comparing Profiles

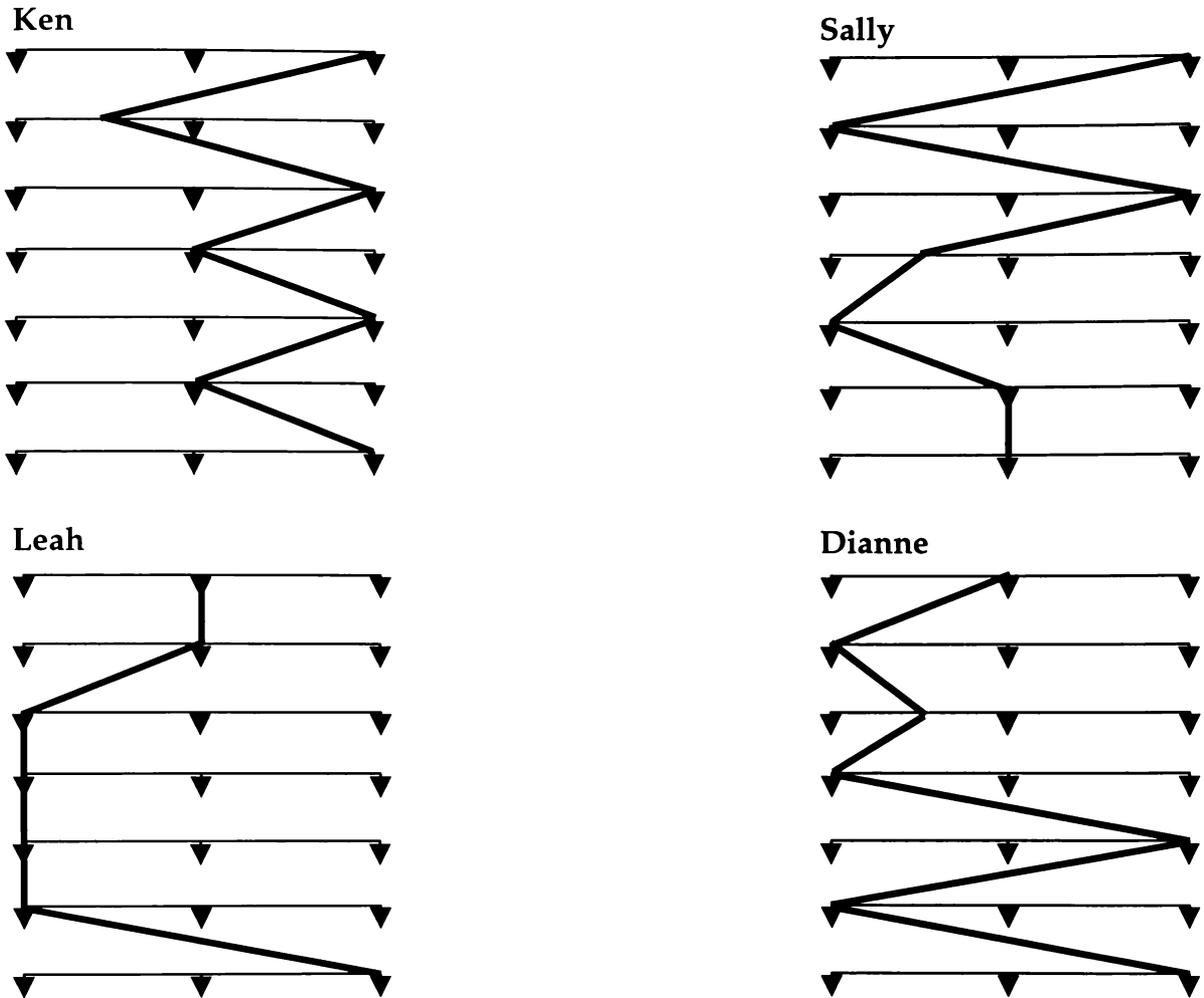
In the FTG it would seem that cultural capital (however it was perceived) appeared to be an important form of power to have in order to be a fully participatory member of this group. Educational capital was of less importance overall, although participants with low levels of this form of capital when in combination with low levels of the other forms, experienced an augmentation of their feelings of insecurity and an inability to participate fully. Symbolic, political and linguistic capital were not critical to full participatory levels, but rather interacted with each other, and the participant's habitus, along with specific settings within the FTG programme, to impact on the nature of interactions, attitudes and roles undertaken.

One aspect mentioned on numerous occasions in the participants' reflections, is that of the level of support that many of the group exemplified as a key component of being a member. There were various ways in which this aspect was developed, with some members forming strong personal friendships, whilst others remained more at a level of strong professional collegiality. The participants identified other members of the group who did not enter into this support network to any great extent at all. This aspect was a very distinctive feature of this FTG and goes a long way towards explaining the many comments regarding the ongoing existence of the group in some form.

It is interesting to note that in situations where the group members who formed strong personal and professional relationships are present, there is a still a strong bond clearly exhibited. Further to this, the levels of support that developed during the programme time continue to sustain many of the group members in their present undertakings both personally and professionally.

The ways of being a 'successful' member of the FTG can be described as reasonably extensive, where successful is interpreted as having fulfilled one's own and others expectations of membership, that is successfully completing the programme. By placing the profiles presented in section 7.3 alongside each other, four distinctly different ways of being 'successful' FTG members in terms of the selected dimensions can be seen. This is presented in Figure 7.4.1.

Figure 7.4.1: Comparing FTG Profiles



### Comparing Views of Purpose

The activities resulting from the perceived purposes of the FTG were identified by these four participants as follows (as taken from Chapter Six, Sections 6.2, 6.3, 6.4, and 6.5):

- pass the masters course; (Leah)
- provision of personal professional development opportunities; (Ken)
- provision for the development of facilitators competent across a range of technological areas; (Sally, and Dianne)
- provision of professional development opportunities for specific schools; (Ken)
- development of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development. (Ken, Sally, Leah and Dianne)

These activities can be summarised into a collective view of the purpose of the FTG as to:

- achieve the requirements of the training programme (see Chapter Six, Section 6.1 for details);
- develop of a network of people nationally who would have an ongoing role in technology education - especially in the area of teacher professional development.

Links can be drawn between the participant's view of their personal role in line with these activities, and their view of their membership as 'successful' as defined above. That is, all members no matter how high their level of participation was, or its nature, felt they personally achieved success to their satisfaction with regards to these purposes.

## **7.5 Description of the FTG as a Community of Practice**

The FTG can be described as a community of practice that came into existence for approximately a year. In terms of a community of practice, members of the FTG can be viewed as a collective that both sought to practice in ways to uphold the purposes of the FTG programme, as well as define how these purposes could be achieved through subsequent activities and interactions in order to maximise and extend the initial programme goals.

Membership in a community of practice is defined by the dispositions of the members, and practices and relations between its members. The above sections 7.2 through to 7.4 provide an account of four instances of such 'memberships' within the FTG. These accounts provide support for the notion that members of any community are not homogenous in nature. Particular dispositions, levels of relative power and different situations all interacted in varying ways in order to determine the level and nature of participation each member exhibited. This led to the assuming of divergent roles that enabled all members to be successful participants within the community irrespective of whether they participated as mutually constitutive members or not. Whilst this community of practice can be seen as having its initial structural and functional practices determined by outside factors, the way in which the members responded to this situation can be viewed as working within (Leah and Dianne) or influencing (Ken and Sally) the ongoing functioning practices in their own right.

If legitimate peripheral participation is viewed as a 'descriptor of engagement in social practice that entails learning as an integral constituent' (Lave and Wenger, 1991, pg. 35) it would seem that for all members of this community, this descriptor is relevant given the purposes of the FTG and all members successful completion of the programme. In keeping with Roth's notion of a designed community (Roth, 1998), it could be viewed that the FTG was designed, and functioned, in order that the members underwent a process of enculturation whereby their learning in practice was critical to the programmes success.

Being a 'newly designed' community, the designers (Tim and myself) effectively played the role of 'oldtimers' to support such this enculturation process. In contrast to the CDG therefore, the FTG was a community 'designed' to be responsive to and for its members. This community of practice was also influenced by external factors in that the community was formed and supported over a period of time as outlined in a Ministry of Education contract. At the end of the programme time therefore, there were no longer the outside factors to support its ongoing existence, or develop further roles. Another important aspect to this particular community's existence, is that there were in fact no longer any members who could be termed 'trainee facilitator', having all experienced some level of participation in the group practices, they had been transformed as the result of their learning into trained facilitators.

It could be argued however, that this community of practice did not totally cease to exist, but rather was itself transformed into another community of teacher development facilitators, which is still in existence today. In contrast to the original community, this community has evolved from the direction of its members. In this new community it would appear all those who were involved in the original trainee community, are full participants, play different roles as 'old timers', and they have as one of their purposes, the initiation and support of 'newcomers'. In so doing this new community of practice is becoming 'socially reproductive' in a way that was not possible for the FTG community.

The material presented in this chapter is discussed further in Chapter Eight, and the usefulness of the notion of a community of practice in terms of the FTG is discussed further in Chapter Nine.

# Chapter Eight: The Field of Technology Education

## 8.1 Introduction

The focusing on the Curriculum Development Group (CDG) and the 1995 Facilitator Training Group (FTG), as formative groups in the development of technology education in New Zealand, has yet to be directly argued in this thesis. I have never intended that this crucial point be glossed over as a given, but rather have left the argument until this stage in my thesis in order that I could employ my own research participants' reflections as a means of supporting this stance. This chapter therefore begins with the validation of these two group, or more specifically members of them, as major influences on the field of technology education.

Having established this point, I move on from the descriptions of the CDG and FTG as communities of practice presented at the end of Chapters Five and Seven respectively, towards an exploration of the implications of this in terms of the nature of the field of technology education in New Zealand. As explained in Section 2.6, the concept of field used in this thesis is that developed by Bourdieu (1977), and provides a useful unit of analysis. A strength of this concept of field is that it provides a mechanism by which an analysis of a particular set of linked happenings can be undertaken. That is, this concept of field supports an analysis that takes account of the members of particular groups involved, the actions of the group as a collective, and the way these interact, to be. Another strength is that it is representative of something which exists in the world in an intuitive sense. People generally recognise the linkings between particular happenings, at least on a macro level. Therefore it is useful both at an intuitive and analytical level, to explore communities of practice in New Zealand's education system which have technology education as a unifying factor. An analysis of the underpinning history, logic of action and forms of capital (Postone, 1993) of these communities, together with an identification of determinative members, can therefore provide indicators of the nature of the field of technology education in New Zealand.

In Section 8.2, I will present the research participants' comments on influences on technology education focused around the 1993 -1995 time period, as taken from Chapters Four and Six. This will provide the basis for my argument that the CDG and FTG have been significant in the development of technology education to date, and therefore were an appropriate analytical focus for this thesis.

In Section 8.3, I present other influences as identified by the participants and discuss these in relation to this technology education as a developing field. In Section 8.4, I discuss both the CDG and the FTG as communities of practice in terms of the resultant discourse and practices they presented as a collective, as based on the descriptions provided in Chapters Five and Seven. Finally in this section I draw from all of the above in order to describe the nature of the developing field of technology education and identify broad characteristics of this field for discussion in Section 9.3.

## **8.2 Influences on Technology Education During 1993 - 1995**

Throughout this thesis, I have identified the CDG and the 1995 FTG as two groups that had a significant influence on the development of the field of technology education in New Zealand. One of the focus questions directly asked the participants which groups and/or people had significantly influenced technology education in New Zealand. This section summarises their responses to this question, as well as relevant comments made throughout the interview, in order to validate my stance.

All participants commented that the people involved in the development of the draft technology curriculum were particularly influential in the establishment of technology education in New Zealand. In particular the Ministry of Education Official, Pete, and the people involved in the Curriculum Writing Group, (CWG), Tim, Shona, Ann and myself, were specifically named as being influential in the development of both the technology curriculum, and technology education generally. This was reflected in the comments made by these people themselves as participants in this research, and by others with whom they worked as part of the CDG. For example, from members of the Minister's Advisory Group (MAG) stated both the CDG and the MAG were influential during this time.

*... the writers of the draft curriculum - their influence on tech. ed goes without saying... and the likes of our group...*

**A:12**

*....In terms of technology education... probably some of the most influential people to date are those of us involved in this writing group (referring to the CDG).*

**C:5**

One of these members discussed the ongoing influence of members of the CDG both as part of, and subsequent to, their role within the CDG.

*By producing what I think is an innovative and workable curriculum statement, which has been validated by many teachers, I think we have had a major influence on technology education. Most of us also had a role in the development of the final document as well... and have also trained facilitators and been involved in other forms of teacher development - including the development of the package... So - I think we have been pretty major players...*

**C:5**

Pete and Tim were specifically mentioned on numerous occasions by all members of the CDG. For example:

*I think Pete was important in terms of actually having a concept of technology education in its own right - rather than it being a subset of something else....*

**C:4**

*Pete was more important than one realised at the time. He listened and also took on board lots of people's ideas. He wasn't just a Ministry Wallah. Of course Tim and of course you.*

**D:7**

*Those who have had the most influence on technology to date are probably the coordinating writing team including Tim, you, and myself plus Pete as he had an almost veto like authority over the material.*

**E:5**

The participants involved in the FTG also saw Tim and Pete as having played a significant role in technology education generally.

*Tim, and you, and the people within the group all worked to determine what happened... The Ministry and Tim and you had the final say.*

**G:1**

*When I think about people that have been important to technology education to date there are a number that come to mind - Pete, Tim, yourself and the team at Waikato.*

**I:7**

Many comments from the facilitators referred to the 'Ministry' or 'people from the Ministry' as having a significant influence. In most cases these references were referring to Pete. The comments made suggest that rather than being seen as an imposition, this influence was viewed positively by this group. For example:

*I feel that Tim, yourself, and some people from the Ministry determined these purposes. I didn't have a problem with this as I agreed with the thinking behind it. Ministry involvement gave status to the whole process.*

**G:1**

Whilst I was mentioned on numerous occasions this was usually linked to the way in which the facilitator group functioned. That is, more specifically in terms of influencing their own group's practices and outcomes, rather than technology education in general.

*I feel the purpose of the group was determined by Tim and the Ministry. What happened in the group was determined by Tim, you – Vicki, and the group itself.*

**H:4**

*Professional experience was recognised and valued....and individual contributions were encouraged all through the process....but it (referring to the functioning of the FTG) was clearly driven by both Tim and you....at no stage did I feel that the original goals were being hijacked , or even significantly 'modified' by the group.*

**F:2**

The facilitators themselves (from both the 1995 and 1996 FTG), were mentioned by eight of the nine research participants (All the FTG participants and four of the CDG participants) as having an influential role in the present and future development of technology education. Six of the participants (two from the CDG, and the remaining four from within the FTG) specifically stated they saw these people as being very influential both in the early implementation stages and in terms of their ongoing role. For example, comments from the CDG participants included:

*The training of the facilitators contract allowed the setting up of groups of people who were informed. This was very important - where there is so little idea of what the curriculum is and what it may mean - these well trained people have played and will continue to play a huge role in the development of technology education in this country*

**C:5**

*Also the people who have completed the facilitator training at Waikato in 1995 and 1996 as they experienced an intensive course with an academic backbone and then went into positions where they could facilitate future developments...In the future the main influence will come from the facilitators...*

**E:5**

In many instances, the participants' comments suggested the influence of the facilitators, and the teachers they worked with, would increase whilst indicating that of the original development group would decline as implementation progressed. For example, comments from FTG participants included:

*As a summary I guess the writers have less influence now and that influence will continue to decrease as teachers gain confidence.*

**H:11**

*I think that the facilitator groups have, and will continue to have, a big impact on technology education in New Zealand.*

**I:7**

This was stated quite clearly by a member of CDG who felt that the influence of the original people involved at the curriculum development level would begin to be over shadowed by the influence of those interpreting the curriculum as they work to implement technology into schools and classrooms:

*But I expect the next tier (referring to the facilitators and practicing teachers) is going to be even more influential as they will interpret their ideas...*

**D:7**

The nature of this shifting influence was described by one of the facilitators in terms of a movement from theory into classroom practice. For example:

*As a group (referring to the FTG) we were trialing things. We were actually putting the theory into practice and could say what worked and what didn't, how much importance is needed to be placed on certain areas, difficulties with staff and communities, children's prior knowledge and what they gained... We had to address many issues when we introduced Technology into our schools. These issues that we had to address were the issues the country would be raising in a year or two's time. For this reason we assisted with Tech development. We also assisted by helping teach in the tech areas, what works and doesn't. We were able to give feedback to the writers and to the documents...*

**H:6**

From these comments, the two groups focused on in Chapters Five through to Eight, can be viewed as having had a strong influence on the development of technology education as a new field in New Zealand. Analysing the description of both as presented in Chapters Six and Seven respectively would therefore seem to provide a valid basis for ascertaining some of the characteristics of the field. However, the comments above also clearly indicate the focusing of influence on specific members of these groups – in particular Pete and Tim. This will be discussed further in Chapter Nine.

### **8.3 Other Influences**

Whilst the CDG and the FTG were in existence, other initiatives in the area of technology in New Zealand were also occurring. For example, a series of Ministry of Education funded professional development 'Exploratory Studies' were undertaken in 1993 and 1994. These studies were as the name suggests, exploratory in nature and did not work from any one framework. Instead the successful contract directors developed regionally based programmes, which often moved in quite different directions from each other. This resulted in widespread national variation in the developing ideas around technology education. Many of the 'other' influences mentioned by the research participants reflect this situation and discussion of this is presented under 'Teacher Educators' heading below.

Soon after the release of the curriculum there was also a change of Education Minister, as well as a change in the Ministry of Education Personnel working in the area of technology. These changes are also reflected in the participants' reflections.

The participants' comments on these influences have been grouped as based on the source of the influences, rather than locating the comments in time. This is because many comments range across time periods from before the policy decisions were made, right up until the time of the participant interviews/editing during 1997-1999.

Comments from participants from both groups have been grouped under the following headings: Practicing Teachers; Ministry of Education/Minister of Education; Teacher Educators; and Miscellaneous.

### **Practicing Teachers (as separate from the facilitators)**

All nine participants discussed the influence of practicing teachers on technology education. The influences were perceived to be in terms of how technology would be implemented in schools - or 'if' it would be in some cases. Six of the participants saw the teachers' increasing influence as a natural and positive aspect for technology education. For example:

*In primary schools in particular, many teachers feel positive towards technology education as an idea - as a new curriculum area, and this is reflected in the numbers of primary schools who are actively implementing technology to date....*

**C:4**

*People that have influenced technology to date would include all teachers who are teaching technology education ...Technology education in New Zealand at this time is – Poised*

**G:4**

One of the CDG members mentioned the impact of the professional development courses being developed within tertiary institutions on the implementation of technology. This was particularly commented on in terms of the differences in the focus of each institution leading to regional variation, however, this was seen as a potentially healthy situation. For example:

*Programmes will reflect regional perspective(s). These are probably similar in a number of respects but not the same, but this is not necessarily a negative thing - possibly a healthy approach... people who complete qualifications in the area (through Massey and Waikato courses available for teachers)...I feel that this will reflect the 'stance' taken in the local areas.*

**E:5**

The difference between primary and secondary sectors in terms of enthusiasm for the implementation of technology was commented on by several of the participants. For example:

*Experience within the PD programme has shown the relevance of technology education in the curriculum from J1 upwards. The speed of pick up by the primary teachers has been particularly encouraging and this will have major implications for their less enthusiastic secondary counterparts.*

**F:6**

*Primary schools are starting to put in place programmes so that they can implement. Teachers are extremely enthusiastic, it is the legislation that is stopping progress.*

**G:5**

*I think technology education in New Zealand is progressing strongly in Primary schools with teachers enthusiastic after trialing and experiencing success and seeing the advantages to their students.*

**I:7**

In contrast however, five of the participants saw the influence of teachers as a cause for concern as they perceived that many teachers were working from very low levels of understanding of technology education. From comments made by one of the participants involved in the CDG, this was linked back to the influence that subsequent professional development would have. For example:

*Another are the teachers... most of whom are working from no knowledge at all. So the professional development they get will have a huge impact.*

**A:12**

Another member of this group, speaking from a Ministry of Education perspective, identified a number of issues that are impacting negatively on teachers' attitudes to technology education.

*My concerns regarding technology education are around the final transition phase we're in. That there are still big doubts about the whole enterprise in some people's minds eg some secondary principals. That it isn't feasible. That we haven't put in place sufficient resources in terms of workshops and equipment...That the translation from Manual Training to Technology is still full of difficulties such as the industrial issues around the contracts that year 7 & 8 teachers are on - general teachers primary, formerly designated specialists secondary. These issues should have been worked through by now but they haven't been worked through sufficiently.*

**B:5**

The issues referred to by this participant are those primarily surrounding the discrepancy between pay rates and student numbers. As a result of the history of technical education, specialist technical teachers in intermediate schools were paid under the PPTA award (secondary school teacher rate), whilst their classroom teacher colleagues were paid under the NZEI award (primary teachers rate), which prior to pay parity, was significantly lower.

Adding to the level of tension between these two groups was the fact that classes were normally split for technical education resulting in a lower student teacher ratio for specialist teachers than classroom teachers.

Three participants expressed concerns regarding teachers' level of motivation for implementing technology in the intermediate and secondary school sectors. In contrast to the positive comments presented above regarding moves to implement technology into primary programmes, these participants' comments reflected they felt very little or no movement had occurred in these sectors to implement technology. For example:

*Technology education in New Zealand at this time appears to me to reflect that a few people know quite a lot, but there are a lot of techies in intermediate schools that are waiting for this to pass. Secondary schools haven't really thought about the issues and it just might be too hard for them to tackle.*

**D:8**

*Secondary schools are waiting to see if the curriculum is going to be gazetted before making yet another change that may or may not come to fruition. Intermediate schools have had no change made to specialist positions until the gazetting.*

**G:5**

*In intermediate schools there is difficulty. The timetable structure is one of the impediments, together with a lack of urgency. I don't have any major contact with secondary schools ...but my impressions are that their structure also presents difficulties. Whether they are worse than intermediate schools remains to be seen.*

**I:7**

The comments regarding intermediate and secondary schools often reflected a perception that teachers and senior management in these schools hold a general mistrust of and apathy towards educational change. The comments also reflected a general perception that structural barriers, such as timetables and staffing designations, are also impeding the implementation of technology within these sectors.

### **Ministry of Education/Minister of Education;**

Five participants commented specifically on the role of the Ministry of Education. One of the FTG participants perceived the combined role of the Minister and Ministry of Education to be most important in determining the direction of future development in technology education.

*I think the Ministry and Minister have the most important role in the direction tech goes in New Zealand. They are the ones who make the decisions and can make it legal.*

**G:4**

The role of the Ministry of Education was generally perceived as having had a positive influence in the past as reflected in the comments presented in Section 8.2. However, the lack of direction from the Ministry of Education from 1996 to 1998, was perceived by two participants from the curriculum development group as having a negative impact on the ongoing development. For example:

*...there are so many mixed messages coming out at that level about the whole future of the learning area - whether it's going to be compulsory, when the curriculum will be gazetted and so on. ...They haven't acknowledged its status... if they spend long enough deferring its gazetting there is a huge danger that it will go away... people will forget it!! ...*

**A:10**

*... I guess the Ministry of Education by their present absence are having an influence on the way it is developing - their lack of auditing of professional development contracts... getting caught up in all sorts of political agendas that we are not privy to - this has really obstructed things... I don't know if they were driven by some bizarre philosophy of - relativism or what... maybe that's why they let 'anything go'...*

**A:12**

*Technology Education in New Zealand at the present time is still struggling. I'm particularly concerned about the integration issue (referring to a recent Gazette article at the time), particularly as schools are taking single achievement objectives from the strands and considering this as 'technology'... It lacks clear leadership across the country as a whole (from within the Ministry) and will be dependant on the strength within the local regions areas.*

**E:4**

One participant from the CDG linked the shift in perception of the positive influence of the Ministry of Education at the end of 1995, to a change in Ministry personnel.

*...I think in the early 90s we had some enlightened people in the Ministry who have now gone - and that was vital.*

**C:4**

Another participant from the FTG indicated that developments closely linked to individuals have had both advantages and disadvantages for the development of technology education.

*The personalities within the Ministry have been particularly important....and this has influenced developments in both a positive and negative manner. It has been important that technology education has been championed from within the Ministry. This has happened and these 'champions' have been able to move things along very quickly and in a way which has been quite different from other traditional learning areas. I believe that the positive influence of the individuals concerned deserves to be recognised. However this type of hands-on involvement can be a two-edged sword and can equally well hold things back when we should be capitalising on gains and moving forward. From an external perspective I've got to say that it looks like a 'control' issue...with individuals reluctant to give up a position of power...or trying to establish a position of relative power.*

**F:7**

Two of the CDG participants perceived the previous Minister of Education was an important influence on technology education. For example:

*You would have to go back to Lockwood Smith in terms of giving the political shove.*

**C:4**

*I don't think Lockwood had as great an influence on the content of technology education as he'd like to think he did. He was the driving force behind it - he made it happen - I guess he got some political gain from it - increased his own political power... He bankrolled the whole thing so he must have had a huge interest in it coming off - but I don't think he had a hell of a lot of influence in actually what went in the final document or how its taught in this country.*

**A:12**

These comments reflect the influence of Lockwood Smith as the Minister of Education was perceived in terms of providing the political drive for the curriculum development process. His influence was not seen as impacting on such things as such things as the content of the curriculum or the direction and nature of its implementation.

**Teacher Educators - both inservice and preservice (as separate to the trained facilitators);**

The influence of teacher educators was only mentioned by two of the nine participants, one from the CDG, the other from the FTG. Their comments reflect a strong element of concern due to the perception that this influence has been, and continues to be, variable in nature - particularly between regions. One participant from the CDG raised the issue of the lack of professional development for the teacher educators involved in inservice advice. For example:

*I think one group which has had a major impact on the development of technology education are those that deliver the professional development to teachers...I guess this is one of the problems of the whole implementation is the diversity of interpretations and programmes out there. And many are based on very different understandings or misunderstandings of what this area is all about... about what learning and teaching in this area is all about. There is no consistency and no quality control - no auditing. Auditing on numbers and figures - but not of what's actually been taught...what's being put across as tech ed. This is weakening the position of tech ed I'm sure... there is no basis to work from...there was no education of facilitators apart from the Waikato contract...which looked at teacher development facilitators understandings of technology education.*

**A:11**

*So there was no consistency within or between programmes - that should have been done nationwide before the programmes ran - but it wasn't. Therefore you've got huge differences between different contractors and regions. And some travel out of their regions - it's almost like spreading the plague - the further these 'rogues' go out of their regions the worse it becomes...There is so much confusion out there that the Ministry is probably thinking to hell with this it's too damn hard - lets flag it for a bit and it might go away.*

**A:12**

The participant from the FTG also focused on the lack of communication, and therefore uniformity, between different sectors of teacher education, that is, preservice and inservice.

The issue of regional variation was again reiterated in this comment.

*There are lots of groups that have had an influence on the way technology education is developing in classrooms around the country. Contract facilitators have had a big part to play in this first stage... advisory services have put their two pennyworth's in...College of Education lecturers have had a captive audience... Academic background and professional experience tends to be different in each area... priorities are different... their ability to carry out the job which is expected of them is often different. Because they are working in the same area professional jealousies often intrude. There are usually few natural in-built lines of communication - so if they are to exist someone has to go out of their way to set them up... a process which takes time and effort and the motives of the person taking the initiative can sometimes be misinterpreted. This lack of effective on-going communication means that when the inevitable 'divisions' occur their effect is compounded. Hence someone looking in from the outside sees chaos, division and very mixed messages...*

**F:7**

However, they also commented that national coordination has the potential to enhance the movement towards shared understandings, and states that they perceive the variability as an acceptable 'interim' state for this stage of technology education's development. For example:

*The view of technology education that contract facilitators are projecting and which classroom teachers are absorbing is nowhere near uniform... but is moving a good way towards a common shared perception of what is involved... meeting this requirement will only come from coordinated contact at a national level. From a personal point of view.... I'm looking at the pragmatic requirements of the classroom and am happy to accommodate 'interim' perspectives ...but with a realisation that we must work towards moving them onto a model which relates more closely to technological practice.*

**F:6**

The concerns raised in comments surrounding the lack of national consistency was generally focused in terms of the potential for confusion for teachers, and the resulting overall negative effect this could have on attitudes towards implementation. This would appear to be supported by the comments presented above, particularly those related to implementation progress, or lack of it, in intermediate and secondary schools.

## **Miscellaneous**

Other influences mentioned by participants included international experts in the area of technology education, resource developers, community groups and professional organisations, private consultants, and other technology education practitioners. Two of the CDG participants particularly referred to the influence of international people. For example:

*... people like Edgar Jenkins, David Layton, Richard Kimbell, Paul Black....*

**B:5**

*Paul Black for putting the Minister on the right track in England or otherwise I don't know what we would have had.*

**C: 4**

Whereas the participants from the FTG tended to refer to New Zealanders involved in technology education practice, or other groups within New Zealand. In the case of some of these influences the participants acknowledged the mixed messages that may have resulted from such influences. For example:

*The 'Know How' production team and the people who shared their initial experiences of teaching Technology Education. The pioneers - Welby Ings, Mark Treadwell, Tony Mander, Derek Wenmoth, Ann etc etc.*

**I:7**

*...businesses and people outside education who support the curriculum as well as Royal Society,...The royal society can help to improve the status of technology and can influence business as well. Teachers - especially the P.P.T.A. at the moment need to endorse this curriculum and the workshop teachers who are reluctant to change.*

**G:4**

*TENZ, and other people running courses independently, for good or bad... they have affected Tech Education. HETTANZ etc and other organisations that are trying to inform members. At times the message has been confused but if people get all fired up and excited about a topic then maybe that isn't a totally bad thing.*

**H:11**

These influences are crucial to the developing field of technology education. However, their influence has been greatest since the release of the final technology curriculum in late 1995, and it is to be expected that they will continue to be so.

In support of the discussion presented in Section 8.2 above, those influences mentioned that can be positioned as having had an impact prior to the release date in 1995, can be viewed as minor influences on the nature of technology education (eg the previous Minister of Education). Alternatively they represent influences which have been accounted for within the communities (eg previous Ministry of Education official).

All the remaining influences mentioned have impacted on the field of technology education after the release of the final technology curriculum statement in 1995, and are therefore outside the scope of analysis for this thesis.

## **8.4 Technology Education as a Developing Field in New Zealand**

### **The CDG Community of Practice**

The forms of power that were valued and therefore valuable in the CDG community of practice were political, linguistic and symbolic capital. Educational capital was also important - but not as crucial to determinative participation as the other three. The focus of the CDG's collective practice was on developing an educationally, culturally, and politically sound curriculum statement in technology education, developing mechanisms to support such a curriculum's implementation in schools, and the provision of professional development for people involved in the overall development process.

The resultant discourse of the curriculum development community of practice was one that was inherently visionary in nature. It recognised the constraints imposed by time, and the institutions of education and politics, but attempted to work within these constraints in such a way as to optimise the opportunities these same institutions could provide. The greatest of these opportunities was the creation of the 'space' for the development of a new learning area in its own right. This learning area could transcend the confines of both other essential learning areas, and traditional 'technical/technology' subjects, which might have otherwise considered they were the central hub of technology education. In order to do this it was crucial that there was a strong philosophical and theoretical basis from which to work.

As discussed in Section 2.2, initiating and sustaining change/reform in education in New Zealand has been extremely difficult, particularly when embedded in a 'centre-peripheral model of curriculum development' (McGee, 1997). Given the lack of time and established school subculture to help the process, it became apparent that if the curriculum was to reflect the vision held by those most influential within the CDG, there would need to be a pragmatic approach taken. The overall process was therefore not as consultative as it appeared to be, rather - as noted by members of the groups involved, there was a small group of people who were really making the decisions. That it appeared to be consultative, with the number of people involved exceeding 300 (Jones 1995), was crucial in terms of the political process. In reality this was largely an exercise to show a process had been adhered to, and to encourage a general feeling of ownership amongst these people. However, their voices were assigned very specific places that had little bearing on the overall structure and content of the curriculum. The involvement of this group did provide a point of reference to ensure the 'vision' was not so far outside teachers' perceptions that there could be no hope of implementation in the future.

This was not as intentionally exclusionary as it may appear. Rather it reflected the situation at the time. There were few people available with a deep and, at least to some degree, uniform philosophical and theoretical understanding of this vision, and no time to enculturate people to the necessary level at which they could realistically participate in the determinative practices in a meaningful and consistent manner. The result was this small group of developers had to assume the determinative role as based almost solely on their own perception that they 'had it right' or at least as 'right' as anybody else both nationally and internationally. Rhetoric and 'Mana', or linguistic and symbolic capital, were crucial elements therefore when attempting to present this vision. Political capital was also crucial to ensure that this vision was allowed to exist in a form whereby it could provide the framework for what was to come, that is, the national technology curriculum statement.

### **The 1995 FTG Community of Practice**

The forms of power that were valued by the facilitators in the 1995 FTG community of practice were political, symbolic, and cultural capital. Education capital was also deemed important by the programme developers as evidenced by the linking of the programme to a formal academic qualification in the area. Whilst this was not valued highly by the facilitators during the initial stages of training period, many admitted later in the programme that the resultant increase in educational capital did provide them with a useful form of power.

For example, during their own subsequent teacher professional development work this capital was able to be translated into power, particularly when working with teachers with more classroom experience than they had (Compton, Jones and Hawe, 1996). Educational capital was therefore valuable to the facilitators, if not highly valued initially. The focus of FTG collective practice was on individual members successfully completing the training programme and the development of a National network to support their own and others' future initiatives in technology education, specifically at a school implementation level.

The resultant discourse of the 1995 facilitator community of practice was one focused on the practicalities of translating a visionary-based framework into very real school settings. There was no longer the luxury of theorising to provide new opportunities. Rather the focus was on attempting to follow the theoretical and philosophical work through into classroom practice.

In order to take this vision into the classroom the members of this group had to first accept the philosophical and theoretical background of the vision. To accept it, they needed to understand it. For many this was an intense personal journey which spanned many areas of both education and technology. Essentially this was a period of enculturation, after which they could bring their own cultural capital in teaching practice to enable the translation to be successful. The facilitators' cultural capital was primarily in areas outside of technology education classroom practice. It was therefore crucial that the enculturation period provided the facilitators with mechanisms by which they could critique their own and others' practices so as to validate those that were useful for the translation of the national technology curriculum into an appropriate school and classroom curriculum in technology.

As discussed earlier, two of the members of the CDG community of practice (Tim and myself) were also key personnel in the 1995 facilitator training programme's development and delivery. We were therefore crucial in terms of providing the opportunity for the enculturation of the facilitators as described above. As identified in Section 7.5, we were the 'oldtimers' who's job it was to support the facilitators as 'newcomers' in their process of enculturation (Lave and Wenger, 1991). However, in this role we were limited to providing guidance in areas where we held capital, but recognising particularly our low level of cultural capital in the area of primary and secondary technology education classroom practice. The structure of the programme reflected this by way of providing a range of 'others' to provide guidance, as discussed in detail elsewhere (Jones and Compton, 1998; Compton and Jones 1998).

These 'others', however, were also often lacking in this critical area of cultural capital. This led to the need to largely step aside at the point of school contact, and allow the facilitators to find their own ways to mediate this requirement of the enculturation process. Our role was required to change from that of 'guiding oldtimers', to 'support oldtimers' for the working in schools phase of the facilitators' practice, and the implementation phase of the technology curriculum within the developing field. The facilitators in response, through their membership in this group, worked towards a position whereby they had a sound basis from which to assume a determinative role in this phase. In so doing they were to become 'oldtimers' in the wider technology education community in a way neither we, nor any other teacher educators working in the area at this time, could ever achieve.

## **8.5 In conclusion**

These discussions reflect the situation as it stood with regard to these two communities at the release of the final curriculum statement. At this point the discourse and practices of the field of technology education had moved through those being based primarily on a vision, to those based primarily on making that vision a reality. The forms of power which were important at this time reflected this shift, with the increase in the importance in the classroom practice based cultural capital of New Zealand teaching practice.

Many members of both communities continued to work towards formal qualifications in technology education, and the increase in courses at a variety of tertiary institutions at this time reflected this movement. This strongly suggested that educational capital was becoming increasingly more important in the field.

The boundaries of the discourse had moved away from being academically imposed, towards those reflective of school and classroom culture. Whilst there is obviously room for contestation between these two communities of practice, in effect the continuity of persons across both communities resulted in a relatively smooth transition during this time. This allowed for the establishment of mutual respect and trust whereby the past discourse was viewed as of value and important at its time, and the new discourse accepted as that appropriate for the next phase of the field of technology education's development. This smooth transition impacted greatly on the resultant nature of the field of technology education in New Zealand at this time.

From the literature presented in Chapters Two, and my analysis presented in Chapters Four through to Eight, I have identified the following characteristics as important within the field of technology education as at the release of the final technology curriculum statement in 1995:

- strong theoretical and philosophical basis;
- philosophical and theoretical basis consistent and appropriate for New Zealand;
- lack of technology subject subculture;
- variety of alternative subject subcultures;
- professional network established between different groups.

The interactions between these characteristics and the influencing factors prior, and potentially subsequent to, the release of the technology curriculum in 1995, are discussed further in terms of their impact on the nature of technology education in Section 9.3. Chapter Nine draws on the analysis presented in the preceding five chapters to answer all research questions, and to provide an overall summary.

# Chapter Nine: Discussion and Recommendations

## 9.1 Introduction

The overall aim of this thesis was to develop an historical account of what happened in technology education, and why it happened as it did, through analysing the views of participants present during two particularly formative years from 1993 to 1995. This was based on the rationale that to understand the nature and potential of technology education in New Zealand as a developing field today, requires an understanding of its past. For those currently involved in technology education in New Zealand at the level of policy, curriculum development nationally and within schools, and/or classroom implementation across all sectors (primary, intermediate, secondary or tertiary) such an understanding is crucial if the field is to have a coherency that will allow it to realise its potential for New Zealand students.

I sought to analyse the development in terms of the people involved, decisions made, and resulting impacts on and implications for the nature of technology education as a field at the time of the release of the technology curriculum in 1995. This analysis was achieved through focusing on both my own reflections and subsequent perceptions of the 1993 to 1995 time period, and interacting these with the views of a other people who were influential during this time. The other people selected were members of influential groups such as the Curriculum Development Group (including the Minister's Advisory Group and the Curriculum Writing Group) and the 1995 Facilitator Training Group. The nature of the analysis was fundamental to providing an explanation that was more robust and less partial than would have been possible if documentation and explanation had been based on my perceptions alone. This chapter provides an overall summary of the findings of this research. In the following four sections of this chapter the data and analysis presented in the preceding chapters will be drawn together to answer the research question presented in Section 1.4.

Section 9.2 answers the first research question focusing on the identification of factors that were most influential on technology education developments during 1993 to 1995, from an analysis of all participants' reflections. Section 9.3 answers the second research question through a discussion of the implications these factors had in terms of the resultant nature of technology education as at the end of 1995, as discussed in terms of the characteristics presented in Section 8.5.

Section 9.4 answers the third research question through the presentation of an evaluation of the thesis structure and analytical process as described in Section 3.5, and undertaken through Chapters Four to Eight. The evaluation presented is specifically in terms of its effectiveness in providing a useful historical account of the development of technology education in New Zealand.

Section 9.5 answers the final research question through a discussion of the implications of this research for future development in technology education in New Zealand. This section also discusses my own transformations as a result of undertaking this analysis.

Section 9.6 identifies the limitations of the research and provides a series of recommendations for future research and development work in technology education as related to four specific audiences concerned with the implementation of technology education into New Zealand classrooms. These audiences are - Ministry of Education personnel, researchers, teacher educators, and practicing teachers.

## **9.2 Influential Factors on Developments in Technology Education During 1993–1995**

### ***Research Question i)***

*What factors did the members of the Curriculum Development Group (including those from the Minister's Advisory Group and the Curriculum Writing Group) and the 1995 Facilitator Training Group identify as the most influential on the developments that occurred from 1993 to 1995?*

As outlined in Chapters One and Two, the entry of technology education into New Zealand's core curriculum was part of an international trend to encourage and support technological literacy and technological advancement. To that end, the role of the Minister of Education and his Ministry was to ensure New Zealand did not lag behind the rest of the developed world in its ability to compete in the 'technological world'. The shift from technical to technology education in New Zealand is discussed at length in Section 2.2 and provides an important background for this thesis in terms of New Zealand previous history of curriculum reform in general, and its movement towards technology education in particular.

Whilst it is the influences on developments over the 1993-1995 time period that I wish to focus on in this section, this previous history is fundamental to understanding why the factors identified below played so critical a role at this time.

From the data presented in previous chapters, particularly Section 8.2, it is clear that the most significant factors influencing the development of technology education during 1993-1995 were specific people who were involved in the making of key decisions of critical importance at the time.

My analysis of this development time is that two people in particular wielded a significant amount of power, and through their alliance exerted the strongest influence on the direction and nature of the developments undertaken. These two people were Tim and Pete – one an academic, the other a Ministry of Education official.

Tim's role in the developments can be argued as being overt, given that he was the director of both the draft curriculum development contract, and the facilitator training contract. The basis of Tim's role was clearly linked to his past involvement in technology education both in New Zealand and internationally. Prior to this developmental time he therefore held a high level of educational, symbolic and linguistic capital, which, combined with his habitus and a conducive environment of political support, he could translate effectively into power.

In contrast, Pete's role was far less transparent to those outside the development process. Pete's past experience in technology education was negligible. However, his experience in the bureaucratic practices of the Ministry of Education was extensive, and he was the official managing technology contracts over this time. This in turn provided Pete with a very high level of political capital, which was quickly transformed into symbolic capital due to the dominant discourse of educational politics, and he also effectively translated his capital into power, as the result of his habitus and a conducive environment of academic support. Therefore, the basis from which Tim and Pete worked was complementary, and augmented each of their positions and power considerably through their alliance.

Whilst the interactions of other people can also be considered to be factors influencing the developments, I argue their influence was mediated by the above alliance. For example, even others centrally involved in the development of the draft curriculum such as myself, and my colleagues, only exerted influence through influencing Tim.

Likewise, those working from the political discourse, including the then Minister of Education and his advisory groups, were influences on Pete, rather than directly on the developments themselves.

The ongoing strength of this alliance was based in part on the high symbolic and linguistic capital that continued to develop for both Tim and Pete as their relationship grew. This was a critical component of their ability to maintain and further push the boundaries of their allied influence as they gained the trust of others, and/or presented a unified position that effectively silenced any individual or group who may have wished to contest the directions being taken. The effectiveness of a high level of symbolic and linguistic forms of power reflects the positioning of the developments within educational politics.

Another related issue in the strength of the Tim/Pete partnership was that of the wider educational history as presented in Section 2.2. Technical teachers in the past have never enjoyed a high status within educational or political discourses. This being despite the fact that technical education has been a focus on and off within New Zealand educational reform for over a century - see Section 2.2. In 1980 the then Inspector General, George Hogben's raised concerns that education was still much too 'bookish' (Hogben, 1890). These concerns were followed through in 1900 with the Manual and Technical Instruction Act. With over a hundred years of 'presence' in some form or other, it could have been expected that a technical teacher 'voice' may have been heard as a disruption to the Tim/Pete alliance. However, as documented in Section 2.2, technical education had undergone many changes over these hundred years with many technical teachers from different areas having fragmented into groups with little in common, either with each other (for example, compare HETTANZ with NZGTTA) or with other teachers generally. Thus, as at 1993, there was in fact no collective voice representing technical teachers. Added to this is the fact that past reforms in the area of technical education were imposed from 'the top' as opposed to being in response to requests from the teachers themselves, parents or employers (Mawson, 1998). Thus the past experience of these teachers has been to resist (or not) through the 'implementation phase' rather than at the level of policy and curriculum development.

This background therefore, combined with the designation of technology as a new subject significantly different to technical education, served to either suppress or invalidate any potential teacher resistance from practicing technical teachers.

The parental population was still largely indifferent, and whilst there was some resistance from a new right lobby group known as the Business Round Table, this was effectively silenced through the Tim/Pete alliance. (For example knowledge of a report being commissioned by the Business Round Table was communicated to Tim, who effectively countered it prior to its release through academic channels).

This underlying sociocultural background therefore served to create a conducive environment for the Tim/Pete alliance to form and develop to be the most influential factor during this time period.

Near the end of the 1993-1995 development period, just prior to and directly after the release of the final technology curriculum, other people were beginning to exert an influence in the field of technology through their direct impact on the implementation of the technology curriculum into schools. At this time, the Tim/Pete alliance began to become a less significant influence on the developments in technology education. Shortly after this, Pete's movement within the Ministry of Education out of curriculum facilitation and into the policy division further disrupted the alliance. This shift, although outside the scope of this thesis, serves to support that the factors most influential in technology education appear to be the actions and interactions of specific people, as they are enabled to practice through the complex interactions of the sociocultural location of the time and place, their levels of capital, and the nature of their habitus.

### **9.3 The Nature of Technology Education in New Zealand**

#### ***Research Question ii)***

*How did these factors influence the resultant nature of technology education as at the end of 1995?*

Section 8.4 identified five characteristics of the developing field of technology education as at the end of 1995. Each of these is now discussed in terms of their interaction with the influencing factors discussed above, in order to discuss the resultant nature of technology education in New Zealand at this time.

### **Strong theoretical and philosophical basis**

This characteristic resulted in a commitment to technological literacy as it was defined within a broad concept of technology education. This basis also acknowledges the overall goal of technology education in terms of student empowerment and educational reform. That is, Technology Education as it is represented in *Technology in the New Zealand Curriculum* (Ministry of Education, 1995) has been described as having the potential to achieve a significant level of educational change for students in New Zealand classrooms (for example, Jones, 1995; Compton, 1997; Burns, 1997; Davies, 1998a; Davies 1998b).

As outlined in Section 2.5, technological literacy as provided for in this curriculum has been specifically discussed in terms of its liberating potential for students (Burns, 1997; Compton 1997; Davies, 1998a; Davies, 1998b). Rather than school leavers being only able to operate within existing technological practice, Burns describes this literacy by way of school leavers being able to be 'truly innovative future citizens' (Burns, 1997, pg. 1). Jones also discusses the importance of students developing innovative dispositions which will allow them to be able to cope with both the 'stable and unstable problems' they will encounter in the future (Jones, 1995 pg. 4). As I have discussed elsewhere (Compton, 1997), one of the key concepts underlying the technology curriculum is that of the purpose of education being focused on the development of empowered students with the ability to challenge and change the status quo, rather than having merely to exist within it.

This emphasis on providing opportunities for the development of empowered students demands a significant level of change to occur within schools and classrooms in New Zealand. For example, one fundamental change that needs to occur to provide for a liberating technological literacy is that learning environments must include a 'socially critical dimension' (Burns, 1997, pg. 5). As I have explained previously,

To enable students to have an opportunity to develop the level of empowerment necessary to initiate change in entrenched social orders, there needs to be an open, honest and supportive environment for discussion of differences in belief and practice. This has often been avoided in school settings and is an important change if decisions are to be critically analysed within the social settings in which they are made. (Compton, 1997, pg. 70)

Whilst this basis primarily underpinned the decisions made and textual outcomes desired by key people such as Tim and Pete, other issues, particularly the pragmatic issue of completing tasks (such as the development of the draft technology curriculum statement, as well as the refining of the final technology curriculum statement), can be seen to have compromised not so much the philosophical basis – but its ability to be communicated through text and/or discussion with others. That is, whilst those that know what they are looking for can see this potential in the technology curriculum, the message is sufficiently ambiguous that many interpretations can be, and have been, made resulting in a range of perceptions of technology education itself.

This includes interpretations and resultant perceptions that are in direct conflict with the stance taken above regarding technological literacy as liberating in nature. For example, in O'Neill and Jelly's discussion of technology education, (1996/97), the perception of the technology curriculum is clearly based on an interpretation of this text as a new right document. In this discussion, far from being liberating in nature, technology education is therefore seen as providing an avenue for new right ideology to enter and/or become further entrenched into New Zealand schools. This is in sharp contrast to the interpretations of the curriculum text made by members of the Business Round Table as mentioned earlier.

The facilitator training groups of 1995 and 1996 were a direct attempt by Tim and Pete to remedy this situation. As discussed in Section 2.5, understanding the theoretical and philosophical basis underpinning *Technology in the New Zealand Curriculum* (Ministry of Education 1995), would require significant shifts and/or reconceptualisations for many educators in New Zealand in such fundamental concepts as knowledge, curriculum, technology, technology education and technological literacy. As outlined in Section 6.1, (and discussed in terms of enculturation into a community of practice in Section 8.4), this was tackled by each facilitator undertaking a post graduate paper in technology education that specifically was structured around developing understandings of these concepts. The assessment criteria of the paper were also structured around these, and thus one could assume that 'passing' the paper indicated the facilitators had developed such understandings - in theory at least. (However, the ongoing robustness and/or impact of such understandings on their practice is something that cannot be assumed, and would be an area worthy of further research.)

The fifteen facilitators therefore could be described as having a good understanding of the theoretical and philosophical aspects of technology and technology education. They also had a clear understanding of the development process to date - including who had made decisions and why. This was a result of the major factors influencing the development within the field during the 1993-1995 time period being people, particularly Tim and Pete. This group of facilitators had more opportunities to interact with Tim and Pete, and the ideas underpinning their decisions, than any other group of people at this time. Combined with this, the facilitators were also working directly or indirectly with many of the other people who, as shown in this thesis, were involved in the development process at the next level of influence under Tim and Pete.

The facilitators' understandings therefore, came from social interactions with these people over an extended period of time, rather than being a result of hearing them speak to an audience, reading their work or being told about them by others. In terms of learning therefore, it was far closer to a situated apprenticeship learning environment. That is, the facilitator community of practice had much in keeping with a site of enculturation as discussed in Section 2.6. This was further illustrated in Section 8.4.

### **Philosophical and theoretical basis consistent and appropriate for New Zealand**

Another characteristic of the field was an overall coherency between policy and the development of the curriculum statement. There was a high level of theoretical and philosophical consistency between technology education policy, curriculum development, and at least some of the professional development initiatives – for example, the 1995 and 1996 facilitator training. This consistency was gained through the continuity of the key personnel - Tim and Pete. This strong philosophical and theoretical basis as discussed above, developed over time and served to build on and enhance understandings that underpinned the earlier policy development. This basis can be viewed as appropriate to, and reflective of, New Zealand schools as it was informed by research carried out in New Zealand schools - Learning in Technology Education (LITE), critical analysis of what was happening in other countries in order to decide on its appropriateness to the New Zealand situation, and professional debate amongst the developers as situated within New Zealand.

However, upon closer analysis of the data presented in this thesis, it could be argued this characteristic should read appropriate for 'mainstream' New Zealand, where education reflects the cultural capital of the dominant Pakeha, middle class discourse.

Whilst outside the scope of this thesis, it must be acknowledged that the participants all fitted this categorisation of Pakeha and Middle Class (including those from the United Kingdom in this category), as did the majority of other members of the CDG and FTG. Whilst the CDG, by way of the CWG, did have a Maori subgroup, their influence was minimal.

### **Lack of technology subject subculture/Variety of alternative subject subcultures**

These characteristics resulted in a situation whereby at the release of the technology curriculum statement a technology subject subculture in keeping with its theoretical and philosophical basis had yet to be established in order to enable sound technological classroom practices in keeping with this basis to be established, validated and enhanced. There was little classroom practice occurring in New Zealand schools that fitted with the technology curriculum objectives. Hence the nature of the field as at the end of 1995 was embedded more in the theoretical construction of possibilities, rather than on good teaching practice in technology. Whilst good teaching practice was valued, it came situated in other subject subcultures that meant it needed to be critically analysed within the context and intent of technology education, in order to be adapted to be useful to the teaching of technology.

The nature of the field as at this time therefore was that successful implementation would need to be accompanied by a level of educational reform. Wenmoth states this quite categorically, employing the metaphor of new wine in old wineskins. He states that 'like old wineskins, the existing structures and organisation of our schools and school systems are not appropriate vessels to be filled with the new wine of technology.' (Wenmoth, 1997, pg. 1).

As discussed in Section 2.2, past experiences of attempting to initiate reforms in New Zealand's education system have shown a lack of teacher understanding, belief and ownership in reform initiatives to be the main reasons why sound initiatives were never realised as changes in classroom experiences (Beeby, 1986). As discussed in Sections 2.2 and 2.5, the technology curriculum development process was clearly positioned within a centre-periphery model of development (McGee 1997). Material presented in Chapters Four, Five, Six, Seven and Eight strongly supports this position. In fact, taking into account the stance argued in Chapter Eight, and in Section 9.2 above, teachers' voices played very little part in the development of the field prior to 1995.

The short time frame between the cut off date for submissions on the draft, and the publication of the final curriculum further served to reinforce the somewhat 'procedural' consultative process. Teachers could therefore be forgiven for feeling that technology education, more than any other of the curriculum developments occurring at the time, was the ultimate in top down imposition. The probability that technology education would be 'understood', 'believed in', and 'owned' by teachers would have had to be rated as extremely low if based on this information alone. The relationship between school reform and technology education can be seen to be complex in nature. The need for change if perceived only by those outside of the change group, will not be enough to sustain that change.

### **Professional network established between different groups**

The overall lack of understanding, belief and ownership regarding technology education could be argued as having serious implementation implications. That it would be implemented in schools at all, let alone in a way that supports a liberating technological literacy, was far from certain as at the end of 1995. However its status as an essential learning area and the characteristic of the early development of a professional network, allowed some room for optimism regarding technology education's implementation.

The most significant aspect of this being the development of a cross-sector network of facilitators who began to view themselves as having a growing role to play in the field of technology and were being actively supported in terms of their future influence on the field.

The facilitators believed in this learning area for a range of different reasons, not least because they understood the vision of how it could translate into meaningful learning for students throughout New Zealand. Whilst this belief could not be said to have originated in 1995 year, I argue it was definitely strengthened during the year's programme due to the learning in technology they experienced themselves, and the opportunity to interact with others with similar beliefs about the area. These people had developed a strong sense of ownership of the technology curriculum over their intense and often difficult year. They had also developed a sense of responsibility towards developing appropriate strategies for its implementation into their own and others' school programme. Therefore, whilst there was no denying that a large group of teachers in New Zealand felt, at best, apathetic to the implementation of technology into their schools and/or own classroom practice, there was also this group of people for whom technology had become something of a passion.

The question that remained unanswered at this time was, would such a group be a successful seed for the 'critical mass' of teachers needed to ensure the development of a subject subculture supportive of technology education's implementation? The formation of the Technology Education New Zealand (TENZ) was an overt attempt to increase the potential for a positive answer to this question. TENZ provided the potential for collaboration between all interested people working in the area of technology education. This network enabled links between: political personnel; primary, intermediate, secondary and tertiary technology educators; researchers from all sectors; industry groups; community groups and a range of professional associations.

## 9.4 Evaluation of the Analytical Process

### *Research Question iii)*

*Does a sociocultural analytical process provide for a useful historical account of developments within technology education in New Zealand?*

This research was positioned within a theoretical framework in keeping with a sociocultural view of education, and the contemporary view of technology. This included a conceptualisation of knowledge, technology, technology education and technological literacy as per those explained in Section 2.5. The thesis was structured so as to provide an historical account of the developments from 1993 to 1995 through the use of varying combinations of my own, and my research participants' voices. Through the extensive use of transcribed quotes in the initial sections of the data chapters, (Chapters Four and Six), I provided opportunities for the reader to 'interact' directly with my participants' voices, whilst employing my own voice to structure and categorise their accounts. After this however, my own interpretation of their experiences becomes dominant.

An evaluation of the effectiveness of this structured transition in terms of providing opportunities for others to read the text in a dialogic fashion and thus further reduce the partiality of the explanation provided is difficult for me to carry out myself. The judgment on this aspect necessarily having to be made by the 'readers' themselves. However, this structure could also be evaluated in terms of its effectiveness as a research writing tool, and thus in this respect my evaluation is appropriate. By developing a pathway by which I could initially present the perspectives of others as largely 'distinct' from my own, allowed me to both remain 'true' to their views, as well as interrogate them through my own analytical lens.

That is, allowing the process of my analysis to be presented in this structure effectively enabled me to overcome the position of researcher as the 'distorter' of others' views. An important evaluative indicator in regards to this, is that of the level of respondent validity demonstrated by participants. As discussed in Section 3.3, sending material out to participants for editing and feedback was an important aspect of the research in terms of evaluating the effectiveness of my process of analysis throughout the analysis period. Through this I was able to ascertain a high level of respondent validation of both their story and my analysis of it. On one occasion a participant emotionally expressed their feelings that my analysis had so authentically captured their experience that they could progress both personally and professionally after reading my account in a way they had been unable to before.

One of the most difficult factors of undertaking this research was the multiple positions I held in terms of the other members of the field particularly my research participants. In keeping with the stance described in Section 2.6 whereby learning is viewed as a transformation resulting from experience, I was aware of the way in which my own lived experience could simultaneously enhance and impede my ability to interpret and analyse material pertinent to the field of technology education. For example, how could I be sure of my basis for interpreting/explaining? When was my argument reflective of my own being, and when was it capturing that of others?

My process of analysis provided an effective mechanism to sort my way through these issues. It allowed me to maximise the positive interpretive aspects of my own experiential base, whilst providing opportunities for others' experiences to be viewed by the reader from both within and outside of my personal frame of reference. This was critical as it served to provide me with tools to both construct and deconstruct a story which may otherwise have been told through a supposedly unifying voice - that is, my own.

As with any set of tools used in research, my development of analysis tools, as well as their application, transformed the site of analysis. The process of analysis reflected my own methodological position, which it then served to validate. My data was analysed through this process only, and as such some aspects would always be brought into the foreground or alternatively dropped out of focus. The choice of tools reflected the knowledges, skills and perspectives I had prior to undertaking the research, as well as those I developed throughout the research and write-up period. In so doing the tools employed both provided opportunities for, and placed boundaries around, the nature of the resultant description of the development of technology education in New Zealand this research could to provide.

By selecting concepts developed by Bourdieu and Lave and Wenger I was able to develop a process that would allow me to progressively shift the focus of my analysis away from the participant account as a reflection of themselves as an individual-in-action (Minick, 1995) towards a basis for describing the group as a collective. For example, Bourdieu's tools allowed me to view the individual within the community and allowed for an exploration of the contestations experienced on an individual and at a community level by employing the notions of habitus and capital. Providing the overarching concept of field also served to create an ongoing site for the discussions to be situated within.

Employing the descriptive potential of Lave and Wenger's communities of practice gave me a frame of reference for exploring the nature of the collective groups and from this ascertain information regarding the process of enculturation inherent within each group when viewed as a community of practice.

I consider the use of Bourdieu's concepts of habitus, capital and field have been effective tools in both my analysis and subsequent explanations. They provided me with specific aspects to focus on when analysing the transcript data, and a means of explaining how they interacted with the sociocultural environment to determine both the level and nature of subsequent practices undertaken by participants.

The usefulness of Lave and Wenger's notion of communities of practice I would evaluate as variable. Communities of practice can be very diverse in nature with members' participation levels varying overtime and varying between functioning members. Membership is often reflective of heterogenous forms of power and expertise. However, there needs to be some sense of collective 'mentality' within the membership if the notion of a community of practice is to be employed effectively.

The CDG did not have such a collective mentality. The interactions of the members within each of the separate groups making up the CDG (the MAG and CWG) were problematic in themselves in terms of a strong collective stance. The larger CDG therefore functioned even less like a 'traditional' community of practice as described by Lave and Wenger and others. As discussed in Sections 5.5 and 8.4, the interactions exhibited by this group as a collective could be at best described as a 'dysfunctional' community of practice.

However, attempting to analyse data using a particular tool that in retrospect 'doesn't work', should not lead one to assume it is the source of the data at fault. Rather, I would evaluate that, after having attempted to employ the descriptive potential of communities of practice as a tool with regards the CDG, the tool itself was not particularly useful in this instance. This may well reflect that the nature of the group's purpose was never focused on the community as a site of collective learning, but rather as a site to 'get a job done'. Thus rather than concluding the CDG was a 'dysfunctional' community of practice – I would conclude it was not, and never sought to be, a community of practice at all.

In contrast to this, I evaluate the notion of communities of practice as a very effective tool in the description of the FTG. In this case it provided a succinct descriptive account of the level and nature of the interactions within this collective in terms of enculturation and learning through practice. The inclusion of both Tim and myself, and other people involved in this programme as 'oldtimers' as discussed in Sections 7.5 and 8.4 served to further explain this group as a community of practice that had been 'designed' for learning (Roth, 1998).

Whilst the use of communities of practice as a descriptive tool has been evaluated above as not being effective for the CDG, it was particularly effective in describing the FTG, and therefore should not be discounted as a useful research tool in education.

I therefore conclude that overall, a sociocultural process of analysis as employed in this thesis, effectively served its purpose in terms of providing me with a means of both developing and presenting an historical account of the development of technology education as at the end of 1995 and insights as to why it was so, as based on the reflections of people involved. However, the final evaluation of the worth and usefulness of this process of analysis rests with the reader/s who will be the evaluator/s of the worth and usefulness of this thesis as an explanatory text that goes beyond the mere documentation of historical events.

## 9.5 Implications of the Research

### *Research Question iv)*

*What are the implications of this research for future development in technology education in New Zealand?*

Given the findings of this research and the above discussions, technology education in New Zealand as at the end of 1995 reflected a situation whereby a minimum level of reform could be predicted that would allow for 'technology' of some description to enter into New Zealand classrooms. Acknowledging that, in general, the level of teacher understanding, belief and ownership would be low at this time, the fact that technology would be implemented at all could be seen as a positive start. Realistically however, it could not be envisaged that any shifts towards meeting the potential of technology education would be evident at this stage of the field's development. That is, it would be highly unlikely that the changes discussed in Section 2.5 regarding the opportunity for students to develop a liberating technological literacy would be made by more than a few teachers scattered throughout New Zealand. For movement towards a general liberating technological literacy to begin, any reform would need to reflect that described by Goodman to be at the level of a 'radical reform' that 'would confront the cultural and pedagogical traditions and beliefs that underlie current practices and' organizational arrangements' (Goodman, 1995, pg. 2).

In the case of technology education, this would include the reconceptualisation of the concepts of knowledge, curriculum, technology, technology education and technological literacy discussed in Section 2.5 and reiterated above. By offering students opportunities to undertake technology as defined in *Technology in the New Zealand Curriculum* (Ministry of Education, 1995), the concept of technological literacy would be broadened towards being inclusive of a liberating component. In contrast, if such conceptual changes did not take place, the 'technology' being translated into classroom practice would reflect little of the critical social dimension (see Section 2.5) so crucial for technological literacy to be liberating in nature. Instead the aim of technology education would be towards developing a technological literacy that is more functional in nature enabling students to work within the boundaries of their world rather than challenging and extending these.

### **Possible advantages of a 'lacking' technology subculture**

Whilst the lack of an existing consistent technology subject subculture may be seen in negative terms regarding overall school implementation (particularly in terms of teacher ownership), it could be viewed in positive terms with regard to developing classroom practice supportive of a liberating technological literacy. That is, I suggest that a lack of a professional 'comfort' with technology education in the classroom, could result in teachers taking more guidance from the national curriculum statement than has occurred in other curriculum areas. For example, I would argue there have been many shifts in science education as represented in the latest science curriculum statement and the policies and a philosophical stance from which it was written. However, as most practicing teachers have an established professional understanding of science education, they are more likely to continue with their existing practices than change these due to new guidance from the field by way of a curriculum statement. This takes me back to my comment in Section 1.3, that making fundamental and meaningful changes in existing areas of practice is frustratingly slow and difficult.

I argue therefore, that the unease that teachers feel about the area of technology could become its greatest asset in terms of educational reform. That is, if a limited concept of technology and therefore technological literacy is treated merely as the beginning point for technology education, it may well be that the nature of technology itself will provide the impetus for change.

The importance of a critical social dimension within the philosophical and theoretical nature of the field itself is overtly supported in the technology curriculum through the inclusion of the third strand of 'Technology and Society' as explained in Section 2.3. This, along with the repeated guidance given that learning experiences in technology should integrate all three strands of the curriculum, (Ministry of Education 1995), provides validation of the importance of this dimension in all technology education programmes. Thus a heavy reliance on the technology curriculum itself could provide for change of the type and nature that a centre-periphery model of curriculum development, and subsequent educational reform based upon this, could never achieve.

I suggest that radical reforms may result out of the students' technological practices as it shows itself to be both diverse and creative. Children undertaking technological practice are motivated and challenged and in turn are motivating and challenging.

Teachers would need to actively suppress their students in order to maintain technology as a narrowly defined, decontextualised activity that they may have conceptualised it as when initially planning its implementation into their classroom programme. In this way the reform itself moves away from a centre-periphery model towards a more consultative/consensus mode of operation, whereby the teachers themselves recognise the limitations of past concepts and practices and seek to make far more substantial changes to remedy this to better support their students' learning. Through this stance, I am arguing that the field of technology education itself may be inherently self-creating in terms of a liberating technological literacy.

Rather than one of hopeless optimism, this position reflects my belief in technology as a learning area and my fundamental belief in teachers. I believe that teachers generally are in the profession to support their students' learning, and any area that provides rich opportunities for allowing this to happen will be embraced, no matter what their political resistance to it might have been in the past.

### **Possible advantage of an initial centre-peripheral model**

Whilst I have discussed the disadvantages of a centre-periphery model of curriculum development, particularly its costs in terms of teacher understanding, belief and ownership, I now wish to discuss an alternative perspective based on the potential advantages that such a mode of development may have in supporting 'radical' rather than 'ameliorative' change (Goodman, 1995).

A natural progression of the history of educational reform in New Zealand as based on that presented in Section 2.2, would have led to a very different looking technology curriculum. If the mode of curriculum development had focused on developing and moving in keeping with a consensus view from practicing teachers in New Zealand, I suggest the resultant document would have looked like a 'Design and Make' curriculum text. Whilst this would undoubtedly have had a high level of teacher understanding, belief and ownership, it would have reflected little of the theoretical and philosophical basis of *Technology in the New Zealand Curriculum* (Ministry of Education 1995). This basis is, as I have argued throughout this thesis, visionary in nature. It is outside of current practice and is in fact an example of the pushing of boundaries it upholds as part of its concept of a liberating technological literacy. Thus, as in most instances of innovative development, surely curriculum development itself must step outside of contemporary discourses in order to create new spaces where things may indeed be 'done differently' (Davies, 1998b).

Rather than producing a curriculum statement that reflects the best of what we already have, it embraces the stance that curriculum must both embrace the 'language of critique' and the 'language of possibility' (Giroux 1990).

Therefore, I am suggesting that the identified exclusive nature of the practices undertaken by the key players within the CDG particularly, reflected the necessary disruption to what would be a natural progression leading to ameliorative change only, in order to set in place a visionary new discourse of technology education in New Zealand which would support radical change in the future.

### **Implications of research findings**

The most significant implication of these research findings for future development in technology education is the dire need to effectively address the lack of understanding, belief and ownership of the key people now who are expected to bring the vision of technology education to fruition. The current implementation phase must therefore focus on developing not only the technology education understandings of practicing teachers and teacher educators nationwide, but also enhancing their feelings of belief and ownership of technology as a learning area.

Only when all of these factors are attended to, will the long process of translating the vision of technology into lived experiences for New Zealand students begin to take shape. As indicated above, the development of the FTG, was the first stage of this critical implementation phase. The explanation, and to some extent justification, of the developments prior to 1995 as provided by this research will provide one resource to aid the developing understandings and provide a basis for movement on from this point.

### **Personal Learning**

This research may also be viewed as having implications for the development of technology education in New Zealand due to my own resulting personal transformations. I continue to work in the field of technology through preservice and inservice teacher education programmes, classroom-based research, resource developments and qualification initiatives.

My own understandings of what happened and why, over the 1993 to 1995 time period have been considerably enhanced. This has served to reinforce my belief that 'single' views are often not sufficient to tell a story. Collecting and analysing multiple viewpoints allows for a significant level of augmentation of understanding that I previously had not fully appreciated.

This comment has also been made by many of my research participants, including those, who through their centrality of involvement, had considered they already had a 'sound overview' of the happenings. Having a greater understanding of the 'overall story' has in turn impacted on my ability to better make sense of my own practices and the way in which these may impact on others, both during, and subsequent to, this time period. This has particularly changed my practices regarding inclusivity. I can best describe this shift as that of a movement from a theoretically based concept to that of a practice based understanding. That is, an understanding that acknowledges the complex interactions between inclusive and exclusive practice, individual habitus and capital, group influences and sociocultural location. In short, what may seem to me to be 'inclusive' in nature, may well be perceived and/or experienced by others in quite a different light according to all these factors. Therefore working towards gaining multiple perspectives to guide my interactions is something I strive for, and encourage others to do the same.

## **9.6 Limitations and Recommendations**

### **Limitations of this research**

The limitations of this research are in many ways the same factors that provide its strength. By concentrating on nine participants only, I could gain a deep level of insight into their reflections of what happened and their perspectives of why. However, whilst concentrating on depth, I in turn lost the possibility of presenting the views of a larger number of people who were involved in some level during this time period. Involving a greater number of participants would have increased my level of representation.

Involving more participants would also have allowed for a greater level of exploration of the impact of different variables in participant backgrounds on their perspectives and practices. Attempting to explore any further the impact of variables such as ethnicity, class, gender, and subject background within a sample size of nine would hold little validity and thus within research of this type. I provided such information as background only and made no attempt to infer any generalisations from it.

Another limitation of the study is that indicated in Section 9.4 above, whereby the descriptive tool of Lave and Wenger's community of practice as applied to the CDG, was less useful than when applied to the FTG.

## **Recommendations from the research**

The following recommendations are based on the implications discussed in Section 9.5. Recommendations are necessarily purpose and audience dependent. Therefore I have chosen to focus on the area of implementation as I argue this is the area of greatest need at this point in the developing field of technology education in New Zealand. The audiences towards which I have directed these recommendations are therefore the four groups concerned most with intimately with the implementation of technology education into New Zealand classrooms - Ministry of Education personnel, researchers, teacher educators, and practicing teachers.

### ***Ministry of Education Personnel***

As outlined throughout this thesis, the Ministry of Education, specifically through Pete, has been instrumental in initiating and supporting the development of a curriculum statement in technology that is innovative and visionary. It is critical that current Ministry personnel strive to understand and validate the intent of *Technology in the New Zealand Curriculum* (Ministry of Education, 1995).

Specifically, this would require validation through future policies, curriculum support initiatives and subsequent initiatives such as the National Certificate of Educational Achievement (NCEA) and the development of national exemplars.

Curriculum support by way of Ministry of Education funded teacher professional development programmes, resource publication and school renovation funding allocation should be scrutinised to ensure they are compliant with the requirements of the curriculum, and will serve to address the issues inherent in teacher and teacher educator levels of understanding and ownership in particular. People within the Ministry of Education can not be seen to support initiatives that will provide quick fix simplistic solutions that are reactive in nature, but rather must be focused on providing informed long term solution. In order to do this, solutions should be underpinned by sound research requiring the continuation of funding for research. (Recommendations regarding the nature of this research are discussed below.)

As NCEA and the development of exemplars are across all learning areas, support must be provided to ensure that achievement standards (within NCEA) and exemplars are developed in keeping with the technology curriculum. This support should be in terms of acknowledging the different needs of technology, both as a new learning area without a current strong subject subculture to nurture it, as well as its nature as practice-based.

It is reasonable to suggest that these factors will require that developers will need more time and research support than their counterparts in other learning areas where notions of progression are better established. More professional development support will also be needed to support the effective use of the resulting achievement standards and exemplars after development.

### *Researchers*

Whilst the strong theoretical and philosophical basis has provided much guidance to the initial development of policy and curriculum, it is essential that research continues into the classroom and in so doing allows for a classroom practice perspective to become part of this basis. One of the strengths of technology education is that of praxis - the union of theory and practice. At this stage of implementation an understanding must be gained of the ways that technology education actually exists in the world of the classroom if it is to reflect the aim of the curriculum, and the vision of the developers. Investigating, trialing and evaluating appropriate teaching and learning practices, including assessment practices, will need to be the primary focus of this research.

In order to aid in addressing the issue of teacher and teacher educator lack of belief, ownership and understanding, academic researchers, teacher educators and practicing teachers need to develop partnerships to work towards this aim. Action research undertaken by teachers and teacher educators themselves would also serve to provide a variety of 'pictures' that incorporate both theoretical and practice-based understandings that are 'owned' by all involved. From this basis, effective strategies and tools for the transition of the vision of the technology curriculum into classroom practice should be developed. Such a basis will aid the development of a technology subject subculture in schools that is embedded in the lived experiences of those participating in its ongoing development. The subject subculture, if developed in this way, should add to the consistency of the field as it serves to extend and enhance its original base in much the same way as the curriculum extended and enhanced the policy. The overall coherency of the field in its curriculum development stage could therefore be re-established, with a technology subculture becoming a part of the educational culture in New Zealand schools.

It is imperative that research is also undertaken to evaluate implementation strategies that have been, and are being, developed to date. This must include the auditing of professional development programmes in terms of their impact on classroom practice.

Having this data will provide opportunities for reflection on the impact of these strategies in terms of their effectiveness regarding the aim of the technology curriculum, that is the opportunity for students to develop technological literacy that is liberating in nature.

This research would serve to identify areas of concern that will need to be targeted if classroom programmes are to reflect this aim. For example: the influence of alternative subject subcultures; the impact of unequal weighting of the strands/non-integration of strands in programmes; the influence of levels of understanding of technological practice; and the influences of resource material developed outside of the curriculum's basis. After such identification, particular strategies for targeting these areas could therefore be modeled and evaluated before they are offered as a means of modifying and/or enhancing implementation strategies.

### *Teacher Educators and Practicing Teachers*

From research such as that indicated above, professional development programmes can be evaluated in terms of their effectiveness at a classroom level. These evaluations will serve to provide material that can be analysed and used to enhance programmes in the future. However, from research already carried out in this area, the following guidelines would seem to be an appropriate starting point for all professional development programmes in technology education if they are to be consistent with current policy and curriculum, and take account of the characteristics that have been identified.

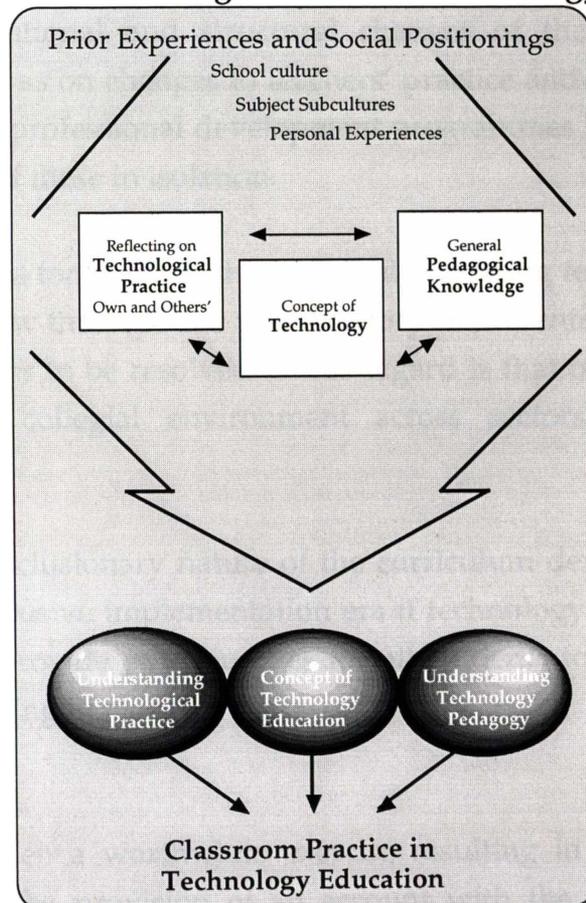
Professional development programmes should focus on identifying, understanding the influences on, and further developing teachers' own conceptualisations of technology education, technology pedagogy and technological practice. Effective ways to develop such areas include reflecting on both one's own and others' concepts of technology, pedagogical knowledge and technological practices. The prior experiences and social positionings of teachers have a major influence on their technology classroom practice. For example, overall school culture can serve to both constrain and/or enhance any programmes that are developed as part of technology education. Strategies to deal with these influences must be a part of teachers' pedagogical understanding.

Subject subcultures have a strong influence on teachers' concepts of technology and technology education, and therefore what they perceive as technological practice and their pedagogical understanding in technology education.

Other influences will be determined by teachers' life experiences both inside and outside education. Experiences of belonging to various social groupings based on categorisations such as gender, ethnicity, sexuality, ability, etc. will all influence teachers' perceptions of themselves and their practice of being technology education practitioners.

Figure 9.6.1: Becoming a Classroom Technology Teacher (see next page) provides a model that summarises these interactions. This model was derived from the experiences of trialing professional development programmes. The 1995 facilitator training programme focused on in this research was a significant component of this. The model reflects the experiences of the people involved including participants, programme deliverers and developers.

**Figure 9.6.1: Becoming a Classroom Technology Teacher**



One of the implications of this model is that teachers will need to experience technological practice in some form to become confident in the teaching of technology. Learning about technological practice is not sufficient. It needs to be experienced, reflected on (Gilbert, 1994), and critically analysed within a theoretical and philosophical framework in keeping with the curriculum statement.

Links between teachers and those in technological communities could provide a fertile ground whereby some experience of the culture of technological practice can be gained. In other words, teachers could experience a level of technological enculturation. Whilst such opportunities would aid their own technological conceptual and skill development, it could provide opportunities to reflect on the technological practice within that community, enabling a critical analysis of all aspects of this enculturation in order to 'unpick' the ethics, values and prioritisation of knowledge bases inherent in any community of practice (Lave, 1991). In doing this, community technological practice opportunities can be translated into opportunities to enhance educational technological practice whether it be of teachers or their students.

Another critical factor in professional development programmes is the need to support changes that work across multiple levels. That is, there must be focus on institutional organisational and structural changes of the school and teaching environment, as well as on changes to teachers' practice and students' learning. For long term success of professional development programmes it is not sound practice to focus on any one of these in isolation.

The recommendations for teacher educators and practicing teachers may well be the most difficult to follow through due to the history as presented in this thesis. One of the most critical issues to be resolved in this regard is that of the development of a healthy supportive collegial environment across sectors within the field of technology education.

In this regard, the exclusionary nature of the curriculum development era must be replaced with an inclusive implementation era if technology education as a field in New Zealand is to provide opportunities for all students to develop technological literacy that is liberating in nature.

### **Concluding Remarks**

This research has been a worthwhile exercise resulting in an extensive personal transformation and the provision of an account with the potential to provide a starting point to enhance the level of understanding of others in the field of technology education in New Zealand. The account is located in the context of the time and focuses on the interactions of people involved rather than outcomes alone.

This research has provided new insights into the past developments within technology education in New Zealand and from this, different ways of perceiving both the current nature of technology education and possible directions for future developments.

Through providing such an explanation of the nature of the developments leading up to the release of *Technology in the New Zealand Curriculum* (Ministry of Education, 1995) this research also serves to improve the chances of technology education in New Zealand living up to its visionary potential. That is, New Zealand students being provided with the opportunity to develop a technological literacy that is liberating in nature. This in turn will lead to New Zealand citizens who are empowered to live in contemporary society, and are capable of undertaking an informed critique of their world in order to employ their knowledges and skills to participate in its enhancement.

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## **Appendix A**

# **Informed Consent Form**

## Informed Consent Form

**Technology Education as a Developing Community of Practice: Defining the community and exploring enculturation, and its relational effect.**

### Introduction

Technology education has the opportunity to become an inclusive, stimulating and exciting field of study for New Zealand students, which should serve to allow them to develop a level of technological literacy. Such a vision for technology education relies on the activities, dispositions and concerns of technology education as a community of practice consistent with, and committed to working towards, these goals. It is essential technology education as a community of practice, is understood as a developing and changing entity. Documentation of the growth of this community of practice, complete with detailed accounts of the enculturation of people into the community, and the way in which their inclusion changes the community, will provide an important historical record. It will also allow for further exploration of the way in which such educative processes work.

### Research Questions

- Who are the people/institutions currently involved in the setting up and legitimization of technology education as 'community of practice' in New Zealand, and what are their political and social positionings?
- What are the essential/particular set of activities, dispositions and concerns of technology education as a 'community of practice', and how do these relate to, and affect, the purpose/s of technology education?
- What factors affect facilitators 'enculturation' into, including their identity construction within, this technology education as a 'community of practice'?
- What effect does the inclusion of these people have on technology as a 'community of practice'?

I, \_\_\_\_\_ (full name), give my informed consent to be a part of Vicki Mather's research project. I understand that I have the right to decline to participate at any stage of the research, and that all of my material will be discussed with me before it is used. Any data collected from me by way of quotations, will remain my property, will only be used in this research, and papers written from this research, and only after I have seen them in the context they are to be used.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_