

2006

Developing a school based science curriculum: Teachers' work as language work

Jennifer Ann Barnett
Edith Cowan University

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**DEVELOPING A SCHOOL BASED SCIENCE CURRICULUM:
TEACHERS' WORK AS LANGUAGE WORK**

**Jenny Barnett
M.A., Grad. Dip. TESOL**

**This thesis is presented in fulfilment of the requirements for the degree of Doctor
of Philosophy**

**Faculty of Education
Edith Cowan University**

March, 2006

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

While it is widely recognised that language is consequential in teachers' work within the classroom, this thesis argues that it is also consequential in their curriculum development work outside the classroom. The study takes a phenomenological approach based in a single school, and the key data sources are transcripts of teachers' meetings held to develop a new curriculum framework for their junior secondary science classes. The broad aims of the study are to better understand the ways in which language is consequential in that work, to consider the implications these have for understanding school based curriculum development, and to identify the kinds of language-related knowledges that support teachers' curriculum development activity.

The review of literature in Chapter 2 focuses initially on constructions of the teacher, the teaching labour process, and teacher knowledge, with an emphasis on the place of language within such constructions. Three currently dominant perspectives on curriculum development are then identified: curriculum development as task, as policy making and as teacher agency. While the consequentiality of language is implicit in each of these perspectives, it is not given any priority, suggesting the value of a phenomenological study focusing specifically on the consequentiality of language in teachers' school based curriculum development.

The research site is a rural South Australian high school serving a socio-economically disadvantaged community with a 19% Aboriginal enrolment. Four key themes emerged from a study of six meeting transcripts. These were: connecting with new curriculum documents; developing a unit of instruction; including Aboriginal perspectives; and incorporating a literacy focus. Contextual data were gathered from the school on each theme, including state and school education policies, interviews with staff, and teacher diaries. The study starts from context and works towards language, adopting a linguistic ethnographic approach.

A functional view of language as systemic social practice or activity was adopted as a base premise, and an analytic framework was developed, making connections between features of a Leont'evian activity system construct, Stuart Hall's articulation theory, Bakhtinian dialogism and recent theorisations of language as mode of action. Use of the analytic framework generated a detailed analysis of how language was consequential in the teachers' work on each of the four meeting themes (Chapters 5 to 8), identifying consequentiality in regard to features of text, voice and discourse and in three parameters of activity – language-as-environment, language-as-consciousness, and language-as-process.

The resultant picture led to the development of a dialogic perspective on school based curriculum development (Chapter 9), as an alternative to the perspectives previously

reviewed (Chapter 2). A dialogic perspective not only takes account of the consequentiality of language in teachers' curriculum development, but suggests a basis for incorporating language in accounts of teacher knowledge – as dialogic dispositions, understandings and skills – and has corresponding implications for further research and application (Chapter 10).

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education.

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TABLE OF CONTENTS

Chapter 1 Introducing the study	1
1.1 Antecedents of the study	1
1.2 Outline of the study	2
1.3 Outline of the thesis	4
Chapter 2 Grounding the study in a teachers' work perspective.....	5
2.1 Teachers' work.....	5
2.1.1 Constructions of teachers' work	5
2.1.2 Constructions of the teacher and quality teaching	7
2.1.3 Places for language in teachers' work.....	10
2.2 Constructions of teacher knowledge	11
2.2.1 Multiple knowledges.....	13
2.2.2 Practical knowledges	14
2.2.3 Morality in teacher knowledge	16
2.2.4 Places for language in accounts of teacher knowledge	18
2.3 Perspectives on school-based curriculum development.....	20
2.3.1 A task perspective	21
2.3.2 A policy perspective	27
2.3.3 A teacher agency perspective.....	33
2.4 Chapter review	44
Chapter 3 Developing an analytic framework	47
3.1 Theoretical foundations.....	48
3.2 The activity system as analytic construct.....	52
3.2.1 Features of the second generation Leont'evian activity system.....	53
3.2.2 Some recent three-level theorisations of human activity from outside activity theory	59
3.3 Locating language in relation to context.....	61
3.3.1 Bakhtinian dialogism	62
3.3.2 The Prague school of linguists	65
3.3.3 Some three-level theorisations of language from outside dialogism	67
3.3.4 A three-level analytic framework for language-in-context.....	70
3.4 Chapter review	72

Chapter 4 The research process.....	73
4.1 Research approach	73
4.1.1 Epistemologies informing theoretical perspectives and methodologies	73
4.1.2 Methodology	74
4.2 Research methods in action.....	77
4.2.1 The research questions	78
4.2.2 Research aims	78
4.2.3 Ethics in the research process	79
4.2.4 The research site	79
4.2.5 Data sources	83
4.2.6 Data generation	84
4.2.7 Data analysis and theory building	86
4.2.8 Reporting the study	89
4.3 Chapter review	90
Chapter 5 Connecting with new curriculum policy	91
5.1 Connecting with curriculum policy: Contexts of influence and practice.....	91
5.1.1 State education policy	91
5.1.2 Science in state education policy	94
5.1.3 School context for science education.....	99
5.2 Connecting with new curriculum policy: Teachers at work	100
5.3 Connecting with new curriculum policy: How language was consequential	112
5.3.1 Connecting with new curriculum: Articulating voice and text	112
5.3.2 Connecting with new curriculum: Articulating voice and discourse	114
5.3.3 Connecting with new curriculum: Language as environment, consciousness and process	117
5.4 Chapter review	117
Chapter 6 Developing a unit of instruction	119
6.1 Developing a unit of instruction: Contexts of influence and practice.....	119
6.1.1 Science in state education policy: The Profile for science.....	119
6.2 Developing a unit of instruction: Teachers at work	123
6.3 Developing a unit of instruction: How language was consequential	136
6.3.1 Developing a unit of instruction: Articulating voice and text.....	136
6.3.2 Developing a unit of instruction: Articulating voice and discourse.....	139
6.3.3 Developing a unit of instruction: Language as environment, consciousness and process	141

6.4 Chapter review	141
Chapter 7 Including Aboriginal perspectives in curriculum	143
7.1 Including Aboriginal perspectives in curriculum: Contexts of influence and practice	143
7.1.1 Aboriginal perspectives in state education policy	143
7.1.2 School context for including Aboriginal perspectives in curriculum	146
7.2 Teachers at work: Including Aboriginal perspectives in curriculum	147
7.3 Including Aboriginal perspectives in curriculum: How language was consequential.....	164
7.3.1 Including Aboriginal perspectives in curriculum: Articulating voice and text.....	165
7.3.2 Including Aboriginal perspectives in curriculum: Articulating voice and discourse.....	168
7.3.3 Including Aboriginal perspectives in curriculum: Language as environment, consciousness and process	170
7.4 Chapter review	171
Chapter 8 Incorporating a literacy focus in science	173
8.1 Incorporating a literacy focus: Contexts of influence and practice.....	173
8.1.1 Literacy in state education policy	174
8.1.2 School context for incorporating literacy across the curriculum	176
8.2 Incorporating a literacy focus: Teachers at work.....	178
8.3 Incorporating a literacy focus: How language was consequential.....	192
8.3.1 Incorporating a literacy focus: Articulating voice and text	193
8.3.2 Incorporating a literacy focus: Articulating voice and discourse	194
8.3.3 Incorporating a literacy focus in science: Language as environment, consciousness and process	196
8.4 Chapter review	196
Chapter 9 Towards a dialogic perspective on school-based curriculum development: Teachers' work as language work	197
9.1 A dialogic perspective on the curriculum development task	198
9.1.1 Task as goal-oriented discourse.....	198
9.1.2 Task as goal-oriented voice	201
9.1.3 Task as goal-oriented text production.....	202
9.1.4 Task from a dialogic perspective	205

9.2 A dialogic perspective on state education policy	206
9.2.1 Policy as authoritative discourse.....	207
9.2.2 Policy as authoritative voice	209
9.2.3 Policy as authoritative text production	210
9.2.4 Policy from a dialogic perspective.....	211
9.3 A dialogic perspective on teacher agency	213
9.3.1 Teacher agency as professional discourse	213
9.3.2 Teacher agency as professional voice.....	215
9.3.3 Teacher agency as professional text production	216
9.3.4 Teacher agency from a dialogic perspective.....	218
9.4 The case for a dialogic perspective on school-based curriculum development .	219
9.4.1 Contrasting a dialogic perspective with task, policy and teacher agency perspectives	219
9.4.2 A dialogic perspective on language consequentiality: Teachers’ work as language work.....	222
9.5 Chapter review	224
Chapter 10 Teachers’ work as language work: Some implications	227
10.1 Some implications for research and practical application.....	227
10.2 Places for language in accounts of teacher knowledge	228
10.2.1 Dialogic dispositions	228
10.2.2 Dialogic understandings	229
10.2.3 Dialogic skills	231
10.2.4 A dialogic perspective on teacher knowledge	232
10.3 Chapter review	232
Reference	233
Appendices.....	249
Appendix 1: Transcript episodes in Chapters 5 to 8 and Appendices 3 and 4.....	249
Appendix 2: Processes and perspective items in the Profile outcomes statements.....	252
Appendix 3: Storying a description of the digestive system.....	262
Appendix 4: Process items: From a “Literacy in the National Profiles” meeting	267
Appendix 5: Outline of a professional development application using a dialogic perspective	274

LIST OF TABLES

Table 3.1: An activity system view of other three-level theorisations of activity	61
Table 3.2: An activity system view of constructs from Bakhtinian dialogism	65
Table 3.3: An activity system view of constructs from the Prague school of linguists	67
Table 3.4: An activity system view of constructs from pragmatics of language	68
Table 3.5: An activity system view of constructs from systemic functional linguistics	69
Table 3.6: An activity system view of Fairclough’s three-dimensional conception of discourse.....	70
Table 3.7: A three-level analytic framework for language-in-context.....	71
Table 4.1: Student population at Countrytown High at the time of the study	80
Table 4.2: Projects at Countrytown High.....	82
Table 6.1: A Strand outcomes page	120
Table 6.2: Components of meaning structure in the Profile outcome statements.....	121
Table 6.3: Pointers for outcome 4.7	122
Table 9.1: Interactive purposes and the discursive goals they evidence.....	199
Table 9.2: Discursive goals and key interactive purposes	200

Chapter 1

Introducing the study

The core underlying premise in this investigation is the reciprocal relation between language and its surrounding activity, and the consequentiality of language in human activity. This has been a widely accepted premise in studies of language in recent years. For example, language has been extensively theorised by linguists as a core mode of action and resource for meaning making in social settings (Halliday & Martin, 1993, p. 22), and by sociolinguists as action “essential to social change, both from the standpoint of possible levers of change and from the standpoint of desirable levers of change” (Hymes, 1996, p. 99). As a philosopher of language in the mid-twentieth century, Bakhtin (1981, p. 271), saw language “not as a system of abstract grammatical categories, but rather language conceived as ideologically saturated, language as a world view”, and thus necessarily consequential. This study investigates the place of language as a consequential feature of teachers’ work specifically in school based curriculum development.

1.1 Antecedents of the study

This doctoral investigation stemmed from a longstanding interest in the connections between language and learning, and what these connections might mean for teachers’ work, and teacher education. I first became interested in such questions as a teacher of English as a Second Language (ESL) in Papua New Guinea in the 1960s and 1970s, and subsequently in Australia. When offering professional development for secondary school teachers working with ESL learners, I noticed that few teachers had any great understanding of the place of language in learning and teaching, nor in the discourses of their specialist areas. Time and again, as they learned to add a language-conscious perspective to their classroom practice, teachers commented about its value for all students, not just those with low English proficiency.

Later, after extensive observation in schools, I was also struck by how much the teachers’ own language was shaped by their conditions of work, and conversely by how much the teachers’ conditions of work were themselves shaped by language. I became very alert to the part played by language in “teachers actively interpreting, making sense of, and adjusting to, the demands and requirements their conditions of work place upon them” (Hargreaves, 1988, p. 211). The more I worked with teachers, the more I realised that teachers and teacher educators needed ways of understanding language more broadly as an integral part of professional practice. For me, this meant understanding more about how language

functioned in teachers' work both outside and inside the classroom. This, I believed, had significance for improving student learning outcomes, and consequently significance also for teacher education and professional development.

For my doctoral study, I therefore set out to design a phenomenological investigation that would not only make a contribution to knowledge about the place of language in teachers' work, but by locating it in a school where student learning outcomes were at issue, might be of some immediate value through the research process itself. I wanted the precise research question to grow out of the lived realities of a single school, and be responsive to that setting, so I adopted linguistic ethnography as my broad methodology, with a case study approach and methods (see Chapter 4).

1.2 Outline of the study

The study was based in a rural secondary school, which I am calling Countrytown High. This school served a socio-economically disadvantaged community, and had a recent and continuing history of struggle to improve student learning outcomes. Related to this, it had a strong commitment to developing students' language and literacy skills across the curriculum. In addition, there was a 19% Aboriginal enrolment, and the school was actively attempting to respond to issues of participation and attendance within that enrolment as well as more generally. Finally, Countrytown High actively supported the involvement of teachers in research work and was keen for them to participate and simultaneously to draw on my expertise. This met my own commitment to conduct the kind of research where the process itself is useful to everyone involved, and the researcher does not take from the research site without giving something in exchange.

During the first year of doctoral preparation, I conducted a preliminary eleven week contextual study, familiarising myself with the school setting, observing and participating in a range of workplace interactions, and refining the research topic. With support from the principal and the school's literacy coordinator, I decided to concentrate the study on locating places for language in school-based curriculum development. A new junior secondary science curriculum was to be progressively developed over the following year by a team comprising three recently graduated science teachers, with an experienced teacher as resource person and mentor. I decided to take this workplace activity as the site for locating places for language, and my substantive research question then became: "How is language consequential in the school-based development of a new junior secondary science curriculum?" The four teachers volunteered to record their meetings and talk with me individually about what was going on, and these interactions became the main data source.

Alongside the substantive research question, a methodological research question progressively emerged and eventually began to take on considerable importance. The methodological problem was that locating places for language in workplace activity

requires skills that are partly linguistic and partly social, whatever the disciplinary origin of the investigator. [. . .] What one needs at the base of the enterprise is something neither social science nor linguistics separately much provide – a social inquiry that does not abstract from verbal particulars, and a linguistic inquiry that connects verbal particulars, not with a model of grammar or discourse in general, but with social activities and relationships (cf. Dittmar, 1983). The social scientist lacks the observational skills and the linguist lacks the framework for making the connections (Hymes, 1996, p. 87).

My own origins as an investigator lay in linguistics and sociolinguistics, and I had for some time been working to integrate insights from sociology more broadly, and particularly from educational sociology. I had a framework for making linguistic and sociolinguistic observations of immediate social activities and relationships, but I did not have a framework for making more extensive connections, for taking account of broader socio-political activities and relationships impinging on the immediacies of teachers' work. Developing such a framework and the practice of analysis based on that framework became a secondary aim for the study.

I looked for methods of locating places for language from the perspective of school-based curriculum development itself, following the ethnolinguistic principle that “the key to understanding language in context is to start not with language, but with context” (Hymes, 1972, p. xix). This pursuit has resulted in the development of an analytic framework (see Chapter 3), which links dialogic theory (Bakhtin, 1981) and articulation theory (Hall, 1996) with aspects of the Leont'evian activity system construct. The development of this framework has been an important outcome of the research process.

The main data sources were the four teachers previously mentioned and the set of state policy documents with which they were required to work. Additional data sources included school policy documents, the principal and the Aboriginal education coordinator, and other science teachers working with the core group. Key data were created from observations and recordings of teachers' work in developing their new junior secondary science program. I used audiotapes of six planning meetings and four other related meetings, recorded over a period of six months. This was supported by transcripts and notes of informal interviews with participating educators, as well as field notes from participant observation in over forty science lessons, and videotapes of six additional lessons. Documentary data included: policy documents; teaching materials related to program development, such as student worksheets and assessment tasks; and teachers' diary entries reflecting on the place of language in classroom events.

1.3 Outline of the thesis

This first chapter has introduced and briefly outlined the research project. The next chapter grounds the study in relation to current research on teachers' work and documented employer requirements. It provides a review of literature relating to teachers' work, constructions of teacher knowledge, and three contrasting perspectives on school-based curriculum development: a task perspective, a policy perspective, and a teacher agency perspective. Chapter 3 develops an analytic framework emphasising the dynamic relationship between language and the larger activity in which it occurs, and provides the epistemological basis for data analysis and theorisation. This is built on in Chapter 4, where the broader methodological frame is described, as well as the research methods in action, and the form of representation used for reporting the investigation.

Chapters 5 to 8 re-present the data and analysis of how language was consequential in the teachers' curriculum development activity. Each chapter takes a single theme that was dominant in the teachers' work, namely connecting with new curriculum documents (Chapter 5); developing a unit of instruction (Chapter 6); including Aboriginal perspectives (Chapter 7); and incorporating a literacy focus (Chapter 8). Within each chapter relevant state policy and school practices are identified, data from the teacher meetings is presented and analysed, and the consequentiality of language is reviewed and theorised in terms of the chapter theme. Chapter 9 draws the analysis together to develop a dialogic perspective on school-based curriculum development, constructing teachers' work as language work, and providing an alternative to the perspectives reviewed in Chapter 2. Chapter 10 concludes the thesis by looking at some implications of constructing teachers' work as language work, particularly in regard to accounts of teacher knowledge.

Chapter 2

Grounding the study in a teachers' work perspective

The aim of this chapter is twofold. One purpose is to locate the study very broadly in the fields of teachers' work, teacher knowledge, and school-based curriculum development. The other purpose is to examine the places currently accorded to language in those fields, and to consider the extent to which language is acknowledged as consequential. This chapter therefore begins by adopting a teachers' work perspective and reviewing theoretical constructions of the teacher, quality teaching and teacher professionalism. This is followed by a critical review of studies relating to teacher knowledge, and the development of a position on teacher knowledge as a set of interrelated dispositions, understandings and skills. The bulk of the chapter is then devoted to a review of three perspectives on school-based curriculum development: a task perspective, a policy perspective and a teacher agency perspective. The attempt to uncover places for language in the literature in all these areas leads to the conclusion that, on the one hand, language is highly consequential in teachers' work, while, on the other hand, this consequentiality is currently understood in quite limited ways.

2.1 Teachers' work

The mapping of potential sites where language is consequential in teachers' work naturally depends very much on constructions of the nature of that work and of the teacher. Section 1.1 reviews constructions of teachers' work, section 1.2 reviews constructions of the teacher and teacher professionalism, while section 1.3 brings together the places for language identified through such constructions.

2.1.1 Constructions of teachers' work

A teachers' work perspective builds on a relational view of human activity. It deliberately "seeks to develop an integrated understanding by examining the pattern of social relationships and processes which constitute, shape and constrain teachers' work" (Seddon, 1991, p. 47). This relational approach opens up a space to construct language as a social relationship and process integral to constituting, shaping and constraining teachers' work. It also puts teachers at the centre of the discussion by locating teachers' work within two broad interacting relationships: an educational relationship and a labour relationship.

First, teachers are party to an educational relationship, standing between those agencies and groups with power over education and the students and

community who are to be educated. [...] Second, teachers are in a direct work relationship with their employer, the state, church or private school (Seddon, 1991, p. 48).

In the materiality of teachers' work, both relationships are constantly in interaction and sometimes in tension, so that all of teachers' workplace practices can usefully be understood in terms of a combined education-labour relationship played out differently at various times and in diverse contexts.

Because of this relationship, teachers are simultaneously members of two different discourse communities (Swales, 1990), respectively prioritising educational discourses and labour discourses. Each discourse community has a different set of common and public goals, of mechanisms of intercommunication among members, and of genres and wordings for furthering goals (Swales, 1990, pp. 24-27). Each also has a different set of cultural-historical and ideological discourses, constructing social habits alongside social interests and power relations. At different times, teachers may affiliate more closely with one community than another, but nevertheless both discourse communities always have hold of them.

The education-labour relationship is clearly evident, for example, in the staffing structures of educational authorities and teacher unions, which typically divide responsibilities in terms of a labour or educational emphasis (Preston, 1996). For example, education authorities usually have human resources units or divisions distinct from curriculum units. Similarly, teacher unions usually have industrial officers, who attend to cases involving wages and conditions, and research officers, who have responsibility for "matters of education policy, professional development and teacher education, curriculum and assessment, pedagogy, school and system organisation and funding, and so on" (Preston, 1996, p. 154). As Preston indicates, some responsibilities overlap, but these tend to be viewed from the perspective of the dominant relationship. Historically, the labour and educational relationship tended to be similarly separated in research disciplines – labour studies and education studies did not traditionally connect. However, the integrative approach adopted in a teachers' work perspective brings the two together, focusing on "teachers as workers, the teaching labour process and the industrial dynamics of teaching" (Seddon, 1991, p. 48). This study is concerned primarily with teachers as workers and the teaching labour process, and only to a limited extent with the industrial dynamics of teaching.

Groundwater-Smith, Brennan, McFadden and Mitchell (2001) put teachers' work into three broad and overlapping categories: intellectual work, emotional work and work organisation, all of which are shaped by the interaction of professional and industrial concerns. The intellectual work is related to specialisation knowledges and pedagogical knowledges; the emotional work concerns human relationships with students and colleagues in often stressful

circumstances, and the work organisation is tied in with government control structures and industrial management of schools. This theorisation emphasises the constants in teachers' work across time and social space, which have particular relevance in the analysis of teachers' everyday experience.

Some other theorisations link teachers' work not with its constants so much as with the variations associated with the changing nature of education. Hargreaves (1994, p. 8), for example, points out that at the turn of the century, educational change is shaped by "a powerful and dynamic struggle between two immense social forces: those of modernity and postmodernity." On the one hand is the longstanding heritage of modernist social conditions, and on the other is the condition of postmodernity where new patterns of social, economic, political and cultural relations shake the foundations of modernist educational structures and curricula. Constructions of teachers' work are inevitably shaped by how education authorities respond to such postmodern patterns of relations and how teachers and quality teaching are constructed within them.

2.1.2 Constructions of the teacher and quality teaching

Connell (1995) suggests three current constructions of the teacher, relating very directly to three theoretical approaches to education. The historically oldest and still most dominant approach to education in industrialised countries emphasises the production of human capital, constructing teachers "as the specialised workforce producing the larger workforce" (p. 94). A second theoretical approach focuses on the interplay between structure and agency, whereby education is "the result of partly intersecting, partly independent struggles around industrial and economic issues over the curriculum, and over the institutional shape of education" (p. 95). In this world of struggle, the teacher is a paid employee negotiating the spaces between structures of authority and personal agency. Emerging chronologically between these two is a construction of education as the production of cultural and ideological identity in a socio-political world. Here the teacher is a cultural worker sharing "in the contestation, subversion, and shifting of cultural codes" (p. 95). Together these constructions of the teacher-worker raise what has come to be a core issue in constructions of teacher professionalism – control over teachers' work.

With moves across the industrialised world towards greater control over teaching and greater formal accountability by teachers and schools, there are fears of the deskilling and proletarianisation of teachers (Densmore, 1987; Harris, 1990; Lauder & Yee, 1987; Ozga & Lawn, 1988; Perrenoud, 1996). Deskilling poses a threat to teacher professionalism, and often a binary opposition is set up between teachers as educated professionals doing intellectual work and teachers as competent practitioners doing technical work (Lingard,

1995). The former is seen as privileging cultural agency, and the latter as privileging technical agency.

Public perceptions of the proper role of teachers have varied between a belief in their importance as key professionals, entrusted to make crucial decisions about educational practice in the best interests of their students, and a view of them as low-level functionaries, in need of instruction, regulation and control (Helsby, 1999, p. 12).

In my view, claiming the teacher as either one or other of technician or professional is working with an image that is false on two counts. First, it imagines a singular, unified subject and ignores the possibility of a multiple subject with diverse, contradictory and changeable characteristics, values and roles. It thus denies the possibility of complementary practices in the one body. Second, the binary imagines a subject independent of socio-political structures, workplace requirements and material circumstances, thereby implying the possibility of free agency. It obscures the fact that teachers' work takes place in multiple social worlds and "within organisational structures and cultural norms that have contradictory effects on their autonomy" (Dow, 1996, p. 3). My preference is to recognise the inevitability of contradictory influences on teachers' autonomy, to acknowledge the political status of the professional- technician binary and to dissolve its grounds of exclusiveness (Bakhtin, 1981). This can be done by foregrounding the complex network of interdependent relations, the possibilities for their articulation (Hall, 1996), and the tensions among them. In this way, both autonomy and control are recognised as integral to teachers' work. The teacher can then be constructed as an "educated competent professional" (Lingard, 1995), combining both creative agency and technical competence within a framework of accountability.

In turn, teaching can be constructed as a complex activity requiring

enjoyment of intellectual struggle; critical reflection on policy, practice, curricula and the like; the formulation of adequate, justifiable educational goals; and the capacity to choose strategies appropriate for achieving their goals (Hatton, 1998, p. xvi).

Such a view of teaching highlights the notion of reflective practice, which is now commonly understood to embrace not only internal self-dialogue but external collaborative dialogue, whereby teachers reflect about their work together as a regular practice (Day, 1993).

Collaborative reflection is increasingly encouraged in the new work order (Grundy & Bonser, 2000), which values co-construction of meanings in dialogue.

The dialogue uncovers the values which underlie practice and are often not surfaced. With these values in view the practitioner can re-assess and re-align practice to more closely relate it to fundamental values. This dialogue takes place against a background of actual working conditions – against the culture of the classroom (Olson, 1992, p. 79).

Both self-reflection and collaborative reflection are frequently mentioned as key features of quality teaching. For example, according to Clark & Yinger (1987), Dewey argued that reflection on experience is a key tool for transformation, defining it as intelligent, responsible action towards meeting and responding to problems, and as action involving “active, persistent, and careful consideration of behaviour or practice” (p. 99). From a constructivist perspective, “[r]eflection involves deliberating on re-constructed images of past thoughts and practices” (Tobin, 1993, p. 225), and gives personal meaning to experiences, by connecting extant knowledge to new understandings (Tobin, Tippins, & Gallard, 1994, p. 46). Critical reflection in the sense of “constructive self-criticism of one’s actions with a view to improvement” (Hatton & Smith, 1995, p. 35) is also featured in accounts of quality teaching.

The tension between the old and the new is the engine which drives critical reflection – it is the source of energy for interpretation. The new always says something about the old – often the new is seen as a criticism of the old. The new, wherever it comes from, causes reflection about the old – it introduces new language, upsets old assumptions, threatens loss and promises plenty (Olson, 1992, p. 80).

This is similar to “critical constructivism” (Tobin & Tippins, 1993, p. 20), where psychological, ethical, moral, and political beliefs are revealed through self-regulation.

In addition, quality teaching in postmodern conditions includes critical reflection grounded in critical theory, in the sense of “the acceptance of a particular ideology” and “making judgements about whether professional activity is equitable, just, and respectful of persons or not” (Hatton & Smith, 1995, p. 35). More specifically,

[...] it involves questioning taken-for-granted thoughts, feelings and actions. Through such reflection, teachers may confront and perhaps transcend the constraints they otherwise perceive as normal or natural (Louden, 1991, p. 160).

Gibson (1986) insists that critical reflection of this kind is needed to identify different levels of explanation (and hence action) in understanding what is happening in student learning and teachers’ work. This kind of applied reflection suggests constructions of the teacher that rate teacher agency high in the professional work of teachers.

Lawn (1996), in historicising the social construction of the “modern” teacher since the 1920s, emphasises the changing dynamics of professional ideals and their links to broader socio-political themes. More specifically, Seddon (1991, p. 48) points out that “the notion of professionalism is not fixed. It changes historically and is used to different effect both by teachers and by the state.” Nevertheless, despite its socially constructed nature, there are several commonly agreed features of professionalism. Professionalism requires specialist theoretical and practical knowledge, the use of such knowledge in “skilful action that is adapted to its context” (Calderhead, 1987, p. 3), a certain degree of autonomy (Densmore,

1987) mixed with compliance (Dow, 1996), and a strong measure of morality (Fenstermacher, 1990; Sockett, 1993).

Hargreaves and Goodson (1996) propose that teacher professionalism be “guided by moral and socio-political visions of the purposes which [it] should serve within actively caring communities and vigorous social democracies” (p. 20). Unfortunately, however, the ideal of an actively caring vigorous social democracy has not been consistently enacted by recent government actions in Australia, and there is a risk of losing sight of moral and socio-political visions in the mists of “imagined communities” (Anderson, 1983) that bear little relation to the mass of the population. Such visions need to be grounded in cultural-historical understandings of the experiences of students and their families in the postmodern conditions that both Hargreaves and Goodson talk about so eloquently in their work. This is supported by a study in 16 American high schools, which indicates teacher professionalism as “contingent upon the strength and character of the local teacher community” (Talbert & McLaughlin, 1994, p. 124). A “principled professionalism” (Goodson, 1999) would take account of local postmodern conditions and call for principled choices among discourses of professionalism, acknowledging social and moral dilemmas in school-based curriculum development, and establishing spaces for reflective practice in curriculum decision making (see section 2.3.3 of this chapter).

2.1.3 Places for language in teachers’ work

Very little of the literature reviewed offers any indication that language has a place in teachers’ work, let alone multiple places. While debate may rage about the teacher as technician or professional, there is no debate at all about the very different kinds of language called for in the two roles. Similarly, while details of quality teaching are spelled out and ideal practices envisioned, there is no acknowledgement of the challenges these pose for teachers in their practice of language; there is no mention of the role language plays in generating and manifesting such attributes as enthusiasm, care, honesty and subject understanding, or such processes as pedagogy, teacher learning, community involvement and accountability. And likewise, theorisations of teacher professionalism do not mention language, even when postmodern conditions of collegial interaction are in question, nor is it an acknowledged feature in situated studies of teacher professionalism. What does emerge, by contrast, is a sense of professionalism as itself discourse – shaping, constituting and constraining the very object of which it speaks. To this extent, language clearly has a place in teachers’ work, since discourses are inherently language-dependent (Swales, 1990). However, the literature on discourses of professionalism does not explicitly acknowledge a place for language either in dealing with the discourses or in enacting professionalism in material settings.

Nevertheless, there is a considerable body of research on language in teachers' work that clearly does demonstrate its importance. To date, most research has focused either on classroom discourse practices (e.g., Baker & Freebody, 1988; Cazden, 1988; Christie, 2002; Freebody & Baker, 1996; Green & Dixon, 1993), or the language of discrete subject areas across the curriculum (in the case of subject science, examples include Bazerman, 1998; Gardner, 1974; Halliday, 1990; Halliday & Martin, 1993; Martin, 1990, 1998). A third area has been language as a factor in learning (where examples in science include Bills, 1993; Engeström, 1990; Gardner, 1974; Kulkarni, 1988; Lemke, 1990). The importance of language in teachers' work outside the classroom is clearly acknowledged in studies of educational policy making (e.g., Ball, 1990; Bella, 1997; Bowe & Ball, 1992; Corson, 1995; Fensham, 1995; Luke, Nakata, Singh & Smith, 1993; Ozga 2000), and in studies of teachers' collaborative planning, teaching and reflection (e.g., Clandinin & Connelly, 1992; Clark & Yinger, 1987; Day, 1999; Doyle, 1992; Loudon, 1991; Roth, 2002). In addition, several recent studies stress the importance of language in teachers' professional learning (e.g., Burton, 1998; Freeman, 1996).

If, as the above sub-sections suggest, teachers need to be self-reflective "to make meaning out of their own practice in relation to the different discourses available to them" (Grundy, Warhurst, Laird, & Maxwell, 1994, p. 120), then teachers' work involves language work, as I argue in this thesis. If, as the discussion similarly suggests, teachers also need to be critically reflective to make meaning out of the material effects of different discourses, the tensions among them, the dilemmas they pose, and the power behind language (Fairclough, 1989), then again teachers' work must be constructed as language work. This has powerful implications for constructions of teacher knowledge.

2.2 Constructions of teacher knowledge

Teacher knowledge has often been broadly categorised in terms of theoretical knowledge and practical knowledge (Densmore, 1987), both of which may be further categorised in terms of specialist subject knowledges and general pedagogical knowledges. In an effort to be more precise, Shulman (1987) approached the matter from a large-scale research base, developing seven distinct categories of teacher knowledge. These categories imply a range of tasks that teachers engage in, and a range of roles that might be taken up within them.

They are:

- content knowledge
- general pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organisation that appear to transcend subject matter

- curriculum knowledge, with particular grasp of the materials and programs that serve as “tools of the trade” for teachers
- pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding
- knowledge of learners and their characteristics
- knowledge of educational contexts, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures, and
- knowledge of educational ends, purposes, and values, and their philosophical and historical grounds (Shulman, 1987a, p. 8).

None of these categories mention language, and yet every one of them is language-dependent to a considerable degree, in terms of teachers both acquiring those knowledges and enacting them.

In addition, of the seven categories, none prioritises teachers’ “capacities to operate as designers and producers of knowledge” (Connell, 1995, p. 110), or their capacities to learn on the job and to generate new ideas on the job, through practices of reflection as well as the experiential acquisition of event-structured practical knowledge (Carter & Doyle, 1987). The absence of professional knowledge creation from an account of teacher knowledge situates the teacher as less than professional, since designing and producing knowledge is a hallmark of the professional. Its absence also marginalises the language associated with knowledge creation, without which little advance can be made in professional development.

Shulman’s categories have endured as a respected reference point in the literature on teacher knowledge, and provide a useful starting point for this discussion. The research methods that led to the categories were such that knowledge was initially “investigated as the ongoing coordinated practices of actual people” (Smith, 1990, pp. 62-63), rather than as an abstract theorisation. This suggests the potentially high validity of the categories. Nevertheless, categorisation invites critique, since categories in scholarly research tend to present themselves as objectively true (McEwan & Bull, 1991), whereas in fact they represent a particular way of knowing and inevitably incorporate the priorities and limitations of that way of knowing. Shulman’s categories generated considerable discussion at the time of publication, and, while much was found useful, a number of issues were raised. In the light of these and of continuing developments in the intervening years, I have identified the following themes that suggest alternative ways of constructing teacher knowledge and places for language within it. These are: multiple knowledges, practical knowledges, and morality

in knowledge. The section concludes with a review of how language is represented in some current professional teaching standards documents.

2.2.1 Multiple knowledges

Typically, the act of categorisation fails to represent (a) the uncertain, unfinalised nature of knowledge in general, which postmodern conditions consistently make apparent, and (b) its socially constructed nature. Both these features are better captured in Foucault's notion of a "regime of truth" as "the ensemble of rules according to which the true and the false are separated and specific effects of power attached to the true" (Foucault, 1980, p. 132). When the "truth" is powerfully sanctioned, the line between belief and knowledge fades, and the dispositions teachers bring to their work may reconstruct hegemonic regimes of truth in terms of situated interests. This makes for uncertain truths.

A knowledge is selective and not comprehensive: it comprises both what is known (and therefore has an exclusionary as well as an inclusive function) and a way of knowing that is coherent and systematic. It involves also the power relationship between the knower, the process of knowing and the known. It serves the interests (material and political) of the social formation which produces it and is evaluated not by reference to an objective and absolute truth but by its social and historical effectivity (which can be traced and assessed) and by its relationship to other knowledges that it struggles to repress, evade or delegitimate (Fiske, 1993, p. 14).

Recognising the articulation of knowledges and their social formation means problematising the nature of teacher knowledges. Each knowledge is necessarily shaped by cultural and historical forces, including language; each is necessarily part of a wider system of social relations; and each is necessarily subject to change.

Such a perspective highlights the way generalised constructs such as Shulman's "knowledge of learners" and "the character of communities and cultures" make diversity invisible, and obscure the fact that teachers are necessarily limited in their experience of diversity and their capacity to respond to it in educationally equitable ways. Unproblematised, such generalisations discount the range of ideological positions that might underpin them in the workplace world.

A clear analytic grasp on a number of social issues, such as social class, gender, sexual orientation, ethnicity (including issues relating to the education of Indigenous people), geographical location and school-community relations, together with a knowledge of the strengths and weaknesses of the relevant policy documents, is crucial to a teacher's capacity to facilitate worthwhile learning for all. Study of these issues demonstrates how social disadvantage is produced and in the absence of appropriate practice, such as teacher and curricula responses, reproduced (Hatton, 1998, p. xix).

Knowledge of how to engage with contextual diversity and with cultural and value conflicts is central to teachers' understanding of education as non-neutral and to their political and creative agency in education.

Turnbull (1993) insists that multiple knowledges can co-exist without the need for a dominant knowledge to displace others.

Knowledge, in so far as it is portrayed as essentially a form of representation, will tend towards universal homogenous information at the expense of local knowledge traditions. If knowledge is recognised as both representational and performative it will be possible to create a space in which knowledge traditions can be performed together (Turnbull, 1993, pp. 560-61).

However, performative aspects of knowledge are not brought out through Shulman's categories, as this next concern in the literature indicates.

2.2.2 Practical knowledges

The next major concern that can be raised in regard to Shulman's categories is the privileging of technical knowledge, and the associated marginalisation of practical knowledge. The categories are all cast as declarative knowledge, knowledge "of" and "about," or what Ausubel (1968) refers to as knowledge "that." Although practical knowledge, or knowledge "how," is implicit in terms such as "pedagogy," "classroom management," "educational ends, purposes, and values" and "professional understanding," the casting of each category as knowledge "that" obscures the active situated nature of such knowledges. Emphasising knowledge "that" undervalues the interactive aspect of teaching, and the personal and interpersonal skills involved, including language. Connell, for example, talks about "craft skills," notably "ways of conveying information, ways of managing groups, ways of relating to pupils, ways of managing time, and ways of managing one's own emotions" (Connell, 1993, p. 60).

Practical knowledge can be linked with what Schön (1987) has called "knowing-in-action" where "the knowing is in the action. We reveal it by our spontaneous, skillful execution of the performance; and we are characteristically unable to make it verbally explicit" (Schön, 1987, p. 25). Knowing-in-action is based on learned assumptions about how to do something bodily, and is characterised by awareness of variables, appreciation of variation, and adjustment to variation through a "continuous detection of error" (Schön, 1987, p. 26), which may be largely unconscious, once the procedure has been learned. It involves awareness, appreciation and adjustment, which occur unconsciously in response to variations in phenomena (p. 29), as when teachers re-phrase an instruction to make it clearer. Any description of knowing-in-action is a construction from memory of experience and thus can be incorporated as part of declarative knowledge "that," although knowing-in-action is

independent of knowledge “that.” Olson (1992, p. 46) similarly makes a distinction between tacit knowledge and articulate knowledge, where the first precedes the second. Olson refers to Polanyi’s point that our powers of knowing “operate widely without causing us to utter any explicit statements and even when they do issue in an utterance this is used merely as an instrument for enlarging the range of tacit powers that originated it” (Polanyi, 1958, p. 27).

In the literature on teaching, practical knowledge refers specifically to knowledge based on a person’s situated experience, which finds expression in practice (Clandinin, 1986; Connelly & Clandinin, 1985; Day, 1990, p. 236; Elbaz, 1981). Connelly and Clandinin (1988) use the term “personal practical knowledge” to refer to

the teacher’s past experience, in the teacher’s present mind and body, and in the teacher’s future plans and actions. [...] a particular way of reconstructing the past and the intentions of the future to deal with the exigencies of a present situation (Connelly & Clandinin, 1988, p. 25).

Elbaz (1981) characterises practical knowledge in terms of content areas, orientations and structural forms. She indicates five content areas of teachers’ practical knowledge: curriculum, subject matter, instruction, milieu and self. While the first four of these are evident in Shulman’s seven categories, the self is not, and adds a dimension that has already been highlighted in some of the constructions of the teacher and teacher professionalism earlier in the chapter. Within each of the five content areas, Elbaz proposes five orientations for teachers’ practical knowledge: situational, social, personal, experiential and theoretical (theoretical as an orientation, while the knowledge itself is practical). Last, Elbaz suggests three structural forms of practical knowledge: rules of practice or “how-to” statements, practical principles or more general statements, and images or metaphors of what good teaching should look and feel like. Usually “how-to” statements are materially oriented and task-focused, while practical principles require a broader frame of reference than a single task. Practical principles can be understood as “those pedagogic principles which emerge from and constantly guide actual classroom practice” (Breen, 1998, p. 3), acting as a source of experientially-based professional wisdom. As Breen and others (e.g., Clandinin, 1986; Tobin, 1993, 1996) point out, such principles may be heavily reliant on image or metaphor, whereby language brings knowledge creation into the public arena, out of tacit knowledge and into articulate knowledge.

Theorising practical knowledges in such ways permits their legitimation in teacher professionalism, and correspondingly reduces the privilege accorded to declarative knowledges. At the same time, it constructs a different meaning for knowledge, which sits uneasily with traditional meanings. One way of avoiding that tension is to refer to knowledge “that” as understandings, and to knowledge “how” as skills. This is the course I have chosen to adopt.

2.2.3 Morality in teacher knowledge

In a specific response to Shulman's (1987a) article, Sockett (1987) indicates a particular concern related to theorising knowledges associated with morality. He points out that teachers are a professional community with moral responsibilities, and that this should be reflected in the description of "both educational ends (ideals, goals, and so on) and means (the techniques, strategies, and repertoires)" (Sockett, 1987, p. 212). Shulman considers morality to be implicit in the list (Shulman, 1987b), and I have no quarrel with that. However, I agree with Sockett that this is not enough and that the moral component in teachers' work needs to be more visible. Shulman's categorisation could easily be read as supporting the view of the teacher as having only technical agency, with no cultural, political or creative agencies.

Aspects of morality in teaching have been explored by several researchers in the tradition of Dewey (e.g., Buzzelli & Johnston, 1997; Goodlad, Soder & Siromik, 1990; Jackson, Boostrom & Hansen, 1993; Noddings, 1992), and there is a body of information to support the view that "teaching demands not only technique, but virtue . . . [and that] excellence lies with the dispositions teachers bring to their job as members of a moral community" (Olson, 1992, p. 10). However, there is in reality no single "moral community" that teachers are attached to, and what counts as moral is not consistent across sites and events: "the judgement of right and wrong is always complex and polyvalent" (Buzzelli and Johnston, 1997, p. 1). In addition, morality is not a unified concept that sits unproblematically in the teacher collective. Rather, it is a contextually grounded construct rooted in relations among specific individuals (Noddings, 1984). According to Buzzelli and Johnston, morality, unlike ethics, which may be imposed by the collective as a code of practice, "is by its nature individual, and constitutes inner, personal sets of values and beliefs [which] cannot be regulated by external organisations, but must always be mediated by individuals" (p. 2). The active individual "is never entirely and simply 'stitched' into its place in social organisations of power" (Grossberg, 1989a, p. 137).

Such views of morality raise the question of whether morality is to be considered a type of knowledge, or rather a set of dispositions towards action, or a set of virtues. Sockett (1993) speaks of virtues, while Olson (1992) speaks of both dispositions and virtues. If we are to talk of dispositions, how might they relate to the principles of practice? Should morality be represented as an integral part of the technical and practical knowledge required to undertake teachers' intellectual, emotional and organisational work? Or should it be considered separately? For example, in discussing issues of school leadership, Sergiovanni (2000) uses Habermas (1972) to make a distinction between what he calls the "systemsworld," relating to the technical interest and systems of knowledge, and the "lifeworld," relating to values,

morals, emotions and social experience. While Sergiovanni is concerned with highlighting moral judgement in professional practice, there is a danger in such a distinction, since it suggests that systems of knowledge and technical interests are not themselves value-laden, and that it is justifiable to set them apart from the lifeworld. Too great an emphasis on the distinction might suggest that the socio-political construction of what counts as true, the regime of truth, can be discounted as part of morality in teacher knowledge.

As I see it, regimes of truth and the local (re-)articulation of regimes of truth, together with notions of morality and multi-located knowledges, suggest a third type of teacher knowledge in addition to declarative knowledge “that” (Ausubel, 1968) and internalised practical knowledge “how.” This is “criterial knowledge” or knowledge “whether” (to parallel Ausubel’s phrasing), which might be seen as a set of dispositions and tendencies towards action in the world. I visualise it alongside knowledge “that” and knowledge “how,” binding the other two into cultural and historical contexts in terms of viability. This notion of criterial knowledge, or disposition to viable action, lays no claims to high moral ground, or to an underlying emancipatory interest (Habermas, 1972), since it places no definition on what might actually count as moral or emancipatory in different cultures, eras and lived situations. As a construct, it may incorporate any kind of values, and assumes diversity, contestation, and changing constructions of what counts as viable in a particular setting. It is inherently selective and exclusionary, serving the interests of the social formation that produces it, and liable to be in conflict with other criterial knowledges.

Criterial knowledge can be understood as a feature of the educational decision making central to teachers’ work. It connects with choices available and not available, obvious and hidden, as well as with the interests and values associated with alternatives and the potential network of effects and counter-effects. The weighing up and making of (interested) choices must inevitably draw on knowledge “whether,” as must any kind of critical reflection, such as when participating in policy critique and development, evaluating content selections and omissions, and assessing one’s own role in perpetuating or reducing social injustices in education. Criterial knowledge is integral to the adoption of referents, such as constructivism or accountability, as organisers of knowledge (Tobin, Tippins & Gallard, 1994). I see it as central also in the development of the pedagogical principles that mediate between teachers’ beliefs and practices (Breen, 1998), and that can be formulated by teachers during reflection (Louden, 1991) or represented as images (Elbaz, 1981; Clandinin, 1986). Without knowledge “whether,” teachers are unable to exercise professional discretion in pedagogical dilemmas or in reconciling the interests of different stakeholders in their work. In other words, they have no disposition to take viable action in any particular direction. This is obviously quite contrary to societal expectations of teachers, as well as expectations in the

education-labour relationship, and expectations constructed in professional standards for teaching.

Constructing teacher knowledge as dispositions, understandings and skills makes it possible to de-throne declarative knowledge from its traditional modernist position of power, and to integrate criterial and practical knowledges on equal terms. An emphasis on knowledge “how” and “whether” makes human interaction more visible than an emphasis on knowledge “that.” There is thus the potential for raising the profile of language in all three types of knowledge.¹ This can be glimpsed through a brief study of some Australian professional teaching standards.

2.2.4 Places for language in accounts of teacher knowledge

In the theoretical accounts of teacher knowledge reviewed above, few places for language were acknowledged, although they were certainly implicit. By contrast, places for language can more readily be identified in some of the professional teaching standards documents that have emerged recently in Australia. Three of these are reviewed below.

In South Australia, where this study took place, a professional teaching standards document is currently nearing completion. However, the document in force at the time of the study was a government booklet entitled *Teachers’ work*, first produced in 1992 and updated in 2001 (see also section 3.1 below). This was designed “to present a clear and detailed description of the work which teachers in the Department of Education, Training and Employment of South Australia are expected to perform” (2001, p. 3). In other words, it was designed to be both a job specification and a performance management tool. It constructs the teacher primarily in terms of skills, reflecting the competencies approaches of previous years, while understandings and dispositions are subsumed and implicit within the skills.

The *Teachers’ work* standards make reference to language in several places, both explicitly and implicitly. Standard 1 requires understanding of learners’ linguistic backgrounds and their implications for educational opportunity, as well as skills and dispositions to take that knowledge into account and respond to the associated needs, rights and contributions of learners. Standard 2 implies talking with people in ways which support collaboration and comfort, as well as links to English language proficiency. Standard 3 can be interpreted as building on standard 1 in regard to programming for and assessing linguistic achievement; it

¹ Dispositions towards language, for example, might highlight criterial knowledges such as whether to adopt scientific discourse with particular students, whether to encourage bilingualism in the classroom, and whether to assess a science assignment for literacy as well as content. Understandings about language might include declarative knowledges such as: that the language of science represents the culture of science, that language has different forms for different purposes, and that classroom language has the power to uplift or to injure. Finally skills for language might include such procedural knowledges as how to write a term report, how to teach the genres of science, and how to correct students’ written language.

also involves a discursive understanding of educational policy, as well as skills and dispositions for communicative reporting. For example, “the teacher provides learners with meaningful feedback [and] provides parents/caregivers with meaningful reports on learner assessments, [which are ...] “descriptive, accurate and understandable” (Department of Education, Training and Employment, 2001, p. 10). Discursive resources are implicit in standards 4, 5 and 6, but not given recognition, except perhaps in the use of the term “explicit” in “the teacher establishes explicit expectations for behaviour conducive to learning” (p. 14) and in the use of verbal processes in some of the indicators, e.g., “communicates,” “negotiates,” “provides a clear statement,” “reasserts,” “documents” (p. 14). Finally, standard 7, like standard 3, involves discursive understandings of educational policy. By contrast, the document makes no reference to language across the curriculum, no reference to students’ linguistic proficiencies (only “backgrounds”), and no explicit mention of the discursive skills required to effectively conduct teachers’ work.

Another state education authority, Education Queensland, provides a more recently developed set of employer standards – twelve in all. The Queensland document values language with considerably more strength and detail than the South Australian *Teachers’ work* document. There is a designated standard for language, literacy and numeracy and another standard for information and communications technology. In both cases language is treated as object of instruction, and teachers are required to inform their professional practice accordingly. For example, teachers are to demonstrate a knowledge and understanding of:

- policies and documents on literacy
- how English functions contextually
- language development and pedagogies
- the language demands of the curriculum
- sources of difficulty in language learning
- needs identification
- assessment of progress.

The document also recognises language as a factor to be considered in curriculum construction. For example, teachers must provide a learning program which values cultural and linguistic backgrounds of learners and the community, taking account of relevant policy. This implies adopting the necessary dispositions and practising the necessary skills to act responsively to the understandings associated with the language focused standards. In addition, the standards make explicit mention of teachers’ discursive skills, as in the

requirement that teachers have effective communication skills (for creating quality relationships, informing, liaising, consulting, negotiating). There are also other implicit connections with language, needing some inferencing to identify them. For example, language is implicit in the standards requiring construction and deconstruction of knowledge, negotiation and conflict resolution skills and skills for managing group dynamics.

Finally, taking a discipline specific perspective, the National Association of Science Teachers of Australia (2002) produced *National professional standards for highly accomplished teachers of science*. While this document is more limited in its references to language than the Queensland generic standards, it makes two important points that are not explicit in the Queensland document. One point concerns the importance of helping students access the discourses of the learning area, and the ideologies they represent. The other point refers to teachers learning through “reflection on practice in the company of colleagues,” where it is important that they “be explicit about their practice and the reasons behind their professional decisions” (National Association of Science Teachers of Australia, 2002, p. 6). While the reference to language here is implicit, it is nevertheless clear, and suggests a requirement for particular discursive dispositions, understandings and skills.

These three professional standards documents together suggest places for language in four distinctive areas of teachers’ work: in classroom practice, curriculum decision-making, policy interpretation, and professional learning. However, these places are merely sketched out and sometimes barely visible even to the searching eye. There is clearly a need for a better understanding of how language is consequential in these areas, of which the last three – curriculum decision making, policy interpretation and professional learning – are particularly relevant in school-based curriculum development.

2.3 Perspectives on school-based curriculum development

For the purposes of this study, the term “school-based curriculum development” is a broad term referring to (a) the production of curriculum outlines for use by teams of teachers in the school, and (b) teachers’ programming and lesson planning. In Australian schools, “curriculum” and “program” can refer both to a lived experience and a written document preceding lived experience, and intended to frame teachers’ practice. Putting the emphasis on the lived program allows programming to be constructed “as an intentional-reflexive activity comprising the (recursive) moments of planning, acting and reflecting” (Green, 1990, p. 53). This in turn allows the traditional linear-rational view of programming to be reconceptualised as “situated action” (Reid, 1995). The notion of intentional-reflexive activity can also be applied, I believe, even when a team of teachers is required to produce a

curriculum outline to serve as a guide for a number of teachers over several years. This is because those same teachers have historically been and are simultaneously preparing individual class programs, enacting a lived program, and feeding information back into initial drafts of the collective curriculum outline. I propose that curriculum development in such cases is simultaneously “pre-determining action” and “situated action.”

In regard to how language is implicated in school-based curriculum development, Green (1990) suggests programming as a form of professional writing with its own textual conventions and meaning-making practices, “best conceived, and practised, as a *composing* activity, [which] involves seeing it emphatically in terms of thinking and meaning” (Green, 1990, p. 48). This is the view I adopt in this study, in regard to school-based curriculum development more broadly, and I similarly understand “composing” to include not only the production of written text but all the talk that directly leads up to written composition.

My reading indicates three currently dominant perspectives on school-based curriculum development: a task perspective, a policy perspective, and a teacher agency perspective. The task perspective emphasises operational characteristics and requirements, the policy perspective emphasises accountability in the education-labour relationship, while the teacher agency perspective emphasises the power of the locale. Each perspective contributes something necessary to a comprehensive understanding of the nature of school-based curriculum development, although in discussions of teachers’ work they are typically not brought together but either occur in isolation or articulation counter-posed oppositionally. The following sub-sections provide a characterisation of each perspective, of how language is implicated in each, and reflections on their constructions of school-based curriculum development.

2.3.1 A task perspective

A very clear example of a task perspective on school-based curriculum development is presented in the 16-page document produced by the Department of Education, Training and Employment of South Australia “to present a clear and detailed description” of the work which teachers are expected to perform (2001, p. 3). This document, titled *Teachers’ work*, is both a job specification and a performance management tool. On the opening page, teachers’ work is repeatedly referred to as “task” – as in “a teacher’s task is to facilitate learning,” a “statement of duties and tasks” and “key component tasks,” which are also referred to as criteria for managing performance and are elaborated through a set of indicators for successful task accomplishment. The document identifies seven “core dimensions” of teachers’ work, of which the one entitled “curriculum accountability” best reflects the focus of this study, particularly through its concise one-page account of

“programming and planning.” This functions as what Doyle (1992) calls “situational instructions for thinking and acting” to achieve required outcomes in a task (p. 503). Doyle sees situational instructions as contributing to the construction of the situation in which the task is enacted, and identifying the attributes required, as well as any learning to be undertaken by participants. Doyle suggests three components – goals, conditions and operations – as useful tools for investigating the nature of task.

Task as goal, conditions and operations

The *Teachers’ work* page opens with a “nature of the work” statement, quoted below, which at once furnishes the reader with the goal of the task: “to provide a program.” It also indicates four distinctive goal dimensions:

The teacher should provide a balanced [goal dimension 1] and challenging [goal dimension 2] program relevant to the needs of learners [goal dimension 3] and consistent with the ideals and aims of public schooling in South Australia [goal dimension 4] (Department of Education, Training and Employment, 2001, p. 9).

The program must be balanced, reflecting the fact that state mandated curriculum is divided up into “learning areas” and “strands” of content within learning areas. It must be challenging, since high quality education is required to prepare for a politically acclaimed “knowledge society” in Australia. The program must respond to learner needs, since this is a core component of education policy established in a previous position statement entitled *Educating for the 21st century* (1990). The program must also be consistent with the ideals and aims of public schooling, which are enshrined in overarching state education policies, in curriculum policy for specific learning areas, and in across-the-curriculum policies on topics such as multicultural education, assessment and reporting, gender equity and anti-racism. A fifth goal dimension – comprehensiveness – is added in the first of four key component tasks, which expand on the initial goal statement; specifically, the teacher is to plan “a comprehensive learning program within mandated curriculum frameworks.” The document does not open up any possibility of tension in integrating the various goal dimensions.

In addressing the above goals, teachers are required to take into account:

- knowledge about learners including the different needs of individuals and groups
- achievement data
- school/centre improvement priorities
- curriculum policy
- department policies, guidelines and support documents
- other resource information (Department of Education, Training and Employment, 2001, p. 9).

These dot points simultaneously elaborate the goal dimensions and indicate task conditions (Doyle, 1992). We can infer that task accomplishment is conditional on access to, and understanding of, a range of information, against which the teachers' work is accountable.

The first two conditions for successful task accomplishment directly relate to learners – knowledge about them as individuals and groups, specifically knowledge about achievement and needs. The following three conditions relate to a policy hierarchy that frames school-based curriculum development. It is noticeable that local, school-based priorities are placed higher up on the list than state education policy. School improvement priorities are required by the state to be formulated as a three-year “school development plan” designed “to improve educational outcomes and [...] ensure a better school providing better education for students” (Department of Education, 1985, p. 1). This school development plan is expected to be backed by other school policies such as the school discipline policy. The last condition for successful task accomplishment is a general “other resource information” condition, including instructional materials and sources such as the local community and the Internet. The document does not address possible tensions within and across these conditions of task accomplishment, or that certain conditions might add complexity to the operations involved.

The criteria and indicators also suggest some of the operations involved in programming, and how they relate to the stated goal dimensions and conditions. The set of indicators cited above required teachers to “take into account” a whole series of material resources as part of constructing a comprehensive program. The other indicators suggest operations such as designing learning activities to enable the achievement of the identified outcomes and developing strategies to resolve potentially difficult aspects of learning (Department of Education, Training and Employment, 2001, p. 9).

The operations specified in the criteria for task accomplishment, identified below, are broadly generic. The teacher

- plans [operation 1] a comprehensive learning program within mandated curriculum frameworks
- structures [operation 2] the program in a manner which facilitates learning
- incorporates [operation 3] the use of information and communication technologies in the learning program
- regularly monitors [operation 4], reviews [operation 5] and responds to [operation 6] the effectiveness of the learning program (Department of Education, Training and Employment, 2001, p. 9).

The first three operations – planning, structuring, and incorporating information and communication technologies – occur prior to and as part of text production, as well as continuing subsequently. The last three – monitoring, reviewing, and responding to perceived effectiveness – occur only subsequent to text production as part of program enactment and preparation for ongoing text variation. This accords with the conceptualisation of teachers' curriculum development as

a recursive design cycle similar to the processes hypothesised to go on in the work of architects, physicians, artists, designers, and other professionals. ...each planning event can be influenced by prior planning and teaching experiences and ...each teaching event feeds into future planning and teaching processes (Yinger, 1977, cited in Clark & Peterson, 1986, p. 265).

This recursive understanding depicts teachers' curriculum development as always in the making, responsive to changing circumstances and changing understandings, dialogic in nature, building on a whole complex of knowledges and voices interacting with one another. This complexity of operations suggests a professional, rather than a technical, undertaking.

Tikunoff (1985, cited in Richards, 1990) connects operations to task demands deriving from three task conditions: mode of response, mode of interaction and complexity. Demands relating to response mode are linked to outcomes, such as the kinds of product required, the sequence of production and the time frame. This includes the dispositions, understandings and skills needed to generate the product. The mode of response for teachers' curriculum development is spoken and written text production: spoken text production, since curriculum development is typically collaborative or mentored (either through internal or external speech), and written text production, since the goal involves some kind of document for programming and accountability purposes. Demands relating to mode of interaction are linked to participant relations and strategies, and to human support in accomplishing the task, including feedback. *Teachers' work* (Department of Education, Training and Employment, 2001) indicates that engaging with policy documents is an important mode of interaction. Teachers are expected to be able to make sense of policy documents and relate the ideas back to their own teaching context in ways that are responsive to that context. This means a considerable demand for interpretive and critical language resources. Demands relating to task complexity are linked to how difficult the task is for particular participants in particular conditions, or problem spaces. For example, highly accomplished teachers of science build learning programs around the powerful ideas of science and

clearly demonstrate links with other areas and the larger framework of scientific knowledge that students will acquire. [...] For them, the science curriculum is not a pre-determined rutted path, but a landscape. They plan programs that help students learn to begin to see this landscape and to find their own way around it (National Association of Science Teachers of Australia, 2002, p. 16).

The task demands in such a conceptualisation suggest three further specific operations for meeting the *Teachers' work* requirement to structure the program in a manner which facilitates learning. These are: linking across curriculum areas, linking across science areas, and enabling students to find their own way around the curriculum landscape. Such operations clearly require more than technical competence, and also make particular calls on language.

According to the expectations of the National Association of Science Teachers of Australia (2002), such teachers also challenge students at the appropriate level; are responsive to individual variations and needs; make purposeful use of a wide range of human, environmental and physical resources; integrate information and communication technologies; articulate the rationale for their programs; and consistently review and modify them (p. 16). Most of these operations are implicit in the *Teachers' work* operations, although the purposeful use of a wide range of resources is not made specific and articulating the rationale for a program is not mentioned at all. One might conclude that the additional operations mentioned in the science standards represent either the difference between accomplished and highly accomplished teachers, or perhaps a limitation in the construction of teachers' work in the *Teachers' work* document.

Places for language in a task perspective

The situational instructions exemplified in the *Teachers' work* guidelines for programming suggest a wide repertoire of language as a means of action in implementing them. This can be summarised in terms of text interpretation and text production.

- Text interpretation in the *Teachers' work* programming task includes: (a) policy interpretation – general educational policies, guidelines and support documents; mandated curriculum frameworks; and school policies, especially the School Development Plan, (b) interpreting student records and achievement data, as well as making sense of students' talk and writing in response to classroom activity, (c) interpreting teacher resource information, e.g., textbooks, planning models, teacher developed units of work, and implicitly (d) interpreting input from colleagues.
- Text production in the *Teachers' work* programming task includes all the talk and writing involved in (a) planning and structuring curriculum, (b) establishing a rationale, and (c) program evaluation – monitoring, reviewing observations and responding to perceived effectiveness. All such text production is to be carried out within a limited time frame, in school-based settings, in particular relations of power and, in the case of written texts, usually according to pre-specified formats. All of it is expected to draw on text interpretation.

While none of this language repertoire is made explicit in the *Teachers' work* guidelines, there is an underlying assumption that teachers will in fact have such a repertoire and will not need to acquire any of it as new learning. Such an assumption has implications for constructions of teacher knowledge and professionalism, as discussed earlier in this chapter.

Reflections on a task perspective

A task perspective constructs teachers' curriculum development in quite material and operational ways, emphasising the immediate circumstances of text production considerably more than the social forces and discourses that might impact upon it. From this perspective, teachers' curriculum development is a material workplace task, directly connected with other such tasks, particularly classroom teaching and assessment. It requires teachers to understand and respond to particular student bodies in particular school communities, whilst also taking account of state curriculum policy and the broader issues it raises. It suggests programming as a process naturalised in the folklore of teachers and teaching, taken for granted in curriculum policy, and inadequately understood as a "transaction and negotiation between theory and practice, text and action, curriculum document and classroom, idea and instantiation" (Reid, 1995).

The *Teachers' work* document constructs school-based curriculum development in procedural terms through a set of situational instructions for its accomplishment, specifying goal dimensions, conditions and operations for task accomplishment, including mode of response, mode of interaction and task complexity. The choices and decisions called for in *Teachers' work* are represented as routine and unproblematic. The document makes no reference to issues that teachers may have to face, such as that curriculum decisions may be differentially consequential for particular groups of learners, and differentially manageable in particular local circumstances. Constructing curriculum development unproblematically in this way has the strengths of simplicity and functionality, but severe limitations in terms of application. It denies the complexity of the task, the value-laden aspects of choice, the social forces behind competing alternatives and the intellectual and emotional work of decision making in dilemmatic conditions. It also minimises the dispositions, understandings and skills called upon, as well as the types of reflective practice involved.

While a task perspective takes account of material goals, conditions and operations, it lacks the dimension of beliefs, which is central to the broader notion of action (Tobin & McRobbie, 1996). Lacking this, it also lacks a way of talking about power relations in the education-labour relationship, and about ideologies, and moral dilemmas. By contrast, power relations and ideologies lie at the heart of a policy perspective, and moral dilemmas at the heart of a teacher agency perspective.

2.3.2 A policy perspective

A policy perspective on teachers' curriculum development prioritises public policy – policy “made on behalf of the state by its various instrumentalities to steer the conduct of individuals, such as teachers or students, and organisations, such as schools or universities” (Taylor, Rizvi, Lingard, & Henry, 1997, pp. 1-2). As such, it has considerable authority in the everyday lives of teachers, whether directly or through the medium of locally constructed policies such as teacher programs. Official state policy can be conceptualised

as a discursive mode of governance absolutely central to the administration of modern societies. Policy serves at various levels of government as a legitimating charter for the techniques of administration and as an operating manual for everyday conduct; it is the symbolic expression of normative claims worked into a potentially viable institutional blueprint (Levinson & Sutton, 2001, p. 2).

In Australia, this includes both state and federal education policies, although state policy dominates because education is primarily a state responsibility, not a federal one. Federal control is limited to special projects, such as national literacy assessment, and affirmative action for equity groups, such as Aboriginal students. Being at the bottom of the policy hierarchy, school curriculum documents need to be revised or renewed whenever new priorities are introduced into the larger framing policies. This was exactly the situation in the school where this study took place. State policy is thus a means of externally regulating teachers' work.

Policy as control

Reid (1997) suggests that the state typically develops a regime of control over education characterised by three overlapping elements: defining the curriculum, supervising and evaluating teachers, and engineering compliance and consent (Reid, 1997, p. 129). Such a regime obviously shapes the very nature of school-based curriculum development. At the same time, curriculum definition, from state curriculum policy to teacher programming, is also designed to serve other functions in teachers' work, such as increasing efficiency and, as with other organisational documents, as a textual means of coordinating activities across different sites and levels of organisation (Smith, 1990, p. 83). Defining curriculum at the state level is an ongoing process, with South Australian policy documents changing every ten years in recent times and school curriculum documents changing sometimes from year to year.

In recent years, curriculum innovations in Australia have increasingly been introduced through state curriculum policy, mandating change from above, and the specification of curriculum as a means of controlling teachers' work (Connell, 1995; Ozga, 2000; Reid,

1997) is obviously central to understanding school-based curriculum development from a policy perspective. There are a number of associated issues debated in the research literature.

One issue concerns the potential reduction of scope for teachers to exercise professional judgement, because, to the extent that teachers'

discretion to take curricular decisions in the best interest of their students is curtailed by central prescription, codification and surveillance, [...] their tasks are redefined away from the exercise of professional judgement and towards the routine application of standardised procedures (Helsby, 1999, p. 172).

Central prescription, codification and surveillance are core features of government policy in Australia at this time, with potential effects not only on the exercise of professional judgement but also more broadly on teacher autonomy. The proposal to introduce national curriculum frameworks in the early 1990s aroused specific concerns about the possible erosion of spaces for teachers' professional judgement (Collins, 1994; Grundy, 1994), particularly in regard to student groups that might be marginalised in particular settings. This prompted a strong rebuttal from the Curriculum Corporation, which was responsible for the national frameworks. The Corporation asserted the importance of teacher interpretation in local settings and the intention of the policy to "provide a framework within which curriculum diversity can flourish alongside some public acknowledgement of the need for commonality" (Wilson, 1994, p. 21). The tensions between curriculum control and curriculum agency are clearly an issue in any imposed curriculum innovation (see section 2.3 on teacher agency).

Another issue, raised by Fensham (1995), is that universal across-the-curriculum innovation uses discourses and concepts generalised over very diverse specialisations, and that these do not necessarily have sufficient finesse to be readily translated into specialist areas such as science, where the knowledge base is so central. He is not convinced as to whether "this superposition of a common meaning is a useful way of sharing meaning among the various practitioners, or whether more internal means for sharing need to be developed" (Fensham, 1995, p. 534).

A third issue is that curriculum innovations imposed from outside the school have been found to increase workloads and reduce teachers' professional confidence (Helsby, 1995).

A key factor in determining teachers' responses to imposed reforms is the level of their "professional confidence." Teachers who are professionally confident have a strong belief not only in their capacity but also in their authority to make important decisions about the conduct of their work (Helsby, 1999, p. 173).

Both capacity and authority in decision making are important in constructions of the teacher-worker, as discussed earlier in this chapter. For example, a study by Hargreaves and Earl (2001) of 29 teachers working with a policy innovation found that

[s]uccessful change in the curriculum and the classroom depends on teachers being accorded enough curriculum space to exercise their professional discretion – to engage their intellectual and emotional investments in their work on behalf of and sometimes in collaboration with the students they know best. Curriculum policy must create, not close down, the spaces in which professional discretion can exert these effects on a local basis (Hargreaves & Earl, 2001, p. 175).

In addition, the successful implementation of a new curriculum requires considerable awareness of dominant pedagogic principles among teachers, so that these can be accommodated in support provisions for curriculum enactment (Breen, 1998, p. 4). Policy as mandated change is obviously a matter of concern in schools, and Breen's point about accommodating teachers' pedagogic principles signals the need to understand policy as process.

Policy as process

Widespread acceptance of the view of policy as process, or "policy making" is clearly indicated in the review of policy research by Elmore and Sykes (1992).

Policy includes not just the intentions of policymakers embodied in law and regulation but the stream of actions that follow from those intentions. Policies are not simply authoritative edicts but also uncertain predictions about means and ends that can be subjected to test. Policies are not the sole determinants of official actions; rather, they work in concert with other influences. Policies operate not just as instruments for accomplishing tangible results but also as powerful symbols for mobilising political interests and as ideologies that legitimate authority (Elmore & Sykes, 1992, p. 188).

Elmore and Sykes distinguish three views of policy as process. In the first, instrumental view, policy making is directed towards tangible goals deriving from well-defined social purposes. In the second, pluralist view, it is depicted as political bargaining designed to produce incremental changes in policy over time through reconciliation of competing interests. In both cases, policy is seen as the rational expression of social interests. The third, currently evolving view, is organic rather than linear and deterministic. Policy from this view is not a rational problem-solving exercise, "rather, problems and solutions flow in more or less independent streams, and they converge, often in random ways, around critical events" (Elmore & Sykes, 1992, p. 190). In this organic view of policy as process, decision making includes the formation of interest group agendas which influence decisions, the problematic relationships among interest groups and the issues and pathways they identify, and the power relations inherent in the complex substructures of decision making. Organic, instrumentalist or pluralist views are likely to be at work in curriculum definition, whether at the level of the state, the school or the teaching team.

In practice, the views underpinning curriculum definition will be shaped by how participants experience and respond to dominant policy contexts: the "context of practice," the "context

of influence,” and the “context of text production” (Bowe & Ball, 1992). Such contexts can have different points of reference depending on where the enterprise sits in the policy hierarchy. With national and state policies, for example, the context of practice is all the conglomerate of schools, whereas for school policies it is site specific. Similarly, the context of influence for state policies comprises global movements and national and regional interests, whereas the context of influence for school policies is framed both by the interests and concerns of its community and a plethora of relevant state policies and broader interests. Policy contexts are thus characterised by diversity and the potential for conflicting interests. All three types of context function to constitute, shape and constrain each other, so that there is a dynamic, although not equal, relationship between them. For example, teachers’ text production generates responses to higher level policy which constitute one element of a broader “context of outcomes” and “context of political strategy” (Ball, 1994). This latter continually re-constitutes the context of influence for further policy making. Within the policy hierarchy there are thus a series of interdependent relations among contexts. Variation in all these contexts has a direct influence not only on discursive policy processes, but on textual products.

From a public policy perspective, the context of text production for school-based curriculum development, the lowest level of policy in the hierarchy, is “stationed” through what Fiske (1993) calls the “imperialising power” of the state power-bloc. Imperialising power aims “to extend its reach as far as possible – over physical reality, over human societies, over history, over consciousness” (Fiske, 1993, p. 11) and is characteristic of a centralised social formation such as public policy making, distanced from classroom teaching and the immediacy of social conditions in schools. “A station is both a physical place where the social order is imposed upon an individual and the social positioning (stationing) of that individual in the system of social relations” (Fiske, 1993, p. 12). Such stationing can be contested through teacher agency in the lived spaces of school-based curriculum development, but a policy perspective assumes the station to hold good even within those spaces.

Places for language in a policy perspective

Ball (1993) conceptualises policy as both “text” and “discourse.” Policy as text is a material document, which can be contextually interpreted and reconstructed in diverse sites and through diverse agencies. Policy as discourse is part of a dominant system of social structures and relations, which frames what can readily be thought and said, and is materialised in text. While Ball suggests that text and discourse are very different conceptualisations of policy, Henry (1993) considers them to be relational categories rather

than contrastive ones, understanding them in a way compatible with a socio-linguistic view of discourse and text as complementary.

The notions of text and discourse are complementary. When we want to focus on the specifics of an event or an occasion, we speak of the text; when we want to look at patterns, commonality, relationships that embrace different texts and occasions, we can speak of discourses (Lemke, 1995, p. 7).

On this basis, policy as text and policy as discourse can be constructed as two semantic categories in complementary relationship, not only with each other but with other social habits and social events. Discourses may only be identified in specific events, through the complementary semantic category of text, while text may only be produced in discursive practice.

Policy as discourse concerns the “*production of ‘truth’ and ‘knowledge’ as discourses*” (Ball, 1994, p. 21) materialised in text. As such, policy as discourse represents particular ideologies and ways of knowing the world, as well as the social relations and power relations involved in those particular ways (Fiske, 1993, p. 15). It therefore acts as a framing device, shaping and restricting what counts as legitimate ideology. Discourse

involves the selection of certain features of the real (and thus the repression of others), the selection of a certain way of knowing and representing (and thus the repression of others), and its circulation in the interests of some social formations (and thus the repression of others) (Fiske, 1993, p. 15).

Policy as discourse is therefore thoroughly political and engages value judgements. It is also multi-voiced, or heteroglossic (Bakhtin, 1981), not only in terms of diversity of discourses but in terms of socio-political relations (Lemke, 1995, p. 39). It combines productions of truth from previous policy with new productions of truth responding to changing social conditions and values. It also combines different discourses put forward by the various stakeholders involved in its development at any one time. This means that policy as text may not be internally consistent in terms of policy as discourse. Text may incorporate dominant but not necessarily compatible ideologies of the day, and also vestiges of ideologies from previous policy. Policy as text thus materialises contestable discourses, but it typically does this through a single authorial voice, masquerading as universal through an authoritative discourse (Bakhtin, 1981). This makes it difficult to discern ideological inconsistencies, something that teachers need to be able to do in making sense of curriculum policies.

The role of the policy reader is not passive in regard to policy as text, in fact for Ball (1994) policy as text comprises not only representations set into words (encoded), but “readings” (decodings) in the consciousnesses of participants. Official policy texts frequently involve complex and sometimes conflicting ways of encoding and decoding.

It is crucial to recognise that the policies themselves, the texts, are not necessarily clear or closed or complete. The texts are the product of compromises at various stages [...] the cannibalised products of multiple (but circumscribed) influences and agendas (Ball 1994, p. 16).

School-based curriculum development is inevitably shaped by this cannibalisation. Some agendas are likely to be marginalised or excluded in the text, and others legitimated. Encountering dilemmas of interpretation, teachers are obliged to make their own sense of policy without any certainty as to whether or not it accords with an intended sense, even though, as Ball points out, policy authors often do make concerted efforts to promote a “correct” reading through linguistic and non-linguistic devices. Policy documents may therefore “be scrutinised for their portrayal of character and plot, for their use of particular forms of language in order to produce impressions or responses” (Ozga, 2000, p. 95).

In this view, making sense of policy texts is in itself a policy variable, shaped according to different contexts and different reading positions, since it is not only the text which has a history, but the context and readers as well (Ball, 1994, p. 181). Text is inherently a

site of possible interventions and conflicting social discourses [... so that] texts are never complete except, perhaps, in a formal or structural sense. There is always the potential for intervention and change in the patterned meaning-making practices that enact them (Thibault, 1991, p. 122).

In this sense, text is always in a state of becoming, and when teachers in schools engage in patterned meaning-making practices, the potential is there for intervention and change. This involves teacher agency (as discussed in section 2.3).

Reflections on a policy perspective

A policy perspective shows how curriculum definition functions as a process in constituting, shaping and constraining teachers’ work (Seddon, 1991). Particularly at issue in teachers’ curriculum development is the extent to which state policy documents illuminate or obscure the multiplicity of educational worlds and student beings, the extent to which they facilitate or stifle the power of teachers to make decisions that reflect local interests, and the extent to which they acknowledge or deny the professional expertise and agency of teachers. Possibilities for transformation may be strongly or weakly regulated through the policy discourse (Bernstein, 1996).

The strength of a policy perspective on teachers’ curriculum development is that it highlights the power relations inherent in the establishment and promulgation of mandated curriculum frameworks in an education-labour relationship. Because policy is language-dependent, this perspective also highlights power in association with language. Policy as text has conventions which embody particular power relations – the single authorial voice, for example. Policy as discourse has what Fairclough (1989) calls “power behind discourse,” the

power effect of institutional and societal orders of discourse (Fairclough, 1989, p. 61), whereby the curriculum framework as text comes to be imposed on students and teachers. Power relations are implicit in a task perspective, but quite explicit in a policy perspective. However, a key limitation of a policy perspective is the privileging of legislative authority in the education-labour relationship at the cost of other factors foregrounded in a task perspective, such as diversity of learners and learning conditions, and local school and teacher priorities.

From a policy perspective, school developed curriculum outlines and teacher programs function “as disciplinary technologies, and ‘techniques of the self’ in Foucault’s (1988) sense, whereby teachers are shaped and formed as particular sorts of subjects within the discourses of schooling” (Reid, 1995, pp. 67-68). This raises questions about the extent to which such disciplinary and surveillance functions restrict teacher agency and the full use of teachers’ professional dispositions, understandings and skills.

2.3.3 A teacher agency perspective

A teacher agency perspective on teachers’ work focuses on teachers’ “capacity to produce an intended result” as distinct from acting “as the agents of a system far beyond their control” (Connell, 1995, p. 91). This perspective is concerned with how teachers’ work is carried out in material sites where teachers stand between corporate bodies with power over education, on the one hand, and individual bodies that are to be educated, on the other, thus being uncomfortably positioned to mediate the interests of both.

In regard to curriculum development, a teacher agency perspective connects the policy and task perspectives through a focus on how teachers discursively engage in policy processes in their own settings. Consequently the discussion here starts with teacher agency in policy interpretation and then moves to sites for teacher agency in regard to concerns, tensions and dilemmas in their school-based curriculum development activity.

Teacher agency in policy interpretation

According to Elmore & Sykes (1992, p. 209), most curriculum policies at the time of this study represented teachers as conduits for the delivery of socially approved knowledge – as *policy implementers* or at best *policy brokers*, whereas the curriculum literature represented them as needing to be able to “embrace contraries” and “manage dilemmas.” The conduit metaphor was also pervasive in school reform literature, positioning teachers as a pathway for curriculum innovation, as implementers or mediators, and contradicting the view of teachers as curriculum *makers* prevalent in the literature of teacher observation and self-report (Clandinin & Connelly, 1992) and teacher education studies (Hatton, 1998, p. xix).

A teacher agency perspective rejects the conduit metaphor and constructs teachers as part of the dynamics of policy making, articulating public policy with local policy, with knowledge about learners and their resources, and with teachers' own talents and preferences. Policy texts and directives indicate a preferred direction for curriculum and provide a framework to pursue it, but they are dependent upon teachers to translate them into practice (Ball, 1994; Bowe & Ball, 1992; Helsby, 1999).

Given constraints, circumstances and practicalities, the translation of the crude, abstract simplicities of policy texts into interactive and sustainable practices of some sort involves productive thought, invention and adaptation. Policies do not normally tell you what to do, they create circumstances in which the range of options available in deciding what to do are narrowed or changed, or particular goals or outcomes are set. A response must still be put together, constructed in context, offset against other expectations. All of this involves creative social action, not robotic reactivity. Thus, the enactment of texts relies on things like commitment, understanding, capability, resources, practical limitations, cooperation and (importantly) intertextual compatibility (Ball, 1994, p. 19).

As Ball makes clear, translation and enactment are not mere technical procedures, but are constructed in context, offset against local expectations and other state mandated expectations, and are reliant on creative agency.

Policy interpretation first needs to take account of the fact that curriculum policy is a product of multiple worlds in the production of national and state histories, and represents a variety of "political compromises between conflicting images of how educational change should proceed" (Taylor, Rizvi, Lingard & Henry, 1997, p. 15). In school-based curriculum development, teachers must negotiate not only internal inconsistencies in policies, but inconsistencies across policies, necessarily making intellectual and moral decisions (Clandinin & Connelly, 1995; Smyth, 1995) on the basis of their professional interpretation of the world around them in their particular context of practice (Bowe & Ball, 1992). Public policy statements "often do not resolve important conflicts among political interests, [which means that they] usually require a high level of discretion and interpretation on the part of those who are supposed to carry them out" (Elmore & Sykes, 1992, p. 186).

Several studies of teachers working with mandated curriculum documents show spaces for professional judgement and teacher autonomy in making curriculum choices (Archbald and Porter, 1994; Dow 1996; Hargreaves and Earl, 2001; Helsby & McCulloch, 1996). For example, in a study in Australia involving outcome-based education mandated through curriculum policy,

teachers were able to exert some productive influence on the meaning of these policies, whilst managing their own compliance to aspects of the policies. A relative "autonomy" grew out of the interdependence and unspoken "negotiation" between teachers and the wider system. At the same time however, the existing, "autonomous" craftskills of teachers were modified and

reformed through their participation in the implementation process, with a discernible shift towards a received curriculum and more outcomes-oriented, reproductive pedagogy (Dow, 1996, p. 10).

An implication of such studies is that policy compliance and teacher autonomy are not necessarily in opposition, and that both engage teacher agency. Where policies allow wide discretion as to when and how they should be implemented, and where teachers are already predisposed to teach the content prescribed, a teacher

may look to a policy for guidance on sequencing of topics, pacing of coverage, or inclusion or exclusion of topics, but from the teacher's perspective, these forms of influence are not likely to be viewed as deprivation of control (Archbald & Porter, 1994, p. 35).

Policy may thus be influential in teachers' decision making, without teachers sensing any loss of control over school-based curriculum development, or engaging in any contestation with policy. In such cases, policy can be conceptualised as "a complex social practice, an ongoing process of normative cultural production constituted by diverse actors across diverse social and institutional contexts" (Levinson & Sutton, 2001, p. 1).

Whether teachers experience policy as control or policy as influence, its translation and enactment inevitably requires them to be creators of meaning (Hargreaves, 1988) in the multiple worlds of the education-labour relationship. They must simultaneously work within the idealised universalising world of state policy; the local worlds of their students, school and community; the regional worlds of state education authorities, and the more distant worlds of the general public and the government of the day. At the same time, they work within their own personal worlds that shift in and out of the other two, generating the "personal in the professional" (Day, Harris & Hadfield, 2001b, p. 43) at multiple levels. To look at teachers' curriculum development involves looking at a set of worlds dynamically constituted in the structures and ideologies that frame teachers' work, as well as in locally functional sites and actions, and through particular material processes. These worlds of teachers' work often embody conflicting expectations and generate complex dilemmas (Calderhead, 1987; Olson, 1992). Teachers must take account of the various interests of each different world in ways that are compatible with their own sense of what is right in the immediacy of the school and classroom. Teachers' agency thus works "within the interface of subject positions made available by a society and the weight of choices constructed out of specific desires, forms of self-reflection, and concrete social practices" (Giroux, 1992, p. 207).

Within the interface of subject positions – whether as policy implementer, policy broker, or policy maker – the teacher is always able to make some kind of "secondary adjustment" to policy (Riseborough, 1992). Such secondary adjustments or transformations may be

“contained” in that they fit in without introducing pressure for radical change, or “disruptive” in that they attempt to radically alter the structure. When public policy directives are followed from their origin in the upper levels of the educational hierarchy through to the school building and into the classroom, there occurs “an observable succession of transformations, each reflecting the wide amount of latitude granted or taken at each step” (Huberman, 1993, p. 24). Such “transformations” are conditioned both by the control-latitude mechanisms established through state policy and by teachers’ responses to what Giroux (1992) calls the weight of choices. If the teacher locale is strong, the imperialising power (Fiske, 1993) of policy is lessened, and teacher agency has more scope for transformative action.

Sites for teacher agency: Concerns, tensions and dilemmas

Teachers’ transformative action in school-based curriculum development is a factor of the education-labour relationship, and how this is shaped by what Connell (1995) refers to as the political order in the workplace. Features of the political order likely to affect teacher agency include:

the structure of authority in the school; the powers and resources brought to bear on decision making by the different players; the alliances, mobilisations, and divisions currently existing in the workplace. Familiar elements of the political order are the relations between departments of a school, the relations between rank-and-file teachers and school administrators (principal, deputy principal, etc.), the effectiveness of local teacher unions, and social divisions among the school’s staff, such as gender and ethnic divisions. All of these affect the way teachers’ work is done (Connell, 1995, p. 104).

The political order within a school shapes how teachers view themselves and their work, and shapes the spaces for teacher agency. However, specific sites for agency emerge from concerns, tensions and dilemmas in the lived processes of teachers’ work. If the political order is supportive of teacher agency, sites for its exercise are more likely to be noticed and taken up. In other words, concerns, tensions and dilemmas are less likely to be denied, marginalised or glossed over, and more likely to be the object of reflection and decision making.

Since the late 1960s there has been a continuing branch of research into teachers’ concerns (Hall & Hord, 1987). They identified concern as an

aroused state of personal feelings and thought about a demand as it is perceived [and] the mental activity composed of questioning, analysing, and re-analysing, considering alternative actions and reactions, and anticipating consequences. [...] Close personal involvement is likely to mean] “more intense (i.e., more highly aroused) concern which will be reflected in greatly increased mental activity, thought, worry, analysis, and anticipation (Hall, George & Rutherford, quoted in Hall & Hord, 1987, p. 59)

This aroused state can result from various objects of concern, particularly what Hall and Hord describe as “self concerns,” “task concerns” and “impact concerns.” Self concerns are to do with teachers’ feelings in the face of professional demands, feelings of self-doubt and anxiety about the adequacy of their knowledge and skills. Such feelings may limit the topics and activities teachers are willing to include in a program. Task concerns focus on the practicalities of teaching: management, preparation, coordination and the like, which may similarly shape curriculum decisions. Impact concerns are to do with the effects of action and what teachers might need to do to improve outcomes. Impact concerns are fundamental to visionary curriculum development, keeping a curb on teacher agency and situating it within a broader frame of responsibility. Concerns theory also proposes a cycle of “stages of concern” which teachers pass through as they gain experience, and revisit whenever teaching circumstances change, as when being required to adopt a new programming approach. Self concerns surface initially, followed by task concerns and impact concerns; then as the wider issues are sorted out and personal comfort and successful outcomes achieved, concerns revert to a task focus. While self and task concerns are likely to involve relatively straightforward decisions, impact concerns may be more complex and are likely to involve tensions and dilemmas that are difficult to resolve.

While dilemmas involve choosing between mutually exclusive courses of actions or decisions, tensions reflect specific sets of pressures which may “pull” in different directions but do not necessarily involve exclusive choices (Day, Harris, & Hadfield, 2001a, p. 24). Both make demands on teacher agency and reflection, and both can surface across teachers’ work. Olson (1992), for example, discusses tensions between current and proposed approaches to curriculum, conflicts among guiding theories, and tensions because of role diffuseness (Olson, 1992, p. 58). Tensions often result from “divergences among different forces or elements in the teacher’s understanding of the school context, the subject matter, or the students” (Freeman, 1996, p. 225), including what Wagner (1987, cited in Freeman, 1996) calls “knots” resulting from teachers’ conflicting beliefs about the emotional and intellectual imperatives on how they should act. A specific tension in regard to science education occurs between respecting students’ understandings of natural phenomena and correcting them if they are scientifically wrong (Jenkins, 2000, p. 602). Such specific tensions may develop into the particular dilemmas that teachers face “as they try to reconcile the many conflicting elements of their work” (Olson, 1992, p. 52).

Studies by Billig, Condor, Edwards, Gane, Middleton and Ridley (1988) clearly show that a dilemma is not a straightforward issue of choice between alternative courses of action. Dilemmas “impose an assessment of conflicting values” (p. 163), and consequently involve reflection, negotiation and compromise, or alternatively evasion and pretence, a denial of

their existence. A dilemma confronts people with making a choice in a situation where there is “difficulty in assessing the various possible gains and losses, and also from attempting to estimate the probabilities of obtaining the various profits and losses. [...] What makes the choice so hard is the chance that the decision might matter” (Billig, Condor, Edwards, Gane, Middleton and Ridley, 1988, p. 11). In addition, “dilemmas are not merely accidental and temporary difficulties which arise in particular situations. Rather, social life itself is essentially dilemmatic” (Clark, Dyson, Millward, & Robson, 1999, p. 170). The characteristics of the dilemmas recounted by teachers in personal accounts of their work (e.g., Carter, 1993; Gudmundsdottir, 1991) are very frequently linked to conflicting facets of the multiple worlds in which they work, and “born out of a culture which produces more than one possible ideal world, more than one hierarchical arrangement of power, value and interest” (Billig et al, 1988, p. 163). In response, teachers find means to recognise, think about and address dilemmas in fruitful ways. They cannot avoid taking a position, even if it consists only in sitting on the fence. From one point of view, indeed, dilemmas provide valuable opportunities for teachers to shake off complacency and to “become different, to think critically and creatively, to pursue meanings, to make increasing sense of their actually lived worlds” (Greene, 1986, p. 72).

Places for language in a teacher agency perspective

Greene’s (1986) view of dilemmas as opportunities for teacher agency and for pursuing meanings and making sense of lived worlds clearly implies places for language related to forms of reflection, and the body of work on practitioner reflection (see also section 1.2 above) provides a useful resource in linking language with teacher agency.

Forms of reflection

Teacher agency in responding to dilemmas and tensions can be linked to Schön’s (1983) notions of “reflection-*in*-action,” which occurs in the moment of action, presenting data in a novel frame and drawing on tacit situated understandings, and “reflection-*on*-action,” involving careful consideration of familiar data. While language need not necessarily be much involved in the former, it is absolutely central to the latter.

Reflection-*in*-action has been described as a sort of problem *setting* generated by “hearing differently” or “seeing differently,” by suddenly noticing something in the situation which sparks off a thought (Russell & Munby, 1991). This may be the practitioner’s first intimation of a concern or dilemma, and results in phenomena being “reframed” and the direction of action taking a new turn. It is this change of direction which signals reflection-*in*-action to outside observers, and which can be accessed through observation and analysis. Reflection-*in*-action

is central to the art through which practitioners cope with divergent situations of practice [... and] draws upon implicit and situation-grounded (“action-present”) cognitions instead of the more explicit and deliberative cognitions associated with reflection on action (Clark & Yinger, 1987, p. 98).

Schön talks of the jazz musician reflecting-in-action through a “feel for the music” and it could be said that teachers do likewise, through a “feel for the classroom” and a “feel for the curriculum.” On the basis of extensive classroom research, Loudén (1991) reports its frequent occurrence.

In the midst of action, and without turning one’s attention back against the stream of experience to become aware of this as action in the world of time and space, teachers seize the moment and change the direction of their action (Louden, 1991, pp.176-177).

My own sense is that such reflection-in-action occurs also in teachers’ work outside the classroom and might be a factor in how teachers collaboratively develop curriculum, reacting to what is going on in the group, and bouncing ideas off each other. Subsequently, through “reflection *on* reflection-in-action” (Russell & Munby, 1991), it is possible to think systematically about the freshly framed data (p. 165). This can also be a part of what Killon & Todnew (1991) have called “reflection-*for*-action,” reflection in preparation for future action and building on prior experience and reflection on experience.

Reflection-on-action is relatively slow and takes place through language, whether internally or externally to the individual. Schön establishes five basic processes in what he calls a “reflective conversation.”

- a problem framed by one participant is taken on board by another and indirectly criticised by restructuring it
- this restructuring reorients the whole situation
- frame experiments are then carried out with the restructured problem to check its consequences and implications
- attempts are made to adapt the situation to the restructured problem, in response to the outcomes and evaluations of outcomes of the frame experiments
- what is said supplies the situation with new meaning, the situation talks back, participants listen, evaluate, maybe restructure again. (after Jordell, 1987, p. 155).

The reflective conversation is thus a spiralling sequence of evaluation, action and re-evaluation, and its processes of inquiry deal all the time with “zones of uncertainty” (Schön, 1983, p. 62). Reflective conversations of this kind might well be expected to be a feature of school-based curriculum development.

Louden (1991) proposes a continuum of forms of reflection relating to reflection-on-action and reflection-in-action, and identifies four forms of reflection or “ways in which changes in understanding and action take place” (p. 164). These are: introspection, enquiry, replay and rehearsal, and spontaneity.



While action in Louden’s study refers primarily to classroom activity, there is no reason why all of these forms of reflection should not occur as an integral part of teachers’ work outside the classroom, including curriculum decision making in curriculum development meetings. Louden also proposes that behind each form of reflection lie one or more of four Habermasian “interests” in reflection: technical, personal, problematic, and critical. These interests link quite closely with the teacher concerns discussed earlier, and with teacher agency.

Teacher reflection might also involve Polanyi’s (1958) concept of heuristic vision, where the mind is “breaking out” of an established interpretive framework and reconstructing previous guiding assumptions. The forms of reflection commonly associated with such heuristic vision are what Claxton (1997) calls “slow-knowing,” and what various spiritual traditions refer to as “mindfulness” and “contemplation” – forms of reflection seldom discussed in today’s workplaces, with their push for solutions, action and quick outcomes. Such ways of knowing are predicated on “a state in which useful patterns in the world have been registered and can be used to guide future action” (Claxton, 1997, p. 18). This kind of reflection may well be a factor in teacher agency, although to my knowledge there have been no studies of it in relation to teachers’ work.

Reflective conversations

While Caxton’s “slow-knowing” and Schön’s spontaneous reflection-in-action may not necessarily involve language, language is obviously integral to reflection-on-action. All reflective conversations of the kind reviewed by Schön involve language. This raises a question as to how the task structures of school-based curriculum development might constitute, shape and constrain the discursive contributions that are made in such reflective conversations. Linguists of the Prague School, adopting a dialogic view of language, speak of various conversational factors relevant to this. Dimensions of dominance (Linell, 1990, pp. 166-170), for example, are partly imposed or supported from outside, via institutionalised rules and social power relations. They are also reproduced through the particular patterns of situated collaborative action; that is, they can be understood partly as generated from within, through the dynamics of the “self-organising principle of dialogue” (pp. 157-158). This self-organising principle has a lot to do with agency and perspectivity.

What makes up the dynamics of a dialogue is the effort of the different interlocutors to bring their own perspective to bear, ie to succeed in setting a given perspective for partners to take up, at least for the next few turns. [...] the dynamics of the dialogue are fed by subtle qualifications of the perspective presented: it is accepted, but evaluated differently by moving to a related aspect within the horizon of comprehension (Graumann, 1990, p. 121).

Graumann points out that horizons move as the perceiver moves cognitively, and remain fixed as the perceiver remains in a habitual stance, necessarily shaping the framing and re-framing potential necessary for a reflective conversation to proceed effectively.

Perspective setting in human conversation is essential for the transformation of human subjectivity into temporary states of intersubjectivity, i.e., of convergence of attention onto relevant aspects of the talked-about state of affairs (Rommetveit, 1990, p. 97).

Perspective setting is obviously central to conversations about concerns, tensions and dilemmas in school-based curriculum development, and combines intellectual and emotional work. Setting a perspective means expressing an attitude, which has both individual and social significance, locating the individual in a wider controversy in opposition to other positions (Billig, 1991, p. 43). In regard to school-based curriculum development, such oppositional struggles “are set within a moving discursive frame which articulates and constrains the possibilities and probabilities of interpretation and enactment” (Ball, 1994, p. 23). This moving discursive frame opens up spaces for contestation and perspective setting, which in turn open up vulnerability. This suggests the need for discursive skills to overcome barriers to dialogue (Olson, 1992; Day, 1999).

Curricular discourses

The exercise of teacher agency in curriculum development is shaped and constrained by the discourses of education available to teachers, and the legitimacy accorded to those discourses in the school environment. Such discourses play a central part in the control mechanisms of the educational settlement and its makers, and are therefore highly consequential for teacher agency, whether it be as compliance, resistance, evasion or adaptation. Reid (1995) points out that curriculum development requires teachers to synthesise the range of discourses that inform their professional practice, and that “this involves the taking up, rehearsal and performance of new and changing subject positions within these discourses over time” (p. 183). Teachers need to be able to identify and compare curricular discourses, be aware of how they articulate with other value positions, and consider the implications for resistance, contestation or compromise (Grundy et al., 1994, p. 120). Policy as discourse is not merely transmitted but negotiated and rearticulated in workplace locales through teachers’ talk.

Such negotiation and rearticulation necessarily involve a “politics of representation” (Yeatman, 1994), which is closely related to the context of practice and how participants are acculturated to it. Teachers’ acculturation to the education system and school-based curriculum development mediates what is seen as possible and not possible in decision making, while curriculum development sessions are themselves sites of representational praxis able to change what counts as possible. While policy representations are a powerful social reality in school-based curriculum development, and may conflict with teachers’ locally constituted reality representations, they do in themselves constitute a site for teacher agency from the moment they become a matter of concern, or are seen to present a tension or dilemma. Representation is thus a form of labour, the work of making things mean (Hall, 1996), and this language-based labour is central to teacher agency. Different styles and outcomes of representational labour can be expected to occur in the contexts of school-based curriculum development. Teachers need to be able to make sense of these and contribute to their constitution, which involves rather more complex discursive practices than those suggested by either a task perspective or a policy perspective.

Reflections on a teacher agency perspective

A teacher agency perspective makes links between a task perspective and a policy perspective, between material processes and ideological processes. In doing so, it constructs school-based curriculum development as transformative labour, whereby teachers effect structural change in the space between government and classroom (Connell, 1995, p. 110). This builds on a view of curriculum policy as a dynamic process in which the teacher does not act merely as policy implementer but as curriculum developer and policy maker. In such a view, curriculum policy documents and frameworks

inform rather than determine a teacher’s planning and action. In this whole process the teacher’s judgement becomes crucial. Judgement rather than prescription will inform action. [...] a dynamic interaction of hypotheses, judgements, action and reflection. [...] It is important that this role of curriculum developer, which has for so long been an invisible role in which teachers have unconsciously engaged, is recognised as a dynamic aspect of the work of teachers (Grundy, 1994a, p. 34).

Teachers as curriculum developers use their professional judgement whether the decision is a straightforward issue of choice or whether it responds to dilemma or tension. Professional judgement is thus central to the social capacity of teachers to enact their agency.

In school-based curriculum development, teachers respond to goals for schooling set formally in public policy documents as well as goals for schooling set informally in other worlds of education, including student worlds. When their agency is invoked, they act as brokers between the policy settlements of education authorities and the locally represented

interests of those to be educated, which are often diverse and conflicting. Because of such conflicting expectations, a key feature of school-based curriculum development from a teacher agency perspective is the identification and resolution of dilemmas, and the critical reflection thus necessitated. Reid (1997) criticises a “control-resistance dichotomy” on the basis that the reality is far more complex.

Teachers have always used the contradictions and spaces that exist in the controls that confront them, to pursue a course that they believe is in the best long-term interests of the students in their care. There is a complex interplay between the beliefs and practices of teachers, and the material and ideological structures of control that seek to shape these beliefs and actual practices in ways that match the ethos of the prevailing educational settlement (Reid, 1997, p. 154).

In the same vein, Louden (1991) insists that “[t]eachers don't merely deliver the curriculum. They develop it, define it and reinterpret it too” (p. vi), and Hargreaves (1988) affirms that teachers “are not just bundles of skill, competence, and technique: they are creators of meaning, interpreters of the world and all it asks of them” (p. 216). The teacher as creator of meaning in school-based curriculum development is engaged in simultaneously interpreting the world of institutionalised learning and teaching and its concomitant sociocultural forces, practices and representations. It is, of course, a multiple world, not a singular one. Teachers work within the local worlds of their students, school and community; within the more distant worlds of the general public, the government of the day and the education system; and within their own personal worlds that shift in and out of the other two. To look at school-based curriculum development involves looking at a set of worlds dynamically constituted in the structures and ideologies that frame teachers’ work, as well as in locally functional sites and actions, and in particular material processes. These worlds of teachers’ work often embody conflicting expectations and generate dilemmas which demand that teachers act as creators of meaning, attempting to take account of the various interests of each different world in ways that are compatible with their own sense of what is right in the immediacy of the school and classroom.

Teachers’ transformative labour in curriculum development is not merely a technical and practical matter. It inevitably involves using critical knowledges in negotiating diverse stakeholder beliefs about views of the subject matter, the learner, the teacher, and the world of schooling – what Schwab (1978), cited in Roberts (1988) calls the four curriculum “commonplaces.” Since teachers are members of a professional culture, their “truths” are shaped by national and state views on these four commonplaces, as expressed in policy, in the literature, and among colleagues. They are additionally and more immediately shaped by local views, and sometimes by the tensions between local, state and national views, as well as teachers’ own views embedded in their personal histories. Taken together, this is “what

makes certain options live, or momentous, or forced, while leaving others dead, or trivial, or optional” (Rorty, 1991, p. 13). Making decisions among such options requires a far more complex range of teacher dispositions, understandings and skills than either the task or policy perspectives suggest.

While a teacher agency perspective sits comfortably with my own understanding of school-based curriculum development, it has the limitation of being largely constructed in opposition to task and policy perspectives, rather than in dialogue with them. I believe it needs further theorisation based on phenomenological data to provide a more broadly relational account.

2.4 Chapter review

The three perspectives on school-based curriculum development that have been presented in section 3 of this chapter are clearly grounded in different world views. The task perspective is instrumentalist in its emphasis on goals, conditions and operations; the policy perspective is imperialist through the primacy it gives to public policy; while the teacher agency perspective is, as its name implies, agentive. The task perspective represents teachers’ curriculum decisions as simple procedural choices among alternatives, based on familiarity with curriculum documents, learner needs and pedagogical practices. The policy perspective suggests teachers as curriculum implementers, translating policy into situated practice, but not particularly requiring engagement with educational values or beliefs. By contrast, the teacher agency perspective represents curriculum decision making as engagement with complex ideological positions, additionally based on familiarity with policy processes, discourses and associated tensions and dilemmas. None of the three perspectives individually captures the complexity of school-based curriculum development that is indicated by the three taken together, and each perspective marginalises the other two. To adopt only one perspective in an empirical analysis is inevitably to ignore important features of the work, and hence to ignore important places for language.

In section 1 of this chapter I argued for a construction of the teacher as educated, competent professional (Lingard, 1995), and supported this in section 2 by showing the limitations of emphasising task or policy at the cost of teacher agency in accounts of teachers’ work. The review suggests that school-based curriculum development must be acknowledged as a highly professional activity involving an interplay between public policy, teacher agency and task fulfilment. Such a framework would place teachers’ work at the centre, integrating task, policy and teacher agency as factors in that work. With teachers’ work at the centre, human interaction is also at the centre, and thus places where language is consequential can readily be identified and their significance investigated. Developing a theoretical framework of this

kind is commenced in Chapter 3, and continued through the practice of data analysis in Chapters 5 to 8. This theoretical development also shapes the possibility of identifying language-related dispositions, understandings and skills as proposed in section 2.

The review of literature in this chapter suggests that the teacher functioning as professional requires a much more extensive language repertoire than does a teacher functioning merely as technician. This is evident, for example, in the expectation that teachers act as designers and producers of knowledge (Connell, 1995) and draw on relevant discourses of education to make meaning out of public policy (Taylor et al, 1997), out of their own practice (Grundy, 1994b), and out of the material effects of both of these (Fairclough, 1989). However, the review has also indicated that language is seldom acknowledged as consequential in accounts of teachers' work, nor in theoretical accounts of teacher knowledge, and only to a limited extent in professional standards produced by and for practitioners. This relative invisibility of language is at odds with the language demands implicit in task, policy and teacher agency perspectives on school-based curriculum development, and particularly at odds with the complexity of teacher dispositions, understandings and skills indicated in the teacher agency perspective. This indicates a gap in current understandings and representations of teachers' work and teacher knowledge – a gap that has significant implications for teacher education and professional practice.

Chapter 3

Developing an analytic framework

In some sense, the task of theorising is always to find or create the tools – both theoretical and methodological – that are appropriate to the particular questions and contexts we confront from within (Grossberg, 1989b, p. 14).

The task of theorising in this study has been to find and create tools appropriate to questions about how language is implicated in teachers' work. This requires a dynamic analytic framework, which can take account of the multiple facets of the education-labour relationship as it is played out in everyday workplace activity. The aim of a teachers' work perspective is to provide a feature analysis of events, institutions and participants, and how they relate to large scale social structures and dynamics (Connell, 1985, p. 3). My study has a single feature focus – language – within particular contexts of teachers' work. Like other studies of language-in-context, the investigation is “partly linguistic and partly social” (Hymes, 1996, p. 87), and therefore required me to find and create theoretical and methodological tools to integrate the two. For Hymes, “the key to understanding language in context is to start not with language, but with context” (Hymes, 1972, p. xix). This means understanding context and language in compatible ways, which has important implications for developing an analytic framework for use in this thesis.

My starting point, in accordance with the philosophy of language proposed by Bakhtin (e.g. Bakhtin, 1986b; Vološinov, 1986), is that language-in-context is both activity and system. In regard to language as activity, Bakhtin emphasises that “language enters life through concrete utterances (which manifest language) and life enters language through concrete utterances as well” (Bakhtin, 1986a, p. 63).

Bakhtin refers to the activity aspect of language as “speech communion” and he refers to the “utterance” (spoken or written) as the core unit of speech communion, in contrast to words and sentences as the core units of the systemic aspect of language (1986b, pp. 67-100). Given this starting point, emphasising language as both activity and system, I was early drawn to the notion of understanding context as a cultural-historical “activity system” (Leont'ev, 1981), and bringing a Bakhtinian dialogic perspective to bear on the relation between language and context. This is the basis of the analytic framework I develop in this chapter.

I first briefly introduce the theoretical foundations of my approach (section 1), before investigating the activity system as an analytic construct for understanding contexts (section

2), and then taking forward selected aspects of it to assist in developing an analytic framework for language in context (section 3).

3.1 Theoretical foundations

A teachers' work perspective shows school-based curriculum development as a policy-related activity, which, in common with other policy activities, is "complex, interactive and multi-layered" (Taylor et al, 1997, p. 25). These three characteristics – complexity, interaction, and multi-layeredness – make particular kinds of demands on theory. It must capture complexity without losing clarity. It must pursue interaction and interdependence in ways that account for agency and effect, and for change, continuity and discontinuity. It must explore multiple layers without losing sight of systems. In developing an analytic framework for my purposes, I have held these requirements in mind, as well as being always conscious of the unfinished nature of theory and method. I see theory not in contrast to practice but as

practice in a double sense: it is a formal conceptual tool as well as a practising or "trying out" of a way of theorising. In joining these two senses of practice, we commit to working with momentarily, temporarily "objectified" theories, moments of "arbitrary closure," recognising that in the ongoing analysis of the concrete, theory must be challenged and revised (Slack, 1996, p. 113).

While the theory building in this thesis has been forcibly subjected to arbitrary closure through its representation in these pages, until the moment of separation from the word processor, it has also been a continuing practice under constant challenge and revision through the ongoing analysis of the concrete. This mirrors Vygotsky's view of method as "simultaneously prerequisite and product" (1978, p. 65).

A teachers' work perspective also invites what Apple (1995) calls "relational analysis," which is grounded in the belief that

the institutions and events of our everyday lives need to be understood not in an isolated way – separate from the relations of domination and exploitation of the larger society – but in a way that stresses their interconnections with these relations. This is especially the case for our institutions, policies, and practices of formal education (Apple, 1995, p. 178).

Relational analysis highlights historicity and the processes of change and interconnection among events and between events and their broad, local and specific contexts. At its most effective, it leads the analyst to make unexpected connections across human activities, and to start "thinking together" (Apple, 1995) diverse aspects, which might previously have been assigned to separate domains. To achieve such relational analysis, I believe a principled framework is needed – one that situates teachers' work in the broader world of human activity. In this chapter I build up such a framework from the intersection of features of

Leont'ev's activity system construct with Bakhtinian dialogism and, to a lesser degree, Hall's (1996) articulation theory. Introducing activity theory, dialogism and articulation theory

Engeström (1999b) indicates that there have been three generations of activity theory. The first, starting in the 1930s, centred around Vygotsky and the notion of mediation in cultural-historical activity. The second, starting a little later in the 1930s, centred around his student Leont'ev and the construction of human activity as a functional activity system involving social relations and the collective community. Zinchenko and Gordon (1981) describe second-generation activity theory as a systemic-structure approach to describing complex forms of activity, and emphasise the importance of the activity system construct (see section 2 below). For Leont'ev, the notion of activity (*deyatel'nost'*) is "always connected to the transformation of reality" (Davydov, 1999, p. 46), and it is this transformation which gives the activity system its meaning, not the fulfilment of any preconceived goal (Newman & Holzman, 1993, p.49). Third-generation developments expand on the work of both Vygotsky and Leont'ev, linking also to other traditions. In the west, these developments began in the 1970s following early translations of Vygotsky's work from Russian to English, and its practice and development in relation to different research priorities and theoretical frames of reference. This third generation has many variations, since it "is not a fixed and finished body of strictly defined statements – it is itself an internationally evolving, multi-voiced activity system" (Engeström, 1990, p. 69). Third generation activity theory occurs in a range of fields including health work (e.g., Engeström, 1990; Engeström, 1999c), learning (e.g., Cole, 1985, 1990; Miettinen, 1999; Wertsch, 1981a, 1981b), classroom activity (e.g., Claxton, 2002; Engeström, 1990; Engeström, Engeström & Suntio, 2002; Gutierrez, Baquedano-Lopez, Alvarez & Chiu, 1999; Wells, 1993), technology (e.g., Kaptelinin & Cole, 1997; Kuutti, 1999), publication (Roth, 2005), cultural psychology (Cole, 1999), social exclusion (Edwards & Fox, 2005), and modes of political discourse (Engeström, 1990; Wertsch, 1987). Cultural-historical activity theory (CHAT) is the name under which third generation activity theory is widely known in the west, although other applications of particular constructs proposed by Vygotsky and/or Leont'ev occur outside of CHAT, as is the case with this thesis.

Recently, key goals for the third generation of activity theory have been "to develop conceptual tools to understand dialogue, multiple perspectives and voices, and networks of interacting activity systems" (Engeström, 1999b, p. 3), as well as to account for the reciprocal influences and mutual adjustments involved in activity engaging multiple participants (Wells, 2002). In attempting to develop conceptual tools for activity engaging multiple participants, I have taken from activity theory only the Leont'evian activity system

construct (see section 2), and then turned to the theory of dialogism developed by Bakhtin/Vološinov (Bakhtin, 1981, 1984, 1986a, 1986b, 1986c, 1990; Vološinov, 1986).

For Bakhtin, existence, and therefore all human activity, is defined as dialogue, as a shared social event or co-being (*sobytie*), dynamic and open, and characterised by change. To equate dialogue with language only is to miss the point. While existential dialogue includes language, it is not restricted to language, but extends to all social practices. Nor does existential dialogue refer only to two human bodies, but to single human bodies, corporate bodies, and multiple bodies. In dialogism, existential meaning or reality is “relative in the sense that it comes about only as a result of the relation between two bodies occupying *simultaneous but different* space, where bodies may be thought of as ranging from the immediacy of our physical bodies, to political bodies and to bodies of ideas in general (ideologies)” (Holquist, 1990, pp. 20-21). As dialogue, human activity involves a socially constituted and very complex “field of answerability” or “field of dialogic vision” (Bakhtin, 1984) in which the many voices of diverse social forces shape what is possible.

Heteroglossia, or multi-voicedness, is the core characteristic of this field, where openness and closure are dialogic partners, not binary oppositions. Exploring the heteroglossic features of human activity highlights contradiction and dilemma, contestation and negotiation. At the same time, it avoids reducing the discussion to oppositional issues of oppression and resistance. A number of third-generation activity theorists incorporate the work of Bakhtin/Vološinov,² and his approach to dialogicality also “has a wealth of implications for a psychology of socioculturally situated mental processes” (Wertsch, 1990, p. 71).

Stuart Hall’s (1996) notion of articulation-as-analytic-method (Slack, 1996) complements both Bakhtinian dialogism and third-generation activity theory. Being grounded in Laclau’s notion of articulation, it requires the analyst “to think the contingent, the non-necessary, connection between different practices – between ideology and social forces, and between different elements within ideology, and between different social groups composing a social movement, etc.” (Hall, 1996, pp. 144-45). This means looking behind the material forms of events and institutions, and additionally being open to the unexpected and the contradictory. It means recognising that two or more different elements “*can* make a unity” (p. 141), but that this linkage or articulation is neither necessary nor fixed; it is contingent upon conditions. Articulation thus refers to a range of practices in human activity. In particular, articulation-as-utterance, often called “articulation-1,” contrasts with articulation-as-action,

² Bakhtin is also believed to have written as Vološinov, and the Vološinov work referred to in this thesis is attributed to Bakhtin.

often called “articulation-2,” which is a way of describing how people make sense of their cultural-historical situation in terms of the articulation of social forces. Here articulation is both a state of connection and a creative process of making connections, and articulation-as-utterance, whether spoken or written, is an integral part of this non-innocent, contestable practice. In this combined sense, articulation functions as a means of constituting identities and relationships and of controlling the articulations-as-action that can readily be made. It is consequently also possible for articulation to occur as “strategy” to support, entrench, resist and transform socially significant hierarchies (Slack, 1996). While Hall denies any essential hierarchies in sociocultural activity, he affirms the existence of contingent hierarchies with the potential to be transformed (Fiske, 1996, p. 214). The potential for transformation lies in the conditions of activity, while the process of transformation occurs through articulation as an act of social agency. Finally, articulation-as-theory “can be understood as a way of characterising a social formation without falling into the twin traps of reductionism and essentialism” (Slack, 1996, p. 112); it takes the analysis beyond relations of correspondence to relations of non-correspondence and contradiction.

Taken together, Bakhtinian dialogism and articulation theory provide a range of complementary constructs for developing an analytic framework to locate language within teachers’ work using aspects of an activity system construct derived from Leont’ev’s early work but not connected with current versions of CHAT. These theoretical foundations are complementary in that they all emphasise the transformative nature of human activity, all reject determinism, all assert the interaction of multiple dimensions of activity, all recognise contradiction as a feature of activity, and all construct meaning making as central to activity. These are core epistemological positions integral to the analytic framework I develop in this study and to my understanding of context in relation to language-in-context.

Theoretical perspectives on “context”

In activity theory, contexts are not “containers of behaviour, untouched in themselves by human actions” (Engeström, 1993, p. 66), nor are they “situationally created experiential spaces” (Engeström, 1990, p. 78), and nor can they “be created at will by two or more persons in interaction, as if independently of the deep-seated material practices and socioeconomic structures of the given culture” (Engeström, 1993, p. 66). On the contrary, “Contexts are activity systems” (Engeström, 1990, p. 78), dynamically reconfiguring over time and bearing traces of sedimented history as well as buds or shoots of a possible future (Engeström, 1993, p. 68). This means that language is part of its sedimented history and potential future, as a way of being, knowing and doing. This is compatible with the teachers’ work perspective that context is “not only the tangible, obdurate, empirical world of

everyday experience; it is also discursively constituted through practices that re-present and, therefore, define the ‘real’ and what is ‘relevant’” (Seddon, 1995, p. 401).

Similarly, in Hall’s social theory of articulation, context “is not something out there, within which practices occur or which influences the development of practices. Rather, identities, practices, and effects generally, constitute the very context within which they are practices, identities or effects” (Slack, 1996, p. 125). This construction avoids the spatial “inside/outside” metaphor, where the object of study is “inside” and the context is “outside,” tending to set up imaginary boundaries and to suggest that context can be stripped away as the layers of an onion. The “inside/outside” metaphor readily treats context as a taken for granted backdrop (Grossberg, 1989b, p. 16) and does not allow for mutual construction of the inside and outside. It also suggests, in a positivist paradigm, that “objective” explanations of phenomena can be made possible by stripping away “contaminating” context (Mischler, 1986). Some research approaches have countered this by “fetishising context as an atomised fragment” and privileging “the local” (Grossberg, 1989b). In articulation theory, however,

the context is constituted, not only by the “horizontal” relations among practices, but also by the “vertical” articulations between practices and tendencies operating across different levels of abstraction. For example, the community always partly involves the rearticulation of national discourses into local conditions. [...] Such vertical or hierarchical articulations constitute the reality of structures constantly transcending the local, although they only exist in their local effectivities (Grossberg, 1989b, p. 16).

Analysis of the vertical articulations between practices is central to understanding the discursive constitution of contexts, and I believe may be facilitated through the notions derived from the Leont’evian activity system construct.

3.2 The activity system as analytic construct

According to Leont’ev (1981), the activity system construct can apply to any instance of human activity regardless of its scope. An activity system may span amounts of time from large to small; it may cover many sites, a group of local sites or a single site; it may have a social reach that is extensive, contained or restricted. School-based curriculum development, for example, can be viewed as a generalised activity system covering many sites, as a local system in one school or faculty; or as a very specific system occurring as a single meeting or even a single episode within a meeting. The activity system construct also assumes change within whatever time frames are superimposed by the researcher. This reflects the views of Marx as methodologist and radical materialist, for whom “the starting point of science and of history is life-as-lived, not interpretations or abstractions extrapolated from life” (Newman & Holzman, 1993, p. 13).

In first generation activity theory, Vygotsky brought a focus to the notion of activity and of *mediation*, whereby the relationship between human subject and environment is shaped by mediational means embedded in culture. Leont'ev extended this to include mediation by social relations, constructing division of labour as a historical factor in the evolution of mental functions. He also specified the activity system as a means of “describing the general structure of human activity and individual consciousness” (Leont'ev, 1981, p. 59).. Thus “activity is an ‘inner’ as much as an ‘outer’ process, transcending the entire dichotomy” (Leontiev, 2005, p. 6). Analysis starts not with the actor but with the activity, defining both in relation to the object of activity, and both as inherently social. “The human individual’s activity is a system in the system of social relations. It does not exist without these relations” (Leont'ev, 1981, p. 47). In this sense, the activity system openly invites attention to power relations and political struggle, even though at the time of its inception in the Stalinist 1930s this was not made explicit.

3.2.1 Features of the second generation Leont'evian activity system

In this brief review of the Leont'evian activity system, I take a second generation perspective, avoiding current debates among the dominant players in cultural historical activity theory. I am deliberately disregarding recent work within the CHAT community, so that I can later take the bare bones of the activity system construct and make direct links with the language work of Leont'ev's contemporary Bakhtin, as well as with other views of language as systemic activity that build neither on the work of Bakhtin nor Leont'ev. I do not espouse an ontological view of the activity system, but view it as an analytic tool – facilitating particular ways of looking and knowing. As well, my interest is deliberately restricted, focusing on insights that might help me in developing the analytic framework I seek, where contexts are viewed, like language, as both activity and system.

The Leont'evian activity system as analytic construct comprises three “levels” of analysis: *operation*, *action* and *activity*, and is situated within the broader system of human social relations. The levels represent a reflexive interdependent layering from the particular to the collective, the concrete to the abstract. In brief, the level of operation involves embodied processes including “tool-using” (Newman & Holzman, 1993); the level of action involves situated human consciousnesses; the level of activity involves generic social forces and structures.

The level of activity

The level of activity represents the global ground against which actions and concrete operations must be construed. This level is identified through its connections with broad social communities and fields of interest, such as labour activity, military activity, legal

activity or educational activity. Characteristics include how the particular community constructs its sociocultural and sociohistorical ways of being and knowing, as well as its rules for practice and the division of labour. All features at the level of activity are concentrated around a central object in the broader system of social relations, towards which the activity system is functionally oriented. This concentration or focus of interest is what Leont'ev calls "motive," in other words something "that energises and directs activity" (Leont'ev, 1981, p. 71), and which "may be either material or ideal, either present in perception or existing only in imagination or in thought" (Leont'ev, 1978, p. 62). For Leont'ev, "there can be no activity without a motive. 'Unmotivated' activity is not activity devoid of a motive: it is activity with a motive that is subjectively and objectively concealed" (p. 59). Motives can also be characterised as "socially and institutionally defined beliefs about a particular activity setting" (Donato, 1994, p. 36), and are strongly coloured by a community's accrued experience of its environment. This activity theory understanding of motive can readily be seen to include current cultural studies notions of broad sociopolitical interests.

Motive underpins the formation at this level of overarching generalised goals for the activity system as a whole (Zinchenko & Gordon, 1981, p. 92). It is seen as the cornerstone of the functional relations constructing the activity system.

Leont'ev conceived of activity as a nested system of coordinations bounded by general human motives. In contemporary ethnographic terminology, an activity is coextensive with the broadest context relevant to ongoing behaviour. Activities are composed of actions, which are systems of coordination in the service of goals, which represent intermediate steps in satisfying the motive (Cole, 1985, p. 151).

According to Leont'ev (1981, p. 62) the overarching goals within any activity system are formed at the level of activity, in other words they are generated not by individual actors but by the social activity itself, including motive.

The level of action

The level of action is strongly characterised by intentionality and by the notions of person, actor, and consciousness. For Leont'ev, consciousness "is not given from the beginning and is not produced by nature: consciousness is a product of society, it is *produced*" (Leont'ev, 1981, p. 56-57). Intentionality comes into play at this level through the transformation of overarching goals formed at the level of activity into a series of locally appropriate sub-goals or "partial" goals (p. 62), which might be called "purposes". However, such goals "are not necessarily stable. Individuals, as agents active in creating their world, can modify, postpone, or even abandon goals altogether" (Lantolf & Appel, 1994, p. 19). At this level,

participants are in dynamic relation both to the encompassing activity and the manifesting operations.

The level of operation

Embodied tool-using is central to the level of operation, where tool-using involves both material tools, such as the larynx or a pen, and semiotic systems, such as language or graphics. A single goal may be operationalised through diverse and multiple processes, depending on prevailing sociophysical conditions. For example, while identical goals may typically recur in curriculum development meetings, their operationalisation may vary according to how participants respond to the particular lived circumstances of each meeting, such as the time of day, whether a certain person is present or not, and the mood of the group. The level of operation concerns the enactment of intentions through diverse means, including semiotic systems such as language, taking account of diverse sociophysical conditions. Operation in activity theory involves processes demanding little or no attention, being carried out more or less unconsciously or treated as a routinised facilitatory procedure and unnoticed. This is very similar to Dewey's notion of habit as a learned relation between an organism and an environment, having meaning only by reference to that environment. Dewey's habits work in interaction, not as "an untied bundle;" and range from the unintelligent and mechanical to what Dewey calls "intelligent habit or art" (1991). Such operational habits draw on cultural-historical resources from the level of activity and embody them in sociophysical conditions. In terms of intentionality, the level of operation is directly shaped by purposes developed at the level of action, and by outcomes emerging from moment to moment and feeding back into the activity system as part of the changing conditions.

Lantolf and Appel (1994, pp. 21-22) point out "that the link between socioculturally defined motives and concrete [...] operations is provided by semiotic systems, of which language is the most powerful and pervasive". In addition, Engeström has noted the function of text/speech as both object of activity and instrument of activity (Engeström, 1987, p. 101), and has more recently pointed to the importance of third-generation activity theory developing conceptual tools to understand dialogue and multiple voices (Engeström, 1999b, p. 3). Wells (2002, p. 50) stresses that sign-mediated activity has its own particular characteristics and that such tools must address this and also the articulation of multiple perspectives and the joint construction of meaning that occur within an activity system. Section 3 of this chapter looks more closely at language, but without taking up the challenge of developing tools from an activity theory perspective.

The activity system as explanatory tool

The Leont'evian activity system constructs human activity as a dynamic transformative system, and inviting the analyst to view activity

from the standpoint of the motive that impels the activity, from the standpoint of actions that are the processes subordinated to a conscious goal, or from the standpoint of operations that depend directly on the conditions under which a concrete goal is attained (Zinchenko & Gordon, 1981, p. 75).

These three standpoints are each equally necessary if the full descriptive and explanatory power of activity theory is to be achieved. On the one hand, an activity system approach has rich descriptive power in that it “opens the way for representing the structure of activity as a system of inter-connected units and components with potential relationships among them and among types of connections” (Zinchenko & Gordon, 1981, p. 99), as well as permitting the construction of layers within levels to provide for micro-analysis (pp. 99 and following). On the other hand, an activity system approach also has considerable explanatory power, since it invites the researcher to uncover “the motive and the interrelationship of this motive with the selection of goal-directed actions and their operational composition” (Donato, 1994, p. 36).

By taking account of all three levels in the Leont'evian activity system, as well as the functional connections between them, a cohesive account of phenomena can be given and holistic explanations developed. For example, an early western phenomenological study (Wertsch, Minich & Arns 1984) used this process in a Brazilian education context to show that differences in how mothers and teachers operationalised a children's model building task were functionally related to how they constructed the task in relation to the level of activity. Through their operational moves, it was apparent that the mothers constructed the task within the arena of labour activity with a motive of successful task completion. The teachers, on the other hand, used a quite different set of operations constructing the task within the arena of school activity, with a motive of children's learning. Mothers and teachers were acting from different understandings of the overarching activity. Such a connection with motive can be reliably made through analysis of phenomena at the levels of operation and action. However, without such analysis its attribution is less reliable. So when Wertsch (1985, p. 212) unguardedly assumes a motive for schooling as learning for learning's sake, this can readily be contradicted by analysis of phenomenological data, and classified as a subjective interpretation that is not universally convincing (Lantolf & Appel, 1994).

Using the activity system as an analytic tool can also uncover single level representations of activity, as well as their limitations and biases. For example, the three perspectives on school-based curriculum development that were reviewed in Chapter 2 each privileged one

level of analysis over others. The task perspective privileged the level of operation, the policy perspective privileged institutionalised activity, whereas the teacher agency perspective privileged the level of conscious action. This means that the same instance of school-based curriculum development could be represented as unthinking routinised operation, as institutionally governed activity, or as agentic problem-solving action. Such single level representations, or “monologic” representations in Bakhtin’s terms, are unlikely to provide a comprehensive or accurate picture, and may have material effects, as when greater or lesser value is attached to participants as part of a politics of representation. For example, when teachers are represented as technicians engaged in routine procedures, their status is lower than when they are represented as consciously agentic beings engaged in “actively interpreting, making sense of, and adjusting to, the demands and requirements their conditions of work place upon them” (Hargreaves, 1988, p. 211). Such effects of monologic representations provide additional support for a multi-level approach.

The Leont’evian activity system as base for theory building

The Leont’evian activity system has been used in third generation activity theory as a base for new developments, among them the activity system construct developed by Engeström progressively since his 1993 publication and used to great effect in a number of studies. I too propose using the Leont’evian activity system as a base for new development, but on a much smaller scale as part of developing an analytic tool for the particular purposes of my study. In what follows, I move away from activity theory and pursue only two Leont’evian insights: the notion of activity system and the notion of levels within activity systems. My aim is to develop an analytic framework directly suited to locating the consequentiality of language in the teachers’ work that forms the data for this study. I am therefore appropriating only a bare skeleton of the Leont’evian activity system. I do this specifically in response to the theoretical position taken up at the start of this chapter, namely that “the key to understanding language in context is to start not with language, but with context” (Hymes, 1972, p. xix). I am looking to frame the notion of context in relation to language in a more dynamic and generative way than the rather simplistic and static text-context dichotomy often encountered in discourse studies.

Some directions for development of the Leont’evian activity system

Third-generation activity theorists have taken up a variety of productive directions in the development of the Leont’evian activity system, but the path I want to take is somewhat different, and does not sit comfortably within activity theory. For my purposes of understanding language-in-context in terms of activity, I keep the focus on the Leont’evian activity system as described in Leont’ev (1981) and as discussed by others since. There are three aspects that need clarifying: use of the term “activity”; relationships among activity

systems; and, last, how features characteristic of one level might be represented at other levels.

On first coming to activity theory, I was consistently frustrated in my reading by the multiple uses of the term “activity.” In one and the same text, it might refer to the activity system as encompassing unit; to the level of activity as an internal unit; to human activity both in general and as instantiated; and even to specific learning activities in the classroom. In time, I realised I was not alone in this frustration. For example, Wertsch refers to Leont’ev’s level of activity as “activity setting” (Wertsch, 1985), highlighting the notion of cultural community and its concomitant “appropriate roles, goals, and means to be used” (Lantolf & Appel, 1994, p. 17). However, because “activity setting” suggests that setting is relevant only at this level and not at the other two, I chose not to use that term, and to retain the Leont’evian terminology. Consequently, I consistently refer to “level of activity” if that is what I am talking about, and use activity only to refer to something under discussion as an activity system, e.g., school-based curriculum development.

While Leont’ev emphasises that the activity system is a factor of the broader sphere of social relations, second-generation activity theory tended not to investigate relationships across activity systems. Addressing this limitation, Engeström’s (1993) model and subsequent work explicitly highlights networks of activity systems, and also the interdependence of activity systems. Engeström makes the point that any activity system must be constructed in relation to past, concurrent and future activity systems, which ties in with Leont’ev’s point that each activity system is a factor of a broader system of social relations. The idea of networks of activity systems provides a useful heuristic for connecting into that broader system, and for understanding context. Engeström also points out that influences from other activity systems “intrude” into each activity system and are appropriated with or without modification. This creates an imbalance and sets up contradictions within and across the existing components, so that the system is constantly working through these contradictions (Engeström, 1999a, p. 72). Engeström’s work has been particularly important in the analysis of contradictions within and between activity systems, with a view to identifying multiple causes of trouble in workplace activity and finding ways of bringing about desirable change. For my present limited purposes, however, I have merely adopted the notion of networks of activity systems.

Leont’ev proposes the three levels of the activity system construct as a macrostructure that “does not rely on separating living activity into elements” (Leont’ev, 1981, p. 65), but rather relies on integrating it into a dynamic system of relational, interdependent levels and components. However, it has been suggested (Lantolf & Appel, 1994, p. 21) that Leont’ev does not clearly show how the different features ascribed to each level are constructed within the system as a whole. Specifically, he provides no way of showing how the sociocultural

characterisation of the level of activity carries through into the levels of action and operation. Since my purpose is to analyse language in relation to the surrounding activity (language-in-context), this issue is important, and the following section investigates the notion of levels of activity from theoretical perspectives outside of activity theory.

3.2.2 Some recent three-level theorisations of human activity from outside activity theory

In articulation theory, considerable importance is attached to taking account of “different levels of structures – where levels are defined precisely by the effective spatial, temporal, and social reach of different practices across contexts” (Grossberg, 1989, p. 16). A similar view is reflected in the distinction made by Bowe and Ball (1992), discussed in Chapter 2.3, among contexts of influence, practice and text production in regard to policy analysis. In accordance with my intention to find ways of looking at the contexts of language compatible with a view of language as both activity and system, I decided to look for other three-level theorisations of human activity outside activity theory. I found what I was looking for in three theorisations in two disciplines related to my topic: cultural studies and education studies. None of these theorisations claim links to activity theory, however I believe them nevertheless to be complementary to the notion of levels in the analysis of activity or contexts.

In the field of cultural studies, Fiske (1993) takes an articulation theory position and identifies three dimensions of social activity: a sociopolitical dimension of social relations; an interior dimension of consciousness, identity or subjectivity in participatory situations; and a physical dimension of bodies in space and time (Fiske, 1993, p. 13). There seems to be a clear correspondence between Fiske’s dimensions of social experience and the levels of the activity system construct. Like Leont’ev, Fiske emphasises the unitary nature of the three dimensions, reiterating that they are not separate but interdependent, and that all are present in any given instance of social activity. Fiske emphasises that each dimension is in potential articulation with the others. In terms of school-based curriculum development, Fiske’s descriptors suggest a vivid image of embodied teachers at work, bringing their consciousnesses to bear on matters shaped by local and state relations in education.

Functional relations are also dominant in Gibson’s (1986) three levels of explanation for human activity in classroom events. These are: the personal and interpersonal (Level I), the institutional (Level II), and the structural (Level III).

Answers to the question, “Why does Mary fail in school?” can be pitched at Level I (“She’s thick.” “She doesn’t like maths/Mr Smith.” “Look at her mother.” “She runs around with Jane and Sharon.”); at Level II (“She’s in 3D.” “She lives in Downtown.” “She follows the wrong curriculum.”); and at Level

III (“She’s black/working class.” “Schooling is about the reproduction of inequality.” “Her teachers are in the grip of instrumental rationality.”) (Gibson, 1986, pp. 14-15).

From the examples, it is clear that Gibson’s personal and interpersonal level attends primarily to physical circumstances and embodied social relations, his institutional level to local situatedness and personal identity, and his structural level to relations in the broad social collective. Gibson’s levels of explanation can thus be loosely matched against the levels in the Leont’evian activity system. What is additionally interesting about Gibson’s approach is the way it suggests the differently distanced knowledges that are brought into play at each level of response. Level I responses call on immediate knowledges, Level II responses evidently call on what Haraway (1991, 1992) calls local or situated knowledges, and Level III responses call on generalised knowledges and what is now widely known as cultural capital (Bourdieu & Passeron, 1965).

Gibson’s account suggests that while it is true that in the activity system “the level of motive answers why something is done” (Lantolf & Appel, 1994, p. 21), the other levels also provide answers to why. In other words, the level of motive provides answers that take account of the activity system as part of a larger world, whereas the levels of operation and action provide answers to more immediate phenomenological and situational worlds. Gibson’s construction of three levels of explanation bears out the point made earlier about the dangers of relying on a single level of the activity system in analyses and representations of activity. It suggests also that answering *why* something is done in curriculum development may not be adequately answered only in regard to motive.

My third example of a three-level theorisation (Seddon, 1995) concerns the contexts of schooling as both a site of activity and as activity itself, specifically as “milieu,” “matrix” and “medium.” The “milieu” of schooling is constituted by the social organisation external to schooling and the changes occurring in that organisation, which then affect the practice and lived experience of schooling. An example of milieu is the educational restructuring that derives from changes of philosophy in public policy generally. The “matrix” for action in schooling is a more immediate context specifically relating to schools, their functioning as institutions, and the ideologies that sustain them. Seddon highlights the textual aspect of the “medium” of schooling, but gives little detail other than establishing the importance of language in educational operations. Nevertheless, understanding schools in terms of medium certainly affirms a place for language in school-based curriculum development activity.

As I see it, these three separate theorisations complement each other and also complement the notion of levels in the Leont’evian activity system, as indicated in Table 3.1.

Table 3.1 An activity system view of other three-level theorisations of activity

Characteristics of Leont'ev's activity system levels	Characteristics of Fiske's (1993) dimensions of social activity	Characteristics of Gibson's (1986) levels of explanation	Characteristics of Seddon's contexts of schooling (1995)	Characteristics of Bowe and Ball's (1992) policy contexts
Societal context of activity	Sociopolitical dimension of social relations	Structural activity in society at large	Milieu – social organisation external to schooling	Context of influence on policy
Situational context of consciousness in action	Interior dimension of consciousness, identity or subjectivity in participatory situations	Institutional activity, local situatedness and personal identity	Matrix – school-based activity and ideologies	Context of practice for policy in institutional situations
Immediate, material conditions of operation	Physical dimension of bodies in space and time	Personal and interpersonal activity and physical circumstances	Medium – the material tools of schooling, notably language	Context of text production of educational policy

While the characterisations are not exactly parallel, particularly at the level of action in the Leont'evian activity system, I find that together they allow me to think more clearly about Leont'ev's activity system levels in relation to the analysis of language-in-context in this study. They also allow greater characterisation of Bowe and Ball's contexts of influence, practice and text production in relation to school based curriculum development, as discussed in Chapter 2.

3.3 Locating language in relation to context

As mentioned earlier, I take a view of language as systemic activity (e.g., Bakhtin, 1981; Fairclough, 1992; Halliday, 1978, 1994), which is highly compatible with Leont'ev's view of human activity, as a number of CHAT theorists have made clear (e.g. Engeström, 1995; Measures, Quell & Wells, 1997; Moro, 1999; Wells, 1993; Wertsch, 1991). My interest at this stage is to locate features of language as systemic activity specifically in relation to levels of activity (context), and, to my knowledge, this is not something which contemporary CHAT theorists have taken up. I have chosen to work directly with key sources in Bakhtinian dialogism and related work by the Prague school of linguists, also making brief reference to perspectives from pragmatics, Halliday's systemic functional linguistics, and Fairclough's social theory of discourse.

3.3.1 Bakhtinian dialogism

Bakhtinian dialogism constructs language as social activity, and stresses “the social nature of humankind and the embeddedness of the individual human mind in the cultural collectivity” (Rommetveit, 1990, p. 84). This is paralleled in articulation theory, where, for example, Grossberg (1992) rejects the positivist model of communication as a relationship between two discrete and independently existing entities, considering it “unreasonable to isolate the communicative relation between texts and audiences from the broader field of social existence” (p. 42).

For Bakhtin, dialogue has two interdependent meanings.

In the first sense in which Bakhtin uses the word, “dialogue” is a description of all language – in effect, a redefinition of language [... as] the product of a complex social situation in which real or potential audiences, earlier and possible later utterances, habits and “genres” of speech and writing, and a variety of other complex social factors shape all utterances from the outset. Utterances address an “already-spoken-about” world and arise out of a socially constituted “field of answerability” (Morson, 1986b, p. 83).

This sense of dialogue provides a way of understanding the observable aspects of teachers’ work, situated and physically embodied in the social space of a single locale. In Bakhtin’s second sense, dialogue refers to a way of creatively being, knowing and doing within such a space, which only comes to the fore under particular conditions.

On those occasions, one needs a certain kind of dialogic activity, a certain way of constituting the “field of answerability” in order to favour the “*open and free*,” “the unfinalisable,” the readiness for something new and original. As Bakhtin outlines the opposition, monologic utterances and situations are constructed so as to restrict or ignore this dialogic possibility. By contrast, dialogue (in the second sense) allows the sort of openness [...] in which differences can produce new and unforeseen possibilities (Morson, 1986b, p. 84).

Dialogism thus comprises both dialogic openness and monologic closedness as ways of constituting the field of answerability. There is a continuum between the two, at one end of which lies what Bakhtin (1984) called “a fully realised and thoroughly consistent dialogic position” constructing the human being in terms of “independence, internal freedom, unfinalisability, and indeterminacy” (Bakhtin, 1984, p. 63). At the other end of the continuum lies monologic closedness, refusing to entertain the possibility of alternatives to the chosen meaning.

Bakhtin constructs the continuous process of verbal communication as “only a moment in the continuous, all-inclusive, generative process of a given social collective” (Vološinov, 1986, p. 95). The social collective is characterised by “heteroglossia,” in other words the multiplicity of social languages or discourses “peculiar to a specific stratum of society (professional, age group, etc.) within a given social system at a given time” (Holquist &

Emerson, 1981, p. 430). Heteroglossia is shaped by two opposing tendencies – centripetal forces tending towards unified, universalising, normative voices and answerabilities, and centrifugal forces tending towards diverse, differentiating and particularising ones. Both forces are in constant tension, the one “preserving us from overwhelming fluidity and variety” and the other “dispersing us outward [...] into a seeming chaos” (Booth, 1984, p. xxi). Heteroglossia and its contradictory forces are “the base condition governing the operation of meaning” (Holquist & Emerson, 1981, p. 428), and are thus an important factor in discoordination within activity systems.

In examining the role of language in social controversies and processes of social and cultural change, Lemke (1995) links heteroglossia with Foucauldian “discourses” of power-knowledge and their systemic relations “that depend on the wider social relations between the sub-communities that use them” (p. 38). Heteroglossic relations can thus be seen as sociopolitical relations “construed, or constructed, by someone, from some point of view” (p. 39), oriented to what Foucault calls the discursive formation – the system of relations among statements, or a typification of what people say and do in any particular historical period. For Foucault, such a discursive formation

is defined by four kinds of relations among statements: those which determine what sorts of discursive objects (entities, topics, processes) the discourse can construct or talk about; those that specify who can say these things to whom in what contexts; those that define the relations of meaning among statements, including how they can be organised to form texts; and finally those that tell us what the alternative kinds of discourses are that can be formed in these ways and how they can be related to each other as being considered equivalent, incompatible, anti-thetical, etc. (Lemke, 1995 p. 30).

As Lemke points out, the notion of discursive formation gives more specificity and systematicity to the notion of heteroglossia, and adds subtlety and complexity to accounts of social relationships and their historical changes.

“Bakhtin (1990) suggested that the accounting of heteroglossia – the push and pull of contradictory versions – allows one to consider ‘the architectonics of answerability’: how credibility, intelligibility, and the social relations they order become persuasively built into texts” (Britzman, 1995, p. 137). This involves the emergence of what Bakhtin calls “voice” or “accent,” or “the speaking personality, the speaking consciousness” (Holquist & Emerson, 1981, p. 434). Such voice is polyphonic even within the one person, and Bakhtin consistently poses the question of who is doing the talking, intimating heteroglossia working out from the history of the individual or group consciousness as multi-accentuality. Negotiating such multi-accentuality is a feature of Hall’s articulation theory.

Hall develops Vološinov’s theory of “accent” to argue that the contingent conditions in which language is spoken (or articulation-1), form the speaker’s

point of entry into a particular set of social relations (or articulation-2). Giving language an accent is articulating it fully, and until it is accented/articulated language, like other deep cultural structures, is another closed and totalising system. Accenting it, therefore, makes it historically contingent and opens it up as a terrain of struggle. The struggle for meaning, which Hall insists is integral to the social struggle at large, can only take place in historically specific conditions (Fiske, 1996, p. 213).

Accent and articulation-as-action (articulation-2) are thus inseparable, and central to the dialogic struggle for meaning brought about by heteroglossia in the collective and accent in the person or group.

Bakhtin also postulates “zones for hearing” multiple voices (Vološinov, 1986), which are both a site of action and a sphere of influence. Speaker “intentions must pass through ‘zones’ dominated by other characters, and are therefore refracted” (Holquist & Emerson, 1981, p. 434). Thus voice is heard through refraction, an idea which can be used to explain instances of “interactive trouble” that occur when different rationalities are brought into play among participants (Freebody & Baker, 1996), leading to discoordinations in the activity system.

Reducing refraction ideally requires

an active understanding, one that assimilates the word under consideration into a new conceptual system, that of the one striving to understand, establishes a series of complex interrelationships, consonances and dissonances with the word and enriches it with new elements. It is precisely such an understanding that the speaker counts on. Therefore his orientation toward the listener is an orientation toward a specific conceptual horizon, toward the specific world of the listener; it introduces totally new elements into his discourse; it is in this way, after all, that various different points of view, conceptual horizons, systems for providing expressive accents, various social “languages” come to interact with one another. The speaker strives to get a reading on his own word, and on his own conceptual system that determines this word, within the alien conceptual system of the understanding receiver; he enters into dialogical relationships with certain aspects of this system (Bakhtin, 1981, p. 282).

I have quoted this piece at length because it highlights the interplay between conceptual systems and linguistic systems, which is central to a dialogic understanding of language activity and the multi-accentuality of the word in its material realisation.

For Bakhtin, material realisation is the “utterance” and its “theme.” Utterance is “specifically social, historical, concrete and dialogised” (Holquist & Emerson, 1981, p. 433), and its theme is similarly “concrete – as concrete as the historical instant to which the utterance belongs” (Vološinov, 1986, p. 100). For Bakhtin, only theme has definite material significance, while meaning does not; meaning “only possesses potentiality – the possibility of having a meaning within a concrete theme” (p. 101). As a material construct, the utterance connects speaker and context dialogically, taking into account possible responsive reactions. “Thus addressivity, the quality of turning to someone, is a constitutive feature of the utterance; without it the utterance does not and cannot exist” (Bakhtin, 1986a, p. 99). The

physicality of turning to someone suggests the embodiment of positions adopted as speaker or hearer in concrete circumstances shaped by spatio-temporal channels of communication. Such embodiment might frequently be unconscious and routinised, as a feature of material operation.

The above constructs from Bakhtinian dialogic theory, can be located very comfortably alongside levels of an activity system construct, as shown in Table 3.2.

Table 3.2 An activity system view of constructs from Bakhtinian dialogism.

Activity system levels	Dialogic relations
Activity	Heteroglossia (linked to Foucauldian discursive formation)
Action	Dialogue as a way of being, knowing and doing; the speaking consciousness or voice/accent (linked to articulation-as-action); the field and architectonics of answerability; zones for hearing multi-acculturality
Operation	Utterance; addressivity; the production of utterances in sociocultural spaces

3.3.2 The Prague school of linguists

The Prague school of linguists derives much of its philosophical base from Bakhtinian dialogism, starting from Bakhtin's notion of co-dependence between the world and language, which led proponents "to search for the common elements and pathways by which they communicate" (Hanks, 1996, p. 120). Prague school linguists have developed detailed analyses of talk in lived settings, as distinct from the literary settings associated with much of Bakhtin's work. As in activity theory, material instances of activity are seen to provide an entry point for understanding activity as a whole. For example, dimensions of dominance in dialogue can be identified without any specific *a priori* assumptions of social order and social power; instead, dialogue analyses *per se* may lead us to a model of the provisions for and constraints on different sorts of social situations and communicative activities (Linell, 1990, pp. 166-170). On the one hand, these provisions and constraints are partly imposed or supported from outside, via institutionalised rules and social power relations (e.g., courtroom procedural rules, or norms for and expectations of adult-child interaction). On the other hand, they are reproduced through the particular patterns of situated collaborative action; that is, they can be understood partly as generated "from within," through the dynamics of the "self-organising principle of dialogue" (pp. 157-158). An analysis that only considers the institutionalised patterns of action and relationship obscures the importance of the individual participant in the dynamics of the interaction and of local settings. An analysis that only considers the individual obscures the importance of the institutional. This inside/outside

frame of reference is very compatible with the multi-level analysis in Leont'evian activity system.

Because the Prague school of linguists works with dialogism as a data based practice, it has developed quite specific constructs for the analysis of instances of talk in workplace settings. These include: topic, topic maintenance and topic progression (Foppa, 1990); perspectival structure and dynamics (Graumann, 1990, p. 115); the principle of "local sensitivity" which is "the structural tendency built into every topic for talk to turn to local matters" (Bergmann, 1990, p. 206); and dominance relations, typically based on unequal status and unequal knowledge distribution (Linell, 1990). The dynamics of dialogue and relations of power have been frequently foregrounded in the work of the Prague school.

In the search for universal attributes of dialogue, *equality* has most frequently been thought to qualify, especially in philosophical discourse. It seems obvious, however, that something like *power* (tending to produce *inequality*), rather than something like equality, commonly characterises social face-to-face communication, not only in other species but also in our own. Equality, therefore, will not do as a universal and defining characteristic of dialogue. [... On the contrary,] there exist status inequality and communicative asymmetry (Luckmann, 1990, pp. 56 and 57).

"Asymmetry" is used "as a general term referring to various sorts of inequivalences in dialogue processes" at different levels of abstraction (Linell & Luckmann, 1991, p. 4). Asymmetries include unequal social status and dominance; differences in knowledge and control; and inequality in patterns of turn-taking. Asymmetries can be linked to different kinds of dialogic effect, such as rights to develop topics and exploit knowledge, and access to and control of what counts as a relevant topic and perspective (Linell & Luckmann, 1991). As a theoretical construct, asymmetry in dialogue has obvious implications for the study of discoordination in activity systems.

As part of dominance relations and topic control, participants are at all times engaged in "intercursively defining conditions" for each other's contributions (Linell, 1990, p. 156), functionally shaping the nature of the communicative interaction through the choices they make (voice/accents) and the utterances they produce. "[S]ituated involvement depends on localised and in some sense culture-bound, on-line inferences. Speakers and listeners are thus not mere participants in conversational processes, they act as active agents who rely on their own inferences as guides to interactive conduct and to judge what an interaction is about" (Gumperz, 1995, p. 104). This notion of culture-bound, on-line inferences links the levels of operation and activity in activity systems, and as Table 3.3 indicates, it is the level of action that much of the Prague school work informs.

Table 3.3 An activity system view of constructs from the Prague school of linguists.

Activity system levels	Dialogic relations
Activity	Cultural systems of status and dominance
Action	Asymmetry; perspectival dynamics; topic management; dominance relations; culture-bound, on-line inferences
Operation	Patterns of turn-taking and topic contribution

3.3.3 Some three-level theorisations of language from outside dialogism

Here I introduce three additional and highly compatible perspectives on language, which have influenced my thinking in this study. These are: pragmatics, systemic functional linguistics and Fairclough's social theory of discourse. What follows represents only a very cursory review of each, with the sole purpose of identifying broad features that contribute to further characterisation of the activity system construct being developed here for the purposes of investigating the consequentiality of language in teachers' work.

Pragmatics

The study of pragmatics specifically attends to the agency of speaker-hearers, and Goffman (1981) suggests three pragmatic roles for dialogic speakers, each role having progressively greater abstraction. There is the role of the "animator" who makes the utterance concrete, the "author" who is responsible for putting the utterance together, and the "principal" who provides the position that is upheld through the utterance, and who might well be a corporate body rather than an individual. The study of pragmatics consciously incorporates collective and individual levels of analysis, exploring meaning in interaction as well as the indeterminate nature of how people operate in real-time (Thomas, 1995, p. 208). It deals in principles or maxims and is motive-dependent and agentive: "the way in which people use language is not solely a reflection of sets of social and contextual variables – people can be seen to use language in order to bring about change" (p. 183). This mirrors Hymes' view of language as a possible "lever of change" (Hymes, 1996, p. 99).

Pragmatics takes particular account of functional relations such as participant goals (as distinct from event goals); allowable contributions (and how people work around restrictions); the degree to which overarching pragmatic maxims are adhered to or suspended; turn-taking and topic control; the manipulation of pragmatic parameters such as social distance, power, rights and obligations, and size of imposition (Thomas, 1995, pp. 190-192). Such functional relations are particularly relevant to characterisation of the level of action in activity systems.

Table 3.4 An activity system view of constructs from pragmatics of language.

Activity system levels	Pragmatic relations
Activity	Pragmatic maxims and parameters; pragmatic role of principal
Action	Participant goals; allowable contributions; manipulation of pragmatic maxims and parameters; pragmatic role of author; authorial control
Operation	How people operate pragmatically in real-time; pragmatic role of animator

Systemic functional linguistics

Some theorists, such as Wells (1993) and Lemke (1995) effectively combine aspects of activity theory with systemic functional linguistics, using it to provide a focus on language in context. Systemic functional grammar was developed initially by Michael Halliday in the 1970s and continues to be actively developed, practised and taught by other linguists in many parts of the world, notably Australia. This theory views language “as a system for construing meaning, rather than as a conduit through which thoughts and feelings are poured. In other words, it views language as a meaning-making system rather than a meaning-expressing one” (Halliday & Martin, 1993, p. 23). As such, the contexts of language use are of central importance. These are constructed at three levels of abstraction: the context of culture (after Malinowski), the context of situation (also after Malinowski), and the immediate context of instantiation. Context of culture is linked to ideology and genre (Halliday & Martin, 1993); context of situation is linked to register variables known as field, tenor and mode; while the context of instantiation relates to processes of textual production (Butt, Fahey, Spinks & Yallop, 2000; Halliday & Martin, 1993). Lemke (1995) considers that the system of registers and genres in a speech community provides a link between the utterance/text and the social system, which allows community to be defined in terms of its system of activities or social practices, rather than as a system of individuals (p. 27).

In such ways, Hallidayian theory demonstrates what Lantolf and Appel (1994, pp. 21-22) suggest – that the connections between concrete operations and the sociocultural setting in an activity system are made through sociosemiotic systems.

Table 3.5 An activity system view of constructs from systemic functional linguistics.

Activity system levels	Systemic functional relations
Activity	Context of culture; genres; ideology; meaning potential;
Action	Context of situation (register variables: field, tenor and mode); text as semantic unit
Operation	Instantiations of situation and text; words in phonic/graphic materiality

Despite the important parallels indicated in Table 3.5, and despite the fact that I use systemic functional grammar to good effect in other areas of my work, I find that it has limitations for my purposes in this study. This is because it starts with language not with context; it puts language activity ahead of the broader notion of social activity.³

Fairclough’s social theory of discourse

Fairclough’s (1992) development of a “social theory of discourse” represents one attempt to mesh language activity and social activity more closely. Fairclough deliberately brings together three theoretical perspectives:

the tradition of close textual and linguistic analysis within linguistics, the macrosociological tradition of analysing social practice in relation to social structures, and the interpretivist or microsociological tradition of seeing social practice as something which people actively produce and make sense of on the basis of shared commonsense procedures (Fairclough, 1992, p. 72).

Linked to these three theoretical perspectives, Fairclough constructs a “three-dimensional conception of discourse” (p. 73) represented by three concentric frames, the inner being the most concrete and specific and the outer the most abstract and generalised. At the centre of these concentric frames lies “text,” which is defined as instances of spoken or written language. In the next frame we have “discursive practice” involving processes of text production, distribution and consumption in specific social contexts or situations, as well as “discourse types” featuring “conventions which embody particular power relations” (Fairclough, 1989, pp. 58-59). In Fairclough’s outer frame lies “social practice” which concerns social orders, discourse orders, ideology, hegemony and political struggle over discourses. Fairclough’s three dimensions of discourse can be mapped onto an activity system framework as indicated in Table 3.6.

³ Systemic functional linguistics could be said to represent “the beginnings of a theory of the social, but one that was projected from a theory of language into that space and which therefore could never be adequate as social theory” (Threadgold, 1997, p. 92). Such criticisms are beginning to be addressed through recent systemic functional linguistic developments, particularly in regard to cultural genres and the appraisal system (e.g., Martin, 2000; Martin & Rose, 2003; White, 2002). However, Threadgold’s point remains valid, not surprisingly, since Halliday did not set out to construct a theory of the social.

Table 3.6 An activity system view of Fairclough’s three-dimensional conception of discourse.

Activity system levels	Dimensions of discourse
Activity	Social practice (social orders, discourse orders, ideology, hegemony, political struggle over discourses)
Action	Discursive practice (text production, distribution and consumption; discourse types)
Operation	Text as material enacted phenomena

While the above activity system view shows clear compatibility between the two theories, it also suggests that Fairclough’s approach risks losing sight of language at the level of activity, and of social practice at the level of operation.

3.3.4 A three-level analytic framework for language-in-context

The discussion in sections 3.1 to 3.3 directly supports a three-level view of language activity, and also indicates suitable names for each level: *discourse* at the level of greatest abstraction parallel to the level of activity in the Leont’evian activity system,, *voice* parallel to the level of action, and *text* parallel to the level of operation. I am not proposing these as equivalent to the levels of the activity system, just as I am not developing this analytic framework within an activity theoretical base. What I have done is to use insights from Leont’ev’s work to help me develop tools for analysing language-in-context with a dynamic view of context as activity, rather than the static view frequently represented in discourse studies.

Discourse, *voice* and *text* are the terms I will use throughout the thesis for analysing language-in-context. However, because they lack the morphological characteristics of activity, I need to specify that I do indeed use them with an activity meaning. Thus *discourse* includes discourse communities in the sense of “systems of doings, of social and cultural activities or practices, rather than as systems of doers, of human individuals *per se*” (Lemke, 1995, p. 93). Similarly, *voice* includes the act of voicing, whether monologically or dialogically; and *text*⁴ includes the act of text production, whether spoken or written.

Table 3.7 presents a predominantly dialogic characterisation of language activity at three levels, and is the heuristic I use for analysing teachers’ work in this thesis. It requires me to

4 In choosing the term text I am going along with current usage in the field of discourse studies. However, it does go against the grain, since Bakhtin spoke out against text and in favour of utterance. For Bakhtin, “[t]he utterance as a whole does not admit of definition in terms of linguistics (or semiotics). The term ‘text’ is not at all adequate to the essence of the entire utterance” (Bakhtin, 1986b,p. 180)

search the phenomenological data for features of text, voice and discourse that are consequential in teachers' work; to look into their dynamic relation with the surrounding activity, again taking account of three levels: context of influence, context of practice and context of text production, introduced in Chapter 2.3.2 and further developed through an understanding of context as activity in section 2 of this present chapter. Chapter 4.7 indicates how I have tried to address this rather comprehensive enterprise, while Chapters 5 to 8 provide an illustration of my practice.

Table 3.7 A three-level analytic framework for language-in-context

Discourse	<p>Social languages (Bakhtin, 1981); discourse communities (Halliday and Martin, 1993); semiotic systems constituting culture (Halliday, 1978)</p> <p>Discourses (Foucault, 1970; Fairclough, 1992; Lemke, 1995); political struggle over discourses (Fairclough, 1992); Foucauldian discursive relations (Lemke, 1995); discursive formation or system of relations among statements (Foucault, 1972); discourse orders (Fairclough, 1992)</p> <p>Heteroglossia or multi-voicedness (Bakhtin, 1981);</p> <p>Corporate pragmatic role (principal) (Goffman, 1981); pragmatic maxims; pragmatic parameters, e.g., social distance, power, rights and obligations (Thomas, 1995)</p> <p>Linguistic resources for meaning making (Halliday, 1978)</p>
Voice	<p>The speaking consciousness/voice/accent (Bakhtin, 1981)</p> <p>Articulation-as-action accenting language, making it historically contingent and permitting entry into social relations (Hall, 1996); articulation-as-strategy (Slack, 1996); articulation as agency, consciousness and struggle (Fiske, 1993)</p> <p>“Zones for hearing” multiple voices (Vološinov, 1986)</p> <p>Polyphony and the architectonics of answerability, including a speaker's orientation to words of self and other (Bakhtin, 1981)</p> <p>Dialogic and monologic stances (Bakhtin, 1981, 1986a, 1986b, 1986c, 1986d, 1990)</p> <p>Dialogic asymmetry (Linell & Luckmann, 1991); perspectival structure and dialogic dynamics (Graumann, 1990)</p> <p>Personal pragmatic role (author) and authorial control (Goffman, 1981)</p> <p>Context of situation; register variables; semantic choices (Halliday, 1978)</p>
Text	<p>Instantiation of situation and text (Halliday, 1978); concrete utterance (Vološinov, 1976); text (Fairclough, 1992)</p> <p>Addressivity or turning to someone (Bakhtin, 1981)</p> <p>Articulation-as-utterance in contingent conditions (Hall, 1996)</p> <p>Topic initiation, maintenance and progression (Foppa, 1990)</p> <p>Embodied pragmatic role (animator) (Goffman, 1981)</p>

3.4 Chapter review

With the aim of developing theory “appropriate to the particular questions and contexts we confront from within” (Grossberg, 1989b, p. 14), this chapter has developed a framework for analysing the consequentiality of language in teachers’ school based curriculum development. Section 1 introduced some theoretical foundations and problematised the notion of “context”.. The second section explored the nature of the activity system as constructed by Leont’ev in second-generation activity theory. In the third section, by drawing on diverse sources investigating a view of language as systemic social activity, I viewed features of language through the lens of an activity system construct, and developed an analytic framework for investigating language-in-context, distinguishing three levels: *discourse, voice, and text.*

Chapter 4

The research process

[...] researchers ought to identify the beliefs that have the most significance for a specific study. By identifying such beliefs, they acknowledge that data creation is theory dependent and that a personal framework of beliefs permits some things to be noticed and others to be ignored (Tobin & Tippins 1993, p. 15).

A core belief permeating my research process is that “theory is itself an active response to local conditions” (Grossberg, 1989b, p. 14). From this perspective, theory grows out of the investigation whilst simultaneously shaping what counts as data within it. Data creation and the development of theory are thus separable only to a degree, since the theory that grows out of research is the same theory through which “we are able to construct the very context to which theory responds” (Grossberg, 1989b, p. 14). It is this kind of dialogic relationship which underpins the understanding of activity system developed in Chapter 3, and which is central to the data analysis in this study. My research approach is described in section 1, building on Chapter 3, while section 2 is an account of the research methods in action.

4.1 Research approach

In describing my research approach, I briefly review the epistemologies underpinning my choice of theoretical perspectives and research methodology (Crotty, 1998, pp. 2-9). I then introduce the core methodology, indicating how it is informed by the theoretical perspectives introduced in Chapters 2 and 3.

4.1.1 Epistemologies informing theoretical perspectives and methodologies

The theoretical foundations of this study were introduced in Chapters 2.1 and 3.1, and developed throughout Chapter 3 into a three-level framework for analysing language-in-context, drawing on a view of language as activity, features of Bakhtinian dialogism and Stuart Hall’s articulation theory. A post-positivist epistemology was developed, in which causal relationships were less dominant than in a positivist epistemology, the focus being on connective relationship rather than deterministic relationship. This epistemology can also be characterised more specifically as social constructivist, since it holds very centrally that meaning is constructed in social interaction framed in cultural-historical settings.

The *mélange* of cultures and sub-cultures into which we are born provides us with meanings. These meanings we are taught and we learn in a complex and

subtle process of enculturation. They establish a tight grip upon us and, by and large, shape our thinking and behaviour throughout our lives (Crotty, 1998).

A social constructivist epistemology closes the door on individual constructivism, which suggests that meaning is made within the individual as if divorced from society and culture, and opens the door to understanding human activity as a key site of meaning making, as proposed in activity theory, dialogism and articulation theory.

Social constructivism also represents my understanding of viable phenomenological research in education, where

knowledge is tested for viability in the personal and social settings in which it is to be used. The tests of viability are associated with the evidence for the particular knowledge claims and the extent to which use of the knowledge in particular situations leads to plausible solutions. The standards for judging the quality of research, therefore, centre on the adequacy of data in relation to knowledge claims and the credibility of the assertions, in the sense that use of the knowledge in given circumstances leads to productive outcomes (Tobin & Tippins, 1993, p.15).

I believe that the knowledge claims I make are well-evidenced through the data representation and analysis in Chapters 5 to 8, and relevant for potential use in teacher education, the development of professional teaching standards, and further research.

4.1.2 Methodology

This is a phenomenological study and draws on principles and practices of interpretive ethnography, as developed in the fields of anthropology, sociology and sociolinguistics. As such, it places “human actors and their interpretive and negotiating capacities at the centre of analysis” (Angus, 1986, quoted in Anderson, 1989, p. 251); it focuses on action in its “natural, ongoing environment where [people] live and work” (Schatzman & Strauss, 1973, p. 5); and it does not isolate the phenomena under study from their context, since “to divorce the act, word, or gesture from its context is, for the qualitative researcher, to lose sight of significance” (Bogdan & Biklen, 1992, p. 30). Since language is only ever produced or interpreted in a social context, it “makes little sense to study verbal interactions as if they were unconnected with social structures” (Fairclough, 1985, p. 746).

Historically, the emphasis in interpretive ethnography has been on description rather than critique, on the capture of existing states of affairs and their processes of change, rather than the framing and production of new states of affairs. This encourages the development of “grounded theory” (Glaser & Strauss, 1967), allowing the data to drive the theory. It also “provides access to ‘situated’ discourses and ‘specific tactics’ and ‘precise and tenuous’ power relations operating in local settings” (Ball, 1994, p. 2). For the ethnographer, the world of enquiry is “a plurality of worlds (*Lebenswelt*); worlds that are *constituted* in the lives and experience of participants in a group or activity, in important part through selecting

and grouping and reinterpreting received traditions” (Hymes, 1980, pp. 74-75). Thus, the analysis is directly in relation to the culture of which it is a part (Heath, 1982; 1983).

Interpretive ethnography also allows data “to generate propositions in a dialogical manner that permits use of *a priori* theoretical frameworks, but which keeps a particular framework from becoming the container into which the data must be poured” (Lather, 1986a, p. 267). This is the principle I adopt, by framing the study within an *a priori* teachers’ work perspective, and focusing on language as consequential in such work. This leads me to a particular branch of interpretive ethnography, what Hymes (1980) has called linguistic ethnography, and which, like dialogism, can be located among integrationist social theories (Coupland, 2001).

Linguistic ethnography

Linguistic ethnography refers specifically to the process of studying language in context, starting either from language or from social life, but taking account of both.

If one starts from social life in one’s study, then the linguistic aspect of the ethnography requires one to ask what are the communicative means, verbal and other, by which this bit of social life is conducted and interpreted? What is their mode of organisation, from the standpoint of repertoires of codes? Can one speak of appropriate and inappropriate, better and worse uses of these means? How are the skills entailed by the means acquired, and to whom are they accessible? These questions lead one into the territory of the other starting point (Hymes, 1980, pp. 82-83).

In this study, I start from social life in the form of teachers’ work, and travel to the borders of linguistic territory, where meaning making dominates and linguistic form is integrated in social life, both shaping and shaped by the context in which it occurs. Such research into verbal interaction is social research and cannot “be detached from the social and political context in which language is used” (Cameron, Frazer, Harvey, Rampton, & Richardson, 1992, p. 13).

According to Seddon (1995), in interpretivist and social constructivist approaches, the “inside/outside” metaphor for context is typically replaced by the more integrated metaphor of figure/ground. These approaches are more holistic, more likely to query the delineation of the object of study and context and to raise questions about the relationship between the two, the nature of their interaction and the part it plays as a force for change (Seddon, 1995, p. 397). This is very relevant in my study, where there is a strong focus on the interaction between language and context, and the part it plays in the processes of school based curriculum development.

Problematising “language” in linguistic ethnography

Linguistic ethnography, as constructed by Hymes (1980), views language primarily as a means of communication and a repertoire of codes for contexts. In my own work, I broaden this view of language in two main ways. First, I incorporate Bakhtinian notions of language not just as means of communication but as a dialogic way of being, whereby a person-with-agency acts through language within and upon context and who is answerable in human activity (Bakhtin, 1990). For Bakhtin, “human existence is the interaction between a given world that is always already there (*uze stavsee bytie*) and a mind that is conjoined (*priobscen*) to this world through the deed (*postupok*) of enacting values” (Holquist, 1997, p. 397). I include the deed of enacting values, the conjoining of mind and world, and the always-already-there heteroglossic world as additional objects of linguistic ethnography. Bakhtin, using Marxist discourse, defines the always-already-there component as the “socioeconomic base” and “official ideology” (later on in the thirties this became “authoritative discourse”), while Leont’ev encapsulated it at the level of activity as “the collective,” without specifying any degree of authority. In this study, the always-already-there includes cultural features such as the education-labour relationship and its associated structures, including state education policies.

The second way that I broaden the view of language in linguistic ethnography is to highlight human activity at the interface between language and context, identified in Chapter 3.3 and Table 3.7 in terms of *text*, *voice* and *discourse*. This means taking account of the textual body, who listens, speaks, reads and writes; of the authorial persona, with its associated consciousnesses and subjectivities; and of the discourse community and its membership. Broadening linguistic ethnography in this way is both like and unlike ethnomethodology. It is like in that it requires attention “to the moment-by-moment processes by which social action [is] constituted” (Rustin, 1993, p. 169), and a constant awareness that “meanings are defined by and within the very conversation [and/or document] they support” (Bilmes, 1992, pp. 96-7). It is unlike ethnomethodology in that the focus is on language acts not only as “courses of action” which provide evidence of the analytic work that people do in order to understand each other (Freebody & Baker, 1996, p. 150), but also as “choices for action” and an integral and consequential part of the broader social activities in which people are engaged. Ethnomethodology documents “how it is that people make sense of one another, through what is said, and perhaps more importantly through what is presupposed or taken as shared” (Freebody & Baker, 1996, p. 150), while linguistic ethnography, as I undertake it, documents how language functions in a particular activity, as text, voice and discourse, and as a way of being, knowing and doing.

Linguistic ethnography and case study

Linguistic ethnography, in accordance with principles of interpretivist ethnography, is frequently linked to case study methods, which focus on a particular instance of the object of study. Case studies have achieved recognition as a foundation for a different way of knowing to the positivist way, a way that values the relationships between setting and action, avoiding universalism yet revealing system.

From case reports we learn both propositional and experiential knowledge ...
Naturalistic, ethnographic case materials, to some extent, parallel actual
experience, feeding into the most fundamental processes of awareness and
understanding (Stake, 1994, p. 240).

Working on the principle that understanding of the particular contributes to understanding of other instances and of systems, cases have high status not only in the legal and medical professions, but in social science research and the “hard” sciences. In the education profession, cases are frequently used in teacher education to bring alive diverse worksite realities and perspectives through the richness and depth of description. They also have a role similar to that in law and medicine in providing a body of lived experience and associated judgements upon which to base policy decisions. In addition, as with the “hard” sciences, they have a role in providing information to be taken up in wider studies or surveys of multiple cases in diverse environments. These features were all relevant to my decision to adopt case study methods.

4.2 Research methods in action

Having decided to adopt a case study approach in a single site, I chose a school where the research process could be directly useful to participating teachers, knowing that the eventual research product might not be at all directly useful to them. In the first year, I spent eleven weeks at the school, becoming familiar with its culture and community, participating as a resource person for literacy across the curriculum, and gradually whittling down the scope of the research and refining its focus and design. Much of the ethnographic data for the study was uncovered during this period, paving the way for the main data generation process the following year.

Initially, my broad topic related to teachers’ work in developing language-aware curriculum across the junior secondary school, but I planned to allow the precise topic and participants to emerge from the research site itself. In the first instance, what emerged was that the development of language-aware curriculum in this school was inseparable from and subsumed within the development of the various subject curricula. While language awareness was something I, as a researcher in language and literacy, was trying to detach and focus on, the teachers themselves kept it always connected and subservient to subject

requirements. A teachers' work perspective and an activity theoretical perspective both required that I respect such workplace realities and let go of my own pre-emptive framework. This gave the research a new direction. It meant focusing on a single curriculum area, and on a particular aspect of teachers' work. Both of these emerged from the site in that (a) the following year was to see the development of a new school-based curriculum outline for junior secondary science, and (b) the teachers involved were keen to participate in my research. The teachers' curriculum development meetings became the key data source.

4.2.1 The research questions

Once this new direction was decided, my research questions took shape. I wanted to find out how language was consequential in teachers' curriculum development activity, and how it functioned to construct that work. In keeping with a teachers' work perspective and with principles of linguistic ethnography, this meant starting from a question about the context of language use, and relating other questions directly to that context. The questions are thus interdependent.

- What is the nature of teachers' work in developing a school-based curriculum outline for junior secondary science?
- How is language consequential in this work?
- How does language function in constructing that work?
- Given my broad ideological aim of raising the profile of language in theorisations of teachers' work and in teacher education, a further question arose in regard to implications from the study:
- What does this imply in regard to identifying places for language in accounts of teacher knowledge?

4.2.2 Research aims

Through the initial pilot study, as well as my previous interests, three types of research aim were established: ideological, methodological and substantive (Lather, 1986b). I identified three broad ideological aims. First, I wanted to raise the profile of language in theorisations of teachers' work and in teacher education. Second, I wanted to develop an analytic framework that would integrate the study of language with that of the context in which it occurs. Third, I wanted the research journey to be respectful of teachers and useful to them in some way. This last led to a methodological aim to generate data through a reciprocal process between researched and researcher, one which could enhance all participants' options for self-determination. This meant taking school and teacher priorities as the starting

point; working only with willing and interested participants; and adopting data generation procedures which would respond to teacher interests. While the overarching substantive aim was to better understand the part played by language in the teachers' work, one associated substantive aim was to develop a less partial perspective on the nature school-based curriculum development than those reviewed in Chapter 2.2; and another was to identify language-related features of teacher knowledge. These latter aims are addressed in Chapters 9 and 10 respectively.

4.2.3 Ethics in the research process

The school principal and staff agreed to the research process before it started and approval was given by the Education Department of South Australia. Subsequently, participating teachers formally gave consent for me to use the data generated as part of their work and through interview.

The core ethical position I took in regard to the research process was a commitment to reciprocity, both in terms of responding to teacher input to the research design and in terms of contributing to the school while there. From feedback at the time, I believe this was carried out successfully and appreciated by the school and the participating teachers, one of whom referred to me as “not just an academic researcher, but a sort of live-in literacy adviser.” I was also determined to adopt a reporting procedure that would allow the teacher voices to be heard in their own right and in their own setting (see section 2.8).

Confidentiality was maintained throughout the study, and the community, school and participants are not named, and neither are there identifying features in the data representation and analysis.

4.2.4 The research site

Given the methodological commitment to studying language in context, the following description of the research site is quite detailed, and draws on a lengthy visit undertaken at the start of the study.

The research site was a rural South Australian high school, which I have called Countrytown High. An industrial city, Countrytown had been on the decline for some years. Employment prospects were poor, and the population was decreasing. For a number of people it was not a very hopeful town, and a significant number of students were living in poverty. The student population at the time is shown in Table 4.1.

Table 4.1: Student population at Countrytown High at the time of the study.

Total number of students	373	100%
Sex:		
Female	194	52%
Male	179	48%
School card holders (students living in poverty)	115	31%
Aboriginal students	70	19%

The school population was characterised by a high number of students living in poverty or in low-income families, reflecting the poor employment situation in Countrytown.

The Aboriginal students were from several different tribal groups in the region. Some spoke an Indigenous language, and all spoke Aboriginal English (Kaldor & Malcolm, 1991), although a few had very little of that. None spoke Standard Australian English, but some were on the way to learning it. Some of these Aboriginal students lived in town and some in a community setting built by the government five kilometres out of town. While poverty was a problem for many people in Countrytown, it affected a disproportionately larger number of the Aboriginal population. This resulted in “effects of multiple disadvantage – in health, in housing and in employment – on the educational outcomes of Aboriginal students” (Boston, 1999, p. 33). Aboriginal enrolments in the school were predominantly shaped by three features common to Indigenous education across Australia. One feature was family transience, whereby some students moved in and out of the school over quite short periods. South Australian figures at the time show that over 15% of Aboriginal students moved “frequently between schools, often with long periods of non-attendance between each enrolment” (Groome & Hamilton, 1995, p. 5). Second, the 19% enrolment of Aboriginal students at Countrytown High was restricted to the first two years of secondary schooling, Years 8 and 9, reflecting national trends of low retention rates among Indigenous populations (Groome & Hamilton, 1995; Buckskin, 2001). The third feature was variable attendance, reflecting a national tendency for Indigenous attendance rates to progressively decline during secondary schooling (Groome & Hamilton, 1995, p. 4). In South Australia, departmental records for 1993 showed attendance rates for Indigenous students at 78.4% as against 89.4% for the total secondary school population – a loss of over two days a fortnight. At Countrytown High, some of the Aboriginal students might be absent for weeks at a time, some for several days each month, while others attended quite regularly.

In regard to the staff, transience was also an important feature, with a 40% turnover in the year of this study. Such a high turnover meant that for Countrytown High to maintain its preferred school culture, core characteristics and required skills had to be constantly revisited through school-based initiatives. There was also an unusually high proportion of recently graduated teachers, 54% of the whole staff having less than three years' experience. Given that administrative and coordinating positions carry a reduced teaching load, the percentage of recently graduated teachers was even higher in terms of classroom contact hours. Senior staff consistently complained that newly graduated teachers were severely under-prepared for the demands of the school, including classroom management; teaching cross-culturally; working with students having low levels of literacy; and implementing department policies and practices in contexts of socio-economic disadvantage. Nevertheless, the principal saw value in having a youthful staff, which was energetic and usually ready to try out a range of strategies to improve students' learning outcomes (Interview data).

School culture

To a very large extent Countrytown High took its day-to-day operating policy from its School Development Plan. This was a product of whole-staff involvement, and established priority areas for improvement over three years, elaborated through objectives, strategies and evaluation indicators. The community and the student and staff composition were central in determining these priorities, and at the time there was a strong emphasis on three areas: improving student attainment levels in general, improving the listening, speaking, reading and writing skills of all students in all subjects, and increasing the involvement of Aboriginal students. The school was also committed to curriculum development in accordance with the new Statements and Profiles, which had made outcome-based education a requirement throughout state schooling. Outcome-based programs and units of work, along with Aboriginal perspectives and literacy across the curriculum, were central to curriculum development across the school.

Underpinning these curriculum emphases was a more general emphasis on student behaviour management, minimisation of aggression, and the development of social skills and strategies for conflict resolution. The School Discipline Policy had recently been negotiated with students, and all new staff and students were inducted into it. At the time of the study, the principal believed that fear and control as discipline strategies had effectively been replaced by collaborative methods, and that teaching strategies were beginning to change to reflect this.

Having developed a culture of social justice and affirmative action for students, the principal and staff determinedly applied for system-resourced projects to support it, particularly through the Commonwealth Disadvantaged Schools Program – the DSP. This was highly

strategic since “[t]he DSP was designed as a decentralised Program, to be driven by local initiative and guided by local perceptions of need” (Connell, White & Johnston, 1991, p. 266). Countrytown High had become known for designing effective submissions (personal communication, senior executive in the Curriculum Directorate, June, 1994), and all projects listed in Table 4.2, resourced by either commonwealth or state funding, were either in operation or had just recently finished.

Table 4.2: Projects at Countrytown High.

<ul style="list-style-type: none"> ▪ Priority Projects Integrated Technology Project ▪ SKIL (Successful Kids Independently Learning) ▪ Literacy and Learning Project ▪ Literacy Education R-10 Focus School Program ▪ The South Australian Junior Secondary Maths Project ▪ Trial school: South Australian Year 11 Writing-based Literacy Assessment (WBLA) ▪ Junior Secondary Review school ▪ Girls at Risk Project ▪ Trial school for the National Key Competencies Project ▪ Literacy in the National Profiles Project

This substantial list of projects shows the school’s commitment to keeping up to date with curriculum developments in its broad context of influence, and to the ongoing professional development of its staff in key matters of concern in the local context of practice, notably literacy.

The part played by the principal in the development of SKIL and related projects was very important, and the positions of SKIL coordinator, Aboriginal Education coordinator, and Literacy coordinator were framed by her particular vision of improving student learning outcomes. Her sixteen years of school experience had been mostly in disadvantaged schools, which led to her particular professional development pathway – a Diploma in Reading Education, involvement in a state-wide Negotiating the Curriculum project, and a Masters in Education through which she became an advocate of the ideas of Stenhouse, Giroux, Apple and Freire. When she first came to the school, four years earlier, she was responsible for training and development and purposely went about setting up a culture of teachers’ learning, which she called the “second curriculum.” The expectation was that everyone would do training and development, provided by the school and mostly run from within the

staff expertise, as a deliberate strategy to make sure that people recognised each other's skills and abilities.

For the teachers in their first two years of employment with the Department, this second curriculum was available through an institutionalised mentoring process. In addition, the school culture encouraged informal professional development with colleagues, as well as at weekly staff meetings where individuals regularly reported on curriculum projects.

Importantly, professional development was also inherent in the projects funded by the Commonwealth Disadvantaged Schools Program, largely because “the choice of the school as the unit of action (rather than the individual child) [... enables the Program] to tap into teacher professionalism and to function as a teacher educator” (Connell et al., 1991, p. 271).

Where possible, the principal deliberately linked professional development directly with curriculum development. For example, a full day staff forum was held to conduct a curriculum mapping exercise where the nine “essential skills and understandings” in the South Australian policy document *Educating for the 21st century* (1990) were matched with required learning outcomes and actual learning activities in each discipline. Another example was the establishment of the junior secondary science curriculum development project that provided the focus for this study (see Chapter 5.1.2). In support of the “second curriculum” of teacher learning, the principal chose not to fill the temporarily vacant position of Science coordinator, which would have involved bringing in an outsider for one year. Instead she used the available funding to create three one-year “key teacher” positions for recently graduated teachers who had been at the school for one year and were contracted for a further three years. This funding reduced their classroom contact hours by one-fifth to give them targeted time for the curriculum development project.

4.2.5 Data sources

The key data sources were teachers and certain state education and school policies that were relevant to the curriculum development project. The main teacher participants were the three science specialists, and the Acting Junior Secondary Curriculum coordinator, whose role it was to oversee the curriculum development project. An additional teacher – the Aboriginal Education coordinator – was an important participant in one meeting. Here the four chief participants are briefly described.

The three key science teachers participating in the junior secondary science project were: Carmen, Lucio and Oscar (pseudonyms they chose for themselves). They were all under thirty and had been in the school for one year only. Countrytown was a new home for all of them, and they spent many weekends away, entering into the local community mainly as householders, sports participants, and figures in the mid-week nightlife. Oscar was already

familiar with the rural scene, having grown up in a small country town, while Carmen and Lucio were city bred. None of the three had previously taught in a rural environment. None of them had previously experienced classes with Aboriginal students, nor with high proportions of transient and mobile students. Only Lucio had previously experienced working with students in poverty. Carmen and Oscar started their teaching career at Countrytown High, while Lucio came with one year of overseas experience and one year with the Department.

The Acting Junior Secondary Curriculum coordinator was not only a previous Science and Technology coordinator, but was the school's first Literacy coordinator, funded through the Literacy Education R-10 Focus School Program at a time when very few secondary schools in the state had established such a position. Lytton (so named as a reminder of his role as Literacy coordinator) was the most senior staff member in the group, having been teaching for fifteen years, mainly in country schools, and having been at the school for four years as Science and Technology coordinator. When he first arrived he quickly became aware of literacy issues affecting students' access to the curriculum and success in demonstrating their learning. This led to his direct involvement in setting up and participating in a number of the projects listed in Table 4.2. He saw the Literacy and Learning Project as crucial for him both professionally and personally, and his experience of designing, carrying out and writing up a small classroom case study as a key factor in his successful application for the Literacy coordinator position.

4.2.6 Data generation

The data generation process comprised an initial eleven weeks of immersion in the school, becoming familiar with the context, establishing a relationship with staff, and designing a research project relevant to the locale. The phenomenological data generation occurred across the following year and arose from the teachers' own decision to audio-record various of their curriculum development meetings, which I followed up with a series of twelve short visits, made in each of four terms and totalling eighteen days.

Contextual and phenomenological data generation relied on three main strategies, providing triangulation of methods and also some triangulation of data sources. These are described below and were:

1. audio-recording teacher meetings
2. interviews: (a) semi-structured, and (b) collaborative reflection on specific aspects of the teachers' work, some of which was previously noted in diary form or based on particular classroom activities and/or materials
3. school-based observation and document study.

These strategies were supported by ongoing participation in the life of the school and by classroom observation, both of which facilitated interpretation of the data in terms of locating them in relation to broader networks of activity systems.

1. Five formal planning meetings took place in term one, all of which were recorded by the teachers themselves. Another formal meeting early in term three was also recorded. These six recordings are of very good quality and constitute the bulk of the data. Participants' attendance at these meetings varied, depending on other calls on their time and on the focus of the meeting. The minimum number of participants was three and the maximum five. The meetings were held in the science staffroom after school hours, and most of the meetings took place without interruptions from other staff. During term two, the teachers took part in an additional curriculum project, which they saw as closely related to the main one. The school had been invited to work with the South Australian Curriculum Development Unit on a project to explore literacy and assessment in the implementation of the new assessment profiles for science. Release time for the four science specialists was provided so that they could participate in occasional full day meetings in the metropolis. The teachers recorded three half-days, one of which I attended.
2. Two sets of interviews were conducted with particular purposes in mind.
 - To obtain additional contextual information about the school and participating teachers, semi-structured interviews were conducted over approximately half an hour – two each with the principal and the Aboriginal Education coordinator, and one each with the deputy principal, teacher-librarian and five participating teachers.
 - Senior administrative staff in the school had a strong interest in any professional development opportunities for teachers that might be associated with the research process. This encouraged me to adopt a technique that I called collaborative reflection, which took place on each visit, twelve times with each of the four central participants. The collaborative reflections were sometimes audio-recorded, but more usually I simply took notes. The meetings were held in the science staffroom after school hours or when teachers collectively had a free period. The teachers talked

about what their work had involved in recent days, explored their concerns, discussed classroom activities and materials, and engaged with the questions I put in response to what they said. This allowed a certain degree of dialogic theory building to occur, for example, as the teachers explored the language demands of their assessment tasks and how to locate and identify what they called “the literacy in the science.” In addition, three of the teachers kept an occasional log of classroom activities or dilemmas directly associated with literacy, which served as a starting point for collaborative reflection. The talks also provided valuable contextual framing for interpreting the meeting data, identifying teachers’ classroom successes and concerns, and thereby providing some triangulation of data sources.

- The school-based observation and document study involved active participation in the life of the school, acting as a support person in classes; engaging in conversations with staff about their understandings of the school, the students and the community; and locating and studying relevant documents, such as educational policy and curriculum documents.

4.2.7 Data analysis and theory building

Data analysis involved a series of seven cumulative and recursive steps, working from the raw data through different levels of analysis, from low inference to high inference. These steps are described below, and were:

1. becoming familiar with the contextual data
2. transcribing teachers’ spoken data
3. thematic analysis of transcribed teacher meeting data
4. analysing transcribed teacher meeting data in terms of *text* and *voice*
5. locating and analysing contextual data relevant to the preceding analyses
6. analysing clusters of episodes in terms of the articulation of the levels of *text*, *voice* and *discourse*
7. theorising a dialogic perspective on school-based curriculum development, suggesting a view of teachers’ work as language work, with corresponding implications for accounts of teacher knowledge.

These seven steps had both strengths and limitations in actual practice, which I have tried to indicate in the following account.

1. The rather large and unwieldy corpus of contextual data was repeatedly combed for factors shaping the practice of teachers’ curriculum development and for related

networks of activity systems. While much of the contextual analysis, including policy analysis, has had to be omitted from this report due to lack of space, reading through the contextual data provided triangulation with, and expansion of, many aspects of the teacher meetings, and much has been distilled across Chapters 5 to 8.

2. All the recorded planning sessions, collaborative reflections and semi-structured interviews were transcribed in full, including false starts, back-channelling (e.g., Mm), pauses and repetitions. The following simple transcription conventions were used to give the flavour of speech:

- {capitals} for words receiving strong emphasis, e.g., “We don’t KNOW.”
- {space .. space} for unfinished sentences, e.g., “What I want .. ” and for hesitations within a sentence, e.g., “But the .. how do the .. ”
- {space ... space} for a pause of more than two seconds within a turn
- {italics} for descriptions of tone of voice or conversational structure, e.g., *anxious*, *overlapping*.

The transcription of audio-recorded spoken data necessarily involved some degree of analytic inference because the talk was filtered through the researcher’s hearing. While my transcriptions might have been improved had I been present and able to note body language, I was nevertheless supported by my extensive knowledge of the school and the participants.

3. Once transcribed, the data, from the teacher meetings were reviewed to identify recurrent themes, topics and tasks in the teachers’ work, indicating priorities and patterns of work as well as dilemmas encountered by the teachers, whether explicitly raised by the teachers or implicitly “contained within the semantic structure of the discourse itself” (Billig et al., 1988, p. 22) and requiring interpretation strategies such as the identification of a counter-theme. This review generated the four themes that are the focus of chapters 5 to 8 respectively, as well as the sub-themes represented in the selection of episodes.⁵
4. A second analysis of the teacher meeting corpus was undertaken, this time to identify locations where language was noticeably consequential in terms of changing the dynamics of the meeting activity. This was done by focusing on (a) the *level of text* (as

⁵ I define ‘episode’ as a unit of conversational interaction, comprising other smaller units, which may be referred to in the detail of analysis.

- episode: minimally one exchange dealing with one topic, but usually a sequence of exchanges dealing with the same topic
- exchange: the minimal interactive unit, involving negotiation of a single piece of content
- turn: everything A says before B takes over and vice versa
- move: a verbal event that carries the conversation forward (Yule, 1996)

established in Chapter 3.3), e.g. identifying addressivity (Bakhtin, 1981), topic initiation, maintenance and progression (Foppa, 1990), and changes in embodied pragmatic role (Goffman, 1981), and (b) the *level of voice*, e.g. the “speaking consciousness/voice/accent” (Bakhtin, 1981), “zones for hearing” others’ voices (Vološinov, 1986), a speaker’s orientation to their own and others’ words (Bakhtin, 1981), dialogic and monologic stances (Bakhtin, 1981, 1986a, 1986b, 1986c, 1986d, 1990), dialogic asymmetry (Linell & Luckmann, 1991); perspectival structure and dialogic dynamics (Graumann, 1990). This analytic process is represented in the discussion of the episodes selected for section 2 of each of Chapters 5 to 8 and in section 3 of each of those chapters.

5. Other data associated with the preceding analyses were then reviewed in order to provide a contextual frame, primarily in regard to the policy context and school context. This analytic process is represented in section 1 of each of Chapters 5 to 8 as well as in the discussion of *voice* in some episodes.
6. The cluster of episodes⁶ in section 2 of each of Chapters 5 to 8, along with their associated analyses and the contextual representations in section 1 of each chapter, provided the basis for inferential analysis in terms of the articulation of the levels of *text*, *voice* and *discourse*. This is given in section 3 of each of chapters 5 to 8.
7. Analysing the data in these ways and reading the analysis against the literature reviewed in chapter 2 alerted me to conjunctions and disjunctions between the patterns of language consequentiality I identified and the task, policy and teacher agency perspectives on school based curriculum development that I identified in Chapter 2.2. This allowed me to progressively develop and argue for a dialogic perspective on school-based curriculum development (Chapter 9) and to suggest some of the implications of a view of teachers’ work as language work, particularly in regard to accounts of teacher knowledge (Chapter 10).

While reciprocity in the research process was a feature of data creation and preliminary analysis, it was not possible to follow this through into the detailed analysis and theory building, as this took place at some distance, both in space and time. Dialogic theory building was thus restricted to the collaborative reflection process and to the school-based phase of the study. This meant that there was reciprocity in the thematic analysis and the place of literacy in the curriculum, but not in regard to the consequentiality of language more

⁶ In chapters 5 to 8 episodes are kept in sequence within a particular meeting, maintaining coherence with the teachers’ lived experience (See Appendix 1 for a list of episodes in Chapters 5 to 8 and Appendices 3 and 4).

broadly nor the theorisation of a dialogic perspective on school-based curriculum development. While I see this as a limitation, the participating teachers did not profess much interest in that aspect of the study, and so perhaps would not have contributed as importantly as they did in the earlier phases.

4.2.8 Reporting the study

In writing the research report I deliberately tried to avoid practices of writing which “convert what people experience directly in their everyday/everynight world into forms of knowledge in which people as subjects disappear” (Smith, 1990, p. 4). Goodson (2000) argues that research into teachers’ work has to faithfully represent teachers’ own voices, “since the kind of knowledge base that is generated feeds back into the kind of professionalism which is legitimised” (p. 14). In addition, it is important to keep context visible and available to the reader and alive in the analysis (Gilbert, 1992), and to provide the reader with sufficient information to take an active role in the validation and critique of constructs presented. As I see it, reporting must present the richness and complexity of the data within the frame of participants’ lived experience, intruding analysis in a clearly demarcated fashion. The task is more than merely providing information and demarcating analytic boundaries, however; it is also to prevent the reader from unthinkingly accepting the familiar ring of a naturalistic presentation or treating it as trivial and turning a blind eye to its immanent meanings. The analyst must somehow render naturalness questionable, and, as in contemporary literature, develop a means of defamiliarisation which “prevents us from regarding the incidents as typical and familiar” (Selden, 1989, p. 12).

Through this line of thinking I came to a decision to present much of the report as a stage script (albeit without claims to artistry). On stage, story becomes plot, a map seen in action from the point of view of the protagonist (Purdum, 1965), in this case the researcher. As in autobiography, the protagonist is “not telling about the past, [...] but deciding what to make of the past narratively at the moment of telling” (Bruner, 1990, p. 123). As a form of representation, a stage script allows for fidelity to lived events, settings, and words, whilst also allowing for conflation and juxtaposition of data through the development of the plot. A stage script can make data plentifully available to the reader, in ways suggestive of the contexts in which it was produced, both initially in the data generation process and subsequently at the researcher’s desk. It can also make visible the analytic processes, their scope and limitations, and openings for contestation, refinement or elaboration. In my stage script, selected workplace data constitute one element of the case study plot, as “the drama of the commonplace” (Stake, 1988, p. 260). The other element of the plot is the researcher protagonist’s attempted resolution of the problem of identifying the consequentiality of

language. This is undertaken through exploration of the setting, through defamiliarisation of transcribed data, and through theory building.

The data presentation and analysis in Chapters 5 to 8 follows a regular pattern. The first section sets the context in terms of state education policies and school practices relevant to the theme of the teacher episodes. The second section is the stage script representing the teachers at work and the researcher as Narrator, Observer and Interpreter. The Narrator introduces and connects the episodes, giving background information. The Observer describes what is happening at the level of text, working with eyes and ears. The Interpreter is concerned with the level of voice, adding situated data such as knowledge of the participants and the workplace and system of education, going beyond the immediate time and place yet remaining local. The naming of these two researcher characters is not intended to suggest that there is no interpretation going on at the level of text and no observation at the level of voice, but is merely to indicate the greater degree of inference required at the level of voice.

Section 3 of each chapter involves some degree of theorisation, first bringing together the episode purposes, and then reviewing the consequentiality of language in terms of (a) the dynamic between voice and text, and (b) the dynamic between voice and discourse. This theorisation incorporates the level of discourse, reading the analyses of the Observer and Interpreter against each other and against wider social structures and ideologies.

The limitations to the stage script as a form of representation include (a) the large quantity of data needed for coherent episodes and episode series, and (b) the fragmentation of the analysis due to the data leading the sequence of reporting. Nevertheless, I believe the stage-scripting foregrounds the teachers' work in an ethically responsible way, and that by attempting to engage dialogism in the visual monologue of the printed page, I have made an epistemological statement that was worth making.

4.3 Chapter review

This chapter has built on the preceding chapters to outline the research approach adopted for this study, locating it as a post-positivist, interpretivist and social constructivist study, using linguistic ethnography as a methodological frame. Section 2 described the research process as it occurred, indicating its strengths and limitations and how the researcher related to the research and to the research participants. Sections 2.4 and 2.5 also provided information about the research site relevant to the data presented now in Chapters 5 to 8.

Chapter 5

Connecting with new curriculum policy

This chapter investigates the place of language in the teachers' work as they familiarise themselves with two new curriculum documents for science. Section 1 is an analysis of aspects of the contexts of influence and practice relevant to the teachers' work. Much of its content is also relevant to Chapter 6 in particular, and to some extent also to Chapters 7 and 8. Section 2 represents episodes from a curriculum development meeting, accompanied by analysis showing how language was consequential in how the teachers came to grips with the new curriculum documents. Data sources include two recently introduced curriculum documents, namely the Statement and Profile for Science; ethnographic field notes; and a meeting transcript. Section 3 of the chapter builds on the preceding data and analysis to theorise the consequentiality of language across the episodes and in relation to the policy context.

5.1 Connecting with curriculum policy: Contexts of influence and practice

Key components in the context of influence for school-based curriculum development activity are state education policy and the nature of the school and school management, which also provides the context of practice for the work to be done and its products. The contexts relevant to the teachers' work in section 2 are reviewed here, using both thematic and discourse analysis.

5.1.1 State education policy

The key education policy in South Australia at the time of this study was *Educating for the 21st century – a charter for public schooling in South Australia* (1990). This document presented the authorised vision for public schooling in the 1990s, and formed the basis of all curriculum development at Countrytown High. Its core component was a set of nine “essential skills and understandings”: communication skills, social skills, planning and design skills, information skills, environmental skills, mathematical skills, health and safety skills, technological skills and work skills (Education Department of South Australia, 1990, pp. 9-10). The notion of cross-curricular learning required that all these essential skills and understandings permeate the curriculum in every learning area and be visibly included in teachers' curriculum development. It is noticeable that language was made significant not

only through communication skills, but through a number of the other prioritised skills, e.g., planning, information and work skills.

Alongside the South Australian charter, national moves were also influential – unusually so in Australia’s history, given the ideological history of states’ rights that generated eight different public education systems for a population of less than 20 million. In the 1980s and early 1990s, the national Labor government began promoting corporate federalism in the economic arena, and also took in the field of education. Moves towards national collaboration in curriculum began in 1986 under the aegis of the Australian Education Council (AEC). 1989 saw the establishment of *Common and agreed national goals for schooling in Australia* (Ministerial Council on Education, Employment, Training and Youth Affairs, 1989), including equity goals relating to educational opportunity and cultural heritage, which were of particular importance at Countrytown High, resounding with the population profile of the school and its community.

The establishment of common goals constituted the first step towards a national educational settlement. The next step was curriculum specification, which at the time of this study had just resulted in an official curriculum Statement for each of eight broad Learning Areas, accompanied by Profiles for assessment and reporting. The Statements and Profiles⁷ promoted outcome-based education, emphasising “what is achieved rather than what is provided” (Spady, 1993, p. 6), attempting to make expectations explicit. The Profiles provided mandated criteria for assessment, being entirely constituted of learning outcomes and indicators of their achievement. At the same time, the corresponding Statements largely embraced social constructivist learning theories, which were to some extent counter-indicative in outcome-based education. School-based curriculum development was expected to take account of both discourses and to gradually re-make curriculum documents that had been objectives-driven and teacher-centred, to ones that would be outcomes-driven and learner-centred.

The Statements were described by the Executive Director of the Curriculum Corporation as “a framework for curriculum development by education systems and schools [...] a foundation for courses which will meet students’ needs and reflect advances in our knowledge – both of the learning area [...] and how students learn” (Statement, p. iii).⁸ The Statements did not set out to specify precise details of content or required methodology.

⁷ These documents were published simultaneously, but in separate volumes. The volumes for science education were: “A statement on science for Australian schools”, Curriculum Corporation (1994) and “Science - a curriculum profile for Australian schools” Curriculum Corporation (1994). Throughout this study these titles will be abbreviated to Statement for Science, or simply Statement, and Profile for Science, or simply Profile.

⁸ All references to Statement and Profile refer to “A statement on science for Australian schools” (1994) and “Science - a curriculum profile for Australian schools” (1994).

Rather, they were to “define the area, outline its essential elements, show what is distinctive about it and describe a sequence for developing knowledge and skills” (Statement, p. 1). Later, in the body of the document, the point was elaborated: “This framework suggests concepts and processes to be introduced to the students. It leaves it to curriculum developers to decide the best way to organise learning activities. There are many options for organising content. [...] These choices belong with the school” (Statement, p. 15).

In this way, the policy explicitly set up the school as a key decision making site for curriculum development, and explicitly affirmed the agency of school-based curriculum developers in the area of pedagogy and content organisation. The wording implied a degree of agency available in regard to both content selection, through the word “suggests,” and content sequencing, since the documents only described “a” sequence, not “the” prescribed sequence. This accords with an earlier paper put out by the overseeing committee, stating that the Statements and Profiles assume teacher professionalism (CURASS, 1992). While this suggests a degree of flexibility in curriculum development, teachers were also required to comply with the accountability structures set within the documents.

One such accountability structure common to all the Statements was the construction of four *Bands* of schooling, defined as “broad stages in a sequence for developing knowledge, understandings and skills in a learning area” (Statement, p. 1). The whole of part three of the Statement for Science, for example, described “the scope and sequence of science learning through the four Bands of schooling” (Statement, p. 2). It is noticeable that here the policy referred to “the” sequence, whereas the page 1 definition of Band (above) referred to “a” sequence. By talking about “a” sequence in defining the Bands there is an implicit indication that it evolved through discussion, argument and negotiation, and that it represents a set of ideological decisions made by the policy writers among a variety of options. However, there is no sense of this once the generalising grammar of “the” comes into force. Here the implication is that “the” sequence is natural and correct, as well as being the authorised one to which teachers are accountable.

Another core accountability structure, which consistently used the generalising grammar of “the learner” or “learners,” was the set of outcome statements constituting the bulk of all the Profile documents. These documents claimed to “describe the progression of learning typically achieved by students during the compulsory years of schooling (Years 1-10)” (Profile, p. 1), thereby constructing learners as a homogenous collective, linked together through a supposedly comparable experience of compulsory schooling. In light of this, the phrase “achieved by” can be read both as (a) valuing students’ contribution to their learning, and (b) making them personally responsible for their achievement regardless of learning environments and other circumstances. It also positions teachers as apparently extraneous to

learning. The avoidance of any reference to teachers in both Profiles and Statements is noticeable, especially given that teachers were clearly to be the chief audience and to have their work regulated by the documents. From a teachers' work perspective, the phrase "typically achieved" is a challenge for educators to have their students achieve that norm, and failure is likely to be a source of anxiety, whether or not it is in fact largely a factor of the school in which they work – its location, the community it serves, the composition of the staff, and the culture it has built up.

5.1.2 Science in state education policy

At the time of this study, public policy for constructing science education in junior secondary school comprised two sets of curriculum documents; those just being introduced and those in force during the previous decade. The curriculum document that previously gave guidance for the development of science curriculum in South Australia was *Science: A way of knowing: Years 8-10 science guidelines*. The document aimed to "provide science teachers with the basis for planning and documenting an 8-10 science curriculum" (Education Department of South Australia, 1984, p. 7). It emphasised that an understanding and appreciation of science as a way of knowing was central to curriculum development (p. 7), and used families of concepts as the core structuring feature for curriculum content, backed up by processes and attitudes in working scientifically. This was a move away from traditional curriculum constructions of science emphasising only conceptual knowledge, or "knowledge that." Nevertheless, concepts were still privileged over processes and attitudes not only in the format of the planning grid, but in the examples of content outlines for units of instruction, and in the content listed in the appendices. This is somewhat in conflict with a constructivist position in education, which holds that concepts and processes cannot be separated in making sense of science. Another tension with social constructivism is that there was little recognition in the document of the social, political and economic world in which science functions. For example, scientific literacy was defined as "the ability to apply science concepts, to use the processes of science and to appreciate the interrelationships of the physical and biological planet" (1984, p. 42), with no mention of social, political or economic relationships.

The newly introduced curriculum documents – *A statement on science for Australian schools* (1994) and *Science - a curriculum profile for Australian schools* (1994) – show evidence of attempting to address both of these tensions. Science was constructed as a set of attitudes and applied ways of inquiry, which "have produced and continue to generate a body of knowledge about the physical and biological world" (Statement, p. 3). The document valued, on the one hand, disciplined observation, careful analysis and precision and rigour, and on the other hand, "creative leaps of the imagination, inspired hunches and guesses" (p. 3). Such

processes in working scientifically were allocated an independent content Strand in the new structure, while social responsibility was explicitly integrated across all the Strands. The documents also continued the constructivist underpinning of the previous documents. However, the new documents differed fundamentally in that they adhered strongly to outcome-based education, with detailed descriptions of required student learning being established in the Statement, and outcome statements at eight Levels of achievement being established in the Profile. These two documents were not only central to the context of influence for the teachers' work, but were also physically present in the contexts of practice and of text production. In the teacher meeting re-presented in section 2 of this chapter, the teachers refer only briefly to the Profile, and spend most of the time familiarising themselves with the Statement.

The Statement for Science

The Statement for Science was the new state curriculum policy mandated for use in schools at the time, alongside the Profile for Science (see Chapter 6.1). This document was intended to shape teachers' work through its functions as both text and discourse (Bowe & Ball, 1992, as discussed in Chapter 2.2.2). Here I use policy as text to identify key discourses central to the Statement for Science, and therefore likely to be consequential in the teachers' work.

In the Statement, content is constructed through five Strands: Working Scientifically, Earth and Beyond, Energy and Change, Life and Living, and Natural and Processed Materials. The last four are conceptual Strands, which "encompass distinctive scientific understandings, theories, ideas and knowledge" (Statement, p. 15). The Working Scientifically Strand is a process Strand, intricately linked to concepts through its processes of knowledge generation, specifically "investigation" and "using science responsibly" (Statement, p. 14).

Working scientifically is a challenging interaction between existing beliefs, the goal of better understanding, and the processes and methods of exploring, generating, testing and relating ideas. It involves a number of attitudes: valuing ideas and seeking explanations; respecting evidence and logical reasoning; open-mindedness, critical-mindedness and persistence; scepticism about evidence and arguments; honesty and openness to new ideas; creativity and lateral thinking; ethical behaviour; regard for the consequences of decisions and the wellbeing of the living and non-living components of the environment; accepting the provisional nature of knowledge (Statement, p. 15).

The emphasis on ethical investigation and the connections made between science and society suggest constructivist underpinnings for this Working Scientifically Strand. Also, in the last part of the description of Working Scientifically, there is a long list of other valued constructivist behaviours, including: inventing feasible, valid and accurate strategies; criticising and evaluating; adjusting personal and established theories; synthesising scientific concepts with a range of other information; challenging beliefs; exploring and playing;

considering implications. This process Strand is intended to permeate the four conceptual Strands, and “should be integrated with the conceptual Strands in planning the curriculum” (Statement, p. 14). However in terms of outcomes weighting, concepts are privileged over process, since at every Level of assessment there are 12 outcomes from conceptual Strands and only 6 from the process Strand. This begs the question of whether science education is to lean more heavily towards concepts and knowledge “that” or be equally weighted towards processes and knowledge “how” and “whether.”

The *Goals of science education* section in the Statement suggest a roughly equal focus on process, since they require students to achieve each of the following goals “with creativity, responsibility, confidence and competence”:

- openness to new ideas, intellectual honesty, commitment to scientific reasoning and to striving for objectivity, respect for evidence and for the tenacious pursuit of evidence to confirm or challenge current interpretations
- scientific investigation, reflection and analysis
- application of scientific knowledge and theoretical understanding to explain and predict everyday events
- communication of scientific understanding
- use of scientific language
- application and evaluation of scientific knowledge and understanding to construct and modify thinking
- appreciation of the evolutionary nature of science, its relationship with other human endeavours and its contribution to society
- appreciation of science as an everyday activity that everyone engages in and that contributes to human wellbeing
- ethical decision making in relation to science (Statement, pp. 3-5, abridged).

The overwhelming emphasis in these goals is on the construction of science through attitudes, values and processes. The emphasis on concepts is relatively small. So there seems to be a tension between the goals and the weighting in the Strand outcomes allocation. School-based curriculum developers will have to negotiate this tension, drawing on the modelling provided in the Statement’s Band by Band descriptions of content in the conceptual Strands, as well as the particular philosophies of their own school.

Of the nine goals, two are directly related to language as process; both of them emphasise language for communication, and one also highlights language for learning. However the critical literacy that is becoming important at Countrytown High with its issues-based approach to science is not highlighted and can only be inferred from some of the wording of the goals: “intellectual honesty,” “explaining and predicting everyday events,” “evaluating scientific knowledge,” “ethical decision making,” On the other hand, the seventh and eighth goals discourage an issues focus by suggesting a very bland view of the place of science in society. This is partly through the absence of any words associated with critique, and partly through the use of terms such as “appreciation” and “contribution,” which usually imply a positive attitude towards their objects. Under either goal, teachers would find it difficult to legitimate discussion of science in relation to either human greed or oppressive and reductionist ways of seeing the world. While people and society are certainly mentioned in these goals, they and their potential for good and evil are not brought alive as agents in the applications of science. On the other hand, the final goal emphasising ethics in science does make implicit reference to the possibility of negative outcomes from applications of science, and provides a key opening for teachers to introduce critical perspectives.

The next section in the Statement that is directly relevant to the teachers’ work is the *Principles for effective learning experiences* in science. These principles involve teachers in:

- taking account of students’ views
- recognising that students construct their own understandings
- providing a supportive learning environment
- learning in practice
- engaging in relevant and useful activities
- complementing learning in other areas
- using scientific language appropriately (Statement, pp. 5-7, abridged).

While those principles directly concern teachers’ pedagogic accountability, the teacher as active agent is more or less invisible even in the paragraphs that expand the principles.⁹ Instead, other constructs are given agent status, particularly in sentences with *should* directives, such as “[s]tudents’ learning experiences should challenge their ideas [...]learning should encourage students to consider” (Statement, p. 6). Here instructional intervention is hidden behind a learner-centred grammatical structure. Teacher agency in

⁹ Teachers are chiefly visible only where training and safety measures are required, e.g., Statement, p. 6.

bringing about and supporting learning is seldom explicitly acknowledged anywhere in the two documents.

The Statement's *Key science curriculum principles for curriculum developers* are summarised below because they are very relevant to the teachers' work throughout Chapters 5 to 8. Curriculum developers are to work towards:

- laying a progressively complex foundation for science which integrates the learning of concepts and the learning of processes, and is “developed in the context of human purposes” (Statement, p. 8)
- assessing in such a way as to assist students with their learning as well as inform teachers
- making the curriculum relevant to students, and particularly to students who in the past have been under-represented in science or alienated from it
- incorporating gender perspectives
- valuing culturally diverse ways of understanding the world and recognising how these might shape students' learning in science
- presenting science as a human activity among other human activities, making visible the human face of science
- engaging students with a selection of ideas in depth and helping them to apply their understanding to a range of situations through activities which take account of students' preferred learning styles
- providing students with opportunities to explore and understand workplace uses of science (Statement, pp. 9-11, abridged).

The human face of science and science education is clearly apparent throughout these principles. We see it in regard to human purposes in learning, teaching and doing science, and to human variables such as alienation, cultural diversity, gender, learning styles, and interest in the workplace. Since taking account of humanity in education is a core principle of constructivist learning theory, these principles can be taken to support the constructivist underpinnings of the national curriculum project.

Context of learning science also emphasises human face, since it concerns taking account of the particular school context (Statement, pp. 11-13). For junior secondary science, specific reference is made to supporting the participation of girls in the physical sciences; making the curriculum accessible to Aboriginal and Torres Strait Islander students; meeting the English language needs of students for whom English is an additional language; making up for lack

of resources in geographically isolated areas; and not divorcing science from human contexts – in other words providing opportunities for students to critique developments in science and applications of science. These are strong guidelines for teacher accountability in regard to equity in their programs and classroom practice, with consequently much greater demands in some schools than in others. Teachers in schools such as Countrytown High will have to work hard to address the expectations and may find it impossible to fulfil them, through no fault of their own.

5.1.3 School context for science education

At the time of this study, there was very little by way of an existing science curriculum for Years 8-10 at Countrytown High, and since there was also a deliberate policy against having sets of class texts, it was difficult for teachers to know what had already been taught. It also meant that teachers had to develop their own units of work, either alone or with colleagues working at the same Year Level. They were consequently very dependent on the versions of subject science that they found around them or brought with them from their own past experience. The three younger science teachers in this curriculum development project drew on their university teacher education programs, on their limited teaching experience, and on the experience of their more senior colleagues, particularly the Acting Junior Secondary Curriculum coordinator, whose role in the school included being a resource person for teachers.

Lytton had developed a social constructivist approach to learning and teaching, with a leaning towards radical constructivism responsive to equity issues. In his view, science education had traditionally been locked into the volume of content, whereas now learning how to do science had become more important. As Literacy coordinator, he set up whole-school professional development days on literacy across the curriculum, offering critical literacy sessions himself. He was concerned about how much the new science teachers had to learn about important features of science education.

What you're looking at is a group of science teachers who've got just about everything to learn about teaching, about critical attitudes towards science, about literacy and science, about computers in science.

Half-way through these teachers' first year in the school, the "second curriculum" took on another dimension as the science faculty started developing a new curriculum outline for the junior secondary science curriculum. This was to cater for a change from single semester courses at each Year Level to full-year courses for Years 8 and 9, with one semester core and one semester optional for Year 10. In the teachers' second year at the school, a number of science staff moved on, and it was up to these three teachers to take responsibility for filling out the skeletal curriculum outline, and for individually leading Year Level teams in the

development of unit plans and materials for Years 8-10. The skeleton indicated topics for units of work and how many weeks they should each take up. A few units had been developed enough to be trialled the previous year, and these simply had to be revised. However, most units had to be developed from scratch. The curriculum had to reflect school and state philosophies of education and be compatible with the Statement and Profile for Science. In summary, the expectations in the project brief were as follows:

- Write student outcome statements for all units of work and, where possible, cross-reference them to similar or higher order outcomes in the Profile.
- Work out the correct duration and sequencing of units to provide a coherent progression over the three year period.
- Identify possible learning activities, resources and assessment activities for each unit of work.
- Bear in mind principles already established by the faculty, including:
 - an issues-based approach to content organisation
 - use of local context and content
 - attention to students' literacy development, with explicit reference in the format of the curriculum outline
 - attention to Aboriginal perspectives
 - attention to gender inclusivity
 - developing a love of learning in students
 - responding to student interests
 - being mindful of the audience of teachers new to the school, or temporarily assigned, and/or inexperienced, and provide adequate structure and direction.

This brief provides a clear direction for the teachers' work, both in terms of epistemological priorities and operational outcomes.

5.2 Connecting with new curriculum policy: Teachers at work

NARRATOR: In the second week of the new school year, four teachers gathered together to begin developing the school's new junior secondary science curriculum. The group comprised three recently graduated science teachers, Carmen, Lucio and Oscar, and the school's Literacy coordinator, Lytton, previously a Science and Technology senior. A key purpose of the meeting was to become familiar with two recently mandated state

curriculum documents, with which their work had to comply. *A statement on science for Australian schools* was “a framework for curriculum development by education systems and schools [... suggesting] concepts and processes to be introduced to the students [and leaving] it to curriculum developers to decide the best way to organise learning activities” (Statement, pp. iii and 15). The Statement was organised to reflect four “Bands” of schooling loosely placed across the ten Year Levels of compulsory schooling (Statement, p. 1). *Science – a curriculum profile for Australian schools* provided required learning outcomes and indicators at eight levels. These were set out as a tool “to assist in the improvement of teaching and learning and to provide a common language for reporting student achievement” (Profile, p. iii). The teachers needed to find out how these documents related to science teaching at Countrytown High.

We join the meeting a moment or two after the start, while the teachers are still leafing through copies of the newly arrived Statement and Profile, which Lytton has just handed out. None of the other teachers have seen them before, although they have all previously worked with an early draft of the Profile.

Episode 5.1 Defining the Statement and Profile

CARMEN	Turning and speaking directly to Lytton.	
	Can I just ask the difference between the Statement and the Profile?	1
	One’s more of an assessment tool, is that right?	2
LYTTON	Yes. The Statement gives the general outline about what is the content,	3
	what are the skills, where they fit into the four Bands. So they’re	4
	GENERAL statements.	5
CARMEN	<i>Overlapping</i> . Right.	6
LYTTON	But the Profiles have broken them up much more, specifically into the	7
	eight Levels. And they’ve got particular content options to give you a	8
	clue on which to assess your kids. So the Profiles are an assessment	9
	tool; the Statements are exactly that – a generally agreed statement	10
	about what science is about.	11
CARMEN	But it doesn’t give you objectives though, does it? The Statement?	12
	It just talks about the four Bands and all that sort of thing.	13
LYTTON	No. It IS just a statement.	14

OBSERVER: Here Carmen initiates an interaction with a focusing move about the relationship between the Statement and the Profile. Her use of “just” is an indicator that the intended focus is for preliminary to the main work of the meeting. That and her act of turning towards Lytton to address him personally, also indicate that the move is for her own

purposes rather than for group purposes. She positions Lytton as the expected source of information, and positions herself as needing information that the other two participants probably do not need.

INTERPRETER: All teachers frequently position Lytton as resource person, and he readily accepts the role. He is not only the most experienced teacher present, he is acting coordinator for the junior secondary curriculum across the school, and is the one most familiar with policy. He also has a mentoring responsibility for the other three in their second year at the school, and he was one of Carmen’s chief advisers throughout the previous year, her first year of teaching. There is a historical novice-expert relationship between them.

OBSERVER: That relationship is clearly reflected in the sequence of moves here: initiate a focus (1-2), respond (3-11), follow-up focus (12-13), respond (14). This can readily be identified as an enquiry sequence. The initiating focus move and the follow-up both use a direct question (1, 12), the second one building on the response to the first. To respond, Lytton uses three verbal processes – describing (3-4; 7-9), categorising (4-5; 9-11) and contrasting (7-11). These verbal processes are all part of a repertoire for clarification, indicating his interpretation of Carmen’s intention in regard to informing herself about the nature of the two documents and how they relate to each other.

INTERPRETER: Through his clarification, Lytton constructs the Statement as not only “general” in nature (3; 5) but “generally agreed” (10). This is a reminder of the document’s validity claim in terms of consultation, and suggests Lytton’s acceptance of that claim. “Generally agreed” refers to the hours of debate that went into the making of this document, including “nationwide consultations with interested groups” (Statement, pp. iii-iv).

Episode 5.2 Defining Strands and Bands

OSCAR	<i>Browsing in the Profile document.</i> This is good. It gives you work samples. It shows you ..	15 16
LYTTON	And they’re annotated ones. <i>Turning back to Carmen.</i> So the only thing I think that’s different is that there’s only one Working Scientifically Strand. I think in our early drafts there were two process Strands.	17 18 19
CARMEN	But the .. how do the Strands and the Bands go together again?	20
LYTTON	The Band is the chronological age, developmental.	21
CARMEN	<i>Overlapping.</i> Right. Yes.	22
LYTTON	The Strand is the content connections.	23

CARMEN	<i>Overlapping.</i> Right. And then they work all the way through ..	24
LYTTON	So the Strands go vertically, the Bands go horizontally.	25

OBSERVER: Oscar interrupts the somewhat private conversation between Carmen and Lytton with a favourable comment, which Lytton responds to with further information before continuing his response to Carmen’s question. He adds more detail, ending with a visual image of the Strands and Bands in a matrix format (25). The focus-response sequence continues in this episode, with one more follow-up question from Carmen (20) and a closing move with “so” indicating that it is a distillation of her understanding (24).

INTERPRETER: That distillation move suggests that she and Lytton have a shared meaning for the word “content” (23), but this cannot be assumed. Lytton has already used it with two distinct meanings. One of these accords with the policy, including all five Strands (5.1: 8) while the other accords with traditional science teaching, which did not count scientific process as content: “The Statement gives the general outline about what is the content, what are the skills.” (5.1: 3-4). So when Lytton tells Carmen a Strand is “the content connections” (23) and she affirms, it is not clear whether or not they are mentally including process content. Nevertheless, classroom observation at Countrytown High has provided frequent evidence of processes not only being taught and practised, but being formally assessed as curriculum content. So the teachers’ practice matches the policy position even if their language does not. This is probably because processes of working scientifically were also counted as curriculum content under the outgoing state curriculum policy, although weighted less than conceptual content.¹⁰

Episode 5.3 Relating student Year Level to policy Profile Level

OSCAR	What Level should we be starting at? Year 8 is Level 3/4 isn’t it?	26
LYTTON	Yes. I was surprised. I was looking at Level 4 and I reckon that’s where	27
	our Year 8s are up to. <i>Sounding relieved about it and speaking to</i>	28
	<i>everyone.</i> Look at Level 4 Energy and Change, page 64, the work	29
	samples.	

OBSERVER: The problem Oscar indicates is how to match the eight Levels in the Profile against the twelve Year Levels of schooling. A response comes from the person most informed in the area, Lytton. Certain words, such as “surprised,” “looking at,” “reckon,”

¹⁰ In *Science: A way of knowing: Years 8-10 science guidelines* (Education Department of South Australia, 1984), which was in place until just prior to this study, there was a different form of content categorisation: (a) unifying statements, embracing a family of concepts (b) processes and (c) attitudes. This categorisation contrasts with the disciplinary nature of the Strands in the new curriculum.

(27) suggest that he has already given it some thought, which allows him to confidently confirm Oscar's thinking. His tone of voice also expresses his surprise and relief that the Year 8 classes at Countrytown High can be said to meet the policy expectations, and he invites the others to look at p. 64, for evidence to support his view.

INTERPRETER: Lytton's relief (27-29) indicates some anxiety about how the Levels given the standardised outcome statements in the Profile might match with the limited amount of science experienced by many Countrytown primary school children. The eight Profile Levels are linked to the ten Year Levels of compulsory schooling, which reflect chronological age. However, this assumes that classroom teaching occurs with comparable material support and contact hours in all schools, which is not an accurate premise. For example, there is considerable disparity between rich and poor schools in terms of student access to computers and expensive science equipment, and in some rural areas primary school students have very few contact hours for science, with much of that limited time involving only nature study. Most students entering Countrytown High have had little opportunity to study all content in Band A, let alone Band B. While the Statement acknowledges such learning contexts (p. 13), the Profile nevertheless calls for particular Profile Levels to be attained by most students in any one Year Level. There is therefore cause for Lytton's anxiety.

NARRATOR The teachers go on to have a detailed discussion of the work samples, making generalisations about how their students' work relates to the samples and annotations provided in the document. At the end, Lytton concludes, again with some relief, "So we're still doing alright. That looks like Year 8 work." He is confirmed in his earlier statement and reassured about the standard of science at Countrytown High.

The teachers' next concern is whether the units of instruction that were drafted the previous year can be matched against the Statement Band descriptions. They decide to check whether all the topics in Band B have been covered in their skeleton framework, and start by reading the introductory section. They read silently to begin with, and then, one after another, start to read segments aloud, using a mocking tone of voice on the phrases underlined in the excerpt.

STATEMENT (p. 21) Students in Band B are attracted to the practical applications of science around them. Independently and in groups they explore the local environment and are excited by the world beyond. They like stories of heroes and welcome having their imaginations stimulated through exposure to alien worlds and distant places as far away as other galaxies. They enjoy the adventure of science and are fascinated by the work of particular scientists from Australia and overseas, including those long dead and those whose work is still shaping our world. Students in this Band have a sense of wonder about the microscopic world as well as a growing excitement and appreciation of the world beyond Earth. Their sense of scale now ranges from the microscopic to the very large.

Students at this stage of their lives derive inspiration, pleasure and knowledge from popular scientific and technological media programs and their presenters. These students relish excursions, field trips and reading popular magazines and fiction that satisfies their desire to expand their world. They are fascinated by how things work.

OBSERVER: The teachers use a mocking tone of voice and laughter whenever they read phrases such as “excited by,” “welcome,” “having their imagination stimulated,” “enjoy the adventure,” “are fascinated by,” “have a sense of wonder,” “a growing excitement and appreciation,” “inspiration, pleasure,” “relish excursions” and “desire to expand their world.”

INTERPRETER: By mocking the text, the teachers are expressing their amazement at the thought of students being so enthusiastically positive about science. Evidently those brightly coloured terms do not match their own experience with Year 8-10 students at Countrytown High, and they reject its assumptions of universality.

OBSERVER: Assumptions of universality are also embedded in the grammar through the use of the generalising present tense, as in “are attracted to,” “like,” “welcome” and through the generalising plural of nouns, as in “Students in Band B” meaning “*all* students in Band B.”

INTERPRETER: Those grammatical constructions are used throughout the descriptions of student behaviours in the Bands, and they have the effect of presenting idealised descriptions of student behaviours as if they were natural. So when this authoritative document says students do and like particular things, readers are being positioned to

believe these behaviours to be universally true. However these teachers decline that position, and refuse to accept the framing of their students as outsiders to the wider student community.

NARRATOR: After this unsettling disjunction between policy representations and their own lived experience, Lytton suggests they check out how the Statement’s descriptions of content compare with the school’s current and planned content. He starts to read aloud items from the Working Scientifically Strand in Band B, so that they can identify related units of work and activities from the school’s current and proposed curriculum.

Episode 5.5 Relating Band B to the existing Countrytown curriculum

LYTTON	<i>Reading aloud.</i> “[e]xplore the social, cultural, technological, economic and environmental impact or speculate about the impact of a scientific application” (Statement, p. 25, Working Scientifically, sentence 2).	1 2 3
CARMEN	Well, you would in things like “Household Energy.” You’d look at that.	4
LYTTON	Yes, that’d be where you’d draw the .. Especially the U.S. or the Western developed countries’ use of energy versus what we’d consider the third world stuff. You know, the energy mismatch .. the energy use mismatch.	5 6 7 8
CARMEN	Mm.	9
OSCAR	How science can help, or could help all people, but it doesn’t. Is that what you’re talking about?	10 11
LYTTON	Yeah. Or the richest 20% of the population of the world uses 80% of the world’s energy.	12 13
LUCIO	You’d get a couple of lessons working that out!	14
<i>Brief discussion on Australian figures</i>		
LYTTON	Alright, alright. Let’s look at “Earth and Beyond.” This is another Strand then. “Students investigate their local environment to assess the impact of human activities on the surface features of the land” (p. 26).	15 16 17
LU./OS.	“Arid Lands.”	18
OSCAR	“Garden.” “Weather and Atmosphere.” You could look at erosion.	19
LYTTON	And haven’t we got “What’s the Earth made of?”	20

OBSERVER: Lytton poses a problem to the group, by reading out a requirement from the Statement and thereby implicitly requesting the others to say how it might relate to the school’s current science curriculum (1-3, 15-17). There are multiple responses, including from Lytton himself (5-8, 20).

INTERPRETER: This suggests that the group (a) considers the problem relevant, and (b) has the necessary information to solve it.

OBSERVER: Lytton uses several focusing moves to put attention on the problem: reading authoritative text aloud (1-3, 16-17), and closing off a topic and turning to another “Alright, alright. Let’s look at .. This is another Strand then” (15-16). Each time, he raises his voice slightly, and speaks more heavily than usual.

INTERPRETER: All the teachers use focusing and refocusing moves from time to time, but in this first meeting Lytton does it most. He is taking a managerial role here at the start of the year, but he lets it go progressively over the weeks as they all become habituated to the task and to their roles in its achievement. In this episode, it is not only Lytton who dominates but, through him, the policy actant. It is the quotes from the Statement that provide the direction for the discussion, as teachers make sense of them in terms of the local context of practice.

OBSERVER: In this episode, making sense is primarily through contextualising moves (4, 5-8, 10-11, 12-13, 14, 18, 19, 19, 20). Of these nine, four link with units of work (4, 18, 19, 20), four link with specific concepts (the energy use mismatch, 5-8, 10-11, 12-13; erosion, 19), and one links with classroom practicalities (14).

INTERPRETER: The contextualising moves are a means of refining the textual descriptions of students’ learning behaviours as well as a means of developing a shared local sense of the document. They also serve to reassure the teachers of the legitimacy of their proposed topics in relation to required policy. The teachers are positioning the Statement in the same way as it positions itself, as authority. In turn, they are positioning themselves as accountable to it in some way, and their curriculum as needing its validation. They are using an accommodating voice, not interrogating the text but going along with it, in contrast to their earlier mockery. For example, each of the teachers readily makes a connection with the socially-oriented view of science education implicit in the first quotation. Carmen immediately identifies a unit of work, Household Energy (1); Lytton identifies a specific issue, the energy use mismatch (7-8); Oscar extends that issue to the social functioning of science in general (10-11); and Lucio thinks of it in terms of lesson management (14). Clearly this particular view of science education is not unfamiliar to them. In fact, an issues-based curriculum was already mooted in the preceding state curriculum document for science, and also the previous year’s science faculty meetings did largely adopt that approach. In addition, Lucio has brought an interest in issues-based approaches with him from his previous school, and the principal has a long history in the

area, including work with the Girls in Science taskforce. So there is a solid basis for an accommodating voice.

NARRATOR As the teachers continue their study of the Statement, they become uncertain whether Band B is indeed the Band intended for Year 8 students. They refer back to page one of the Statement where they find that “Generally, Bands A and B will be covered in primary schooling, C in secondary school to Year 10, and D in the post-compulsory years.” In other words, Year 8 students are expected to be in Band C, not in Band B.

Episode 5.6 Relating Bands to Year Levels

CARMEN	No, I think C is [Years] 9 and 10.	1
LYTTON	I think you’re right, Carmen, that we can, that we should be expecting them to be ..	2 3
CARMEN	Because really I mean ..	4
OSCAR	<i>Firmly.</i> Well, let’s look at Working Scientifically for Band C, and see whether we can fit in 8, 9 and 10. “[L]earn to be increasingly methodical.” Well, we’re doing that, teaching Methods. “[P]recise with measurement”- we do measurement - “[B]e critical-minded and sceptical about evidence. <i>Voice begins to fade.</i> “[A]ware of the provisional nature of knowledge, and take into account ethical and social considerations; pose questions ..” (Statement, p. 30)	5 6 7 8 9 10 11
CARMEN	<i>Continuing to read, in an amazed tone.</i> “[A]ble to identify testable and falsifiable hypotheses.” <i>Laughter.</i> My Year 12s can’t do that!	12 13
OSCAR	<i>Similar tone.</i> “Students design, carry out, report on and evaluate investigations involving dependent and independent variables.” Well, I’m going back to Band B.	14 15 16

OBSERVER: Carmen categorically opposes the given allocation of Bands to Year Levels (1) and is backed up by Lytton (2-3). Oscar then attempts to resolve the conflict through empirical checks, searching for parallels between the description of the learning behaviours of junior secondary students as given in the Statement and their own Countrytown High experience of student behaviours. This ends in failure. The teachers begin to mock the generalisations through tone of voice (12-15), laughter (13) and counter-comment (13, 16).

INTERPRETER: In critically reading the text against their local knowledge, the teachers are countering not only the Statement’s generalised descriptions of student learning behaviours, but the standard that the document has claimed as “generally agreed.” They are rejecting an authoritative voice in favour of a localised one.

OBSERVER: The sequence of moves in this episode negotiates meaning in a very specific way – through problematisation. Based on a preceding proposition in the text of the Statement, Carmen puts forward a counter proposition (1), which Lytton tentatively backs (2-4). Then Oscar embarks on a validity check (5-15) with instantiating moves (7-8), such as “Well, we’re doing that” and a counter instantiation from Carmen (13) “My Year 12s can’t do that.” The last move, “I’m going back to Band B” (16), provides further backing for Carmen’s opening counter-proposition.

INTERPRETER: And across the sequence of moves, they are also moving in and out of different positions. From previously going along with the authority of the Statement, they switch to doubting it, tacitly drawing on their past experience, Oscar takes them to an empirical evidence position, which fails, and then they move towards developing their own localised position, based on their shared experiences.

Episode 5.7 Interpreting descriptions of learning behaviours (1)

CARMEN	<i>Laughs.</i> “suitable sampling and statistical techniques”	17
LUCIO	“for example, in a study of shrubs on a sand dune.” Where are our kids going to find sand dunes?	18 19
OSCAR	Obviously someone at Upmarket High. ¹¹ <i>Laughter.</i>	20
LYTTON	Actually, [the principal] and I wrote to them in the early days to say exactly that.	21 22
OSCAR	That’s how it is, isn’t it?	23

OBSERVER: The mockery ending the previous episode continues to build up through laughter (17, 20), criticising the choice of example (18-19), and attacking the validity of the example by suggesting it was contributed by a teacher at a socio-economically privileged school (20).

INTERPRETER: Lucio and Oscar are positioning the choice of example (18-19) as a representation of privileged norms, since student access to sand dunes in South Australia is chiefly limited to the metropolis and those with time and money for travel. Picking on that example is a means of affirming what is really at issue here for these teachers – their power of resistance to the normalising tendencies of global decision making on curriculum. These teachers are generating solidarity among themselves and with the local context of practice, and rejecting the normalisation of an imagined and idealised context.

OBSERVER: You can see the solidarity among the teachers in the turn-taking pattern throughout this series of episodes, in the way they cap each other’s interpretations.

¹¹ A state school in a monied metropolitan suburb.

INTERPRETER: Solidarity with the locale was also a feature of the feedback sent in by Lytton and the principal during the consultation process (21-22). This was specifically from an equity and access perspective. Lytton later mentions that a number of rural and isolated schools gave similar feedback about the choice of examples in the Statements and pointers in the Profiles, but the feedback does not appear to have been taken up.

Episode 5.8 Interpreting descriptions of learning behaviours (2)

CARMEN	<i>Reading mockingly.</i> “Sensitivity to purposes, validity and reliability.” ¹²	24
LYTTON	You have to like my “love of learning.” Pointing to one of the overall curriculum goals from the previous year.	25
CARMEN	I love your “love of learning.”	26
OSCAR	<i>Reading.</i> “Take part in community debates on practical issues.” ¹³	27
LUCIO	<i>Laughs.</i>	28
CARMEN	<i>Adopting a cheeky student voice.</i> “I don’t give a shit, Miss.”	29
LUCIO	<i>As a pompous teacher.</i> “Now, Eddie Baker, ¹⁴ what’s your opinion?”	30
LYTTON	<i>In his normal voice, seriously.</i> “Write a letter to the paper that says there’s pollution coming out of the [ZP factory].”	31 32
OSCAR	<i>In the same tone.</i> “How it affects you.” How it changes their lives.	33
LUCIO	So it’s our job to explicitly teach them how to do that, alright? Being a literacy focus school.	34 35
OSCAR	My Year 12s couldn’t do that.	36
CARMEN	<i>Reading.</i> “They are alert and sympathetic to the ideas, purposes and attempts of other students in science, and seek parallels <i>laughing</i> between their own procedures and efforts in learning science and the work of professional scientists.” ¹⁵	37 38 39 40
LUCIO	<i>Sarcastically.</i> I wonder how I could do this slightly differently.	41
CARMEN	I’m going to do it my own way!	42

OBSERVER: The teachers here respond to the Statement’s propositions by momentarily taking on an imaginary character, first as a student (29), and then as a teacher (30, 31-32, 33). In lines 29-30 the characters are adopted to ridicule the Statement’s proposal for “community debates” (27), while in lines 31-33 the teacher character provides a serious take on setting a classroom task.

¹² Statement, p. 31, lines 6-7.

¹³ Statement, p. 31.

¹⁴ Eddie Baker is the pseudonym for a student experienced by the teachers as unruly.

¹⁵ Statement, p. 31.

INTERPRETER: Because of their shared locale, the teachers can comfortably adopt and recognise different voices and name an individual student as a type-cast (29-33), indicating possible eventualities. The first character adoption mocks and contests the policy position in the light of shared experiences of classroom management. The second accommodates and applies the policy position, functioning as a counter-counter proposition as well as a simple affirming one.

NARRATOR: Lytton then goes on to express a local concern about Band D, which was designed to represent high achieving students in Year 10.

Episode 5.9 Questioning the validity of the Bands

LYTTON	What I'd be interested in, some other time, is that .. I reckon Band D is even beyond our SACE. ¹⁶	1 2
OSCAR	Crazy. It's beyond me!	3
CARMEN	The only trouble is, do the people who actually sort of write this and produce this .. ? I mean ..	4 5
OSCAR	Schmucks.	6
CARMEN	I mean, one presumes they didn't just fish in their insular little world.	7
LYTTON	No, no. They were put out. That's what the draft copies were.	8
LUCIO	Yeah, but did WE give them feedback?	9
LYTTON	[The principal] did in the first couple of drafts.	10
CARMEN	But you know, if they got feedback from mostly, Topmarket College ¹⁷ and all that sort of stuff. They wouldn't think about Countrytown.	11 12
LYTTON	Well, that of course is the other thing I've heard – that a lot of people in our department did give them feedback, but the feedback was rarely incorporated into changes.	13 14 15

OBSERVER: As in one of the earlier episodes (5.5) this episode opens with a proposition counter to the Statement (1-2). This is followed by a spontaneous support move (3), and a validity check (4-15).

INTERPRETER: The teachers are attempting to validate in a different way here, looking back to the authoring processes of policy. Having previously contested some of its pronouncements, they now contest its origins, by using contextualising moves linking with historical processes (4-15). The mockery is now directed into specific critique (4-5, 6, 7, 9, 11-12) in regard to the presumed privileging of perspectives from well-off

¹⁶ South Australian Certificate of Education, taken over Years 11 and 12.

¹⁷ A private monied school in the city where the Statement and Profile were drawn up.

metropolitan schools. Once again, it is their shared locale that makes the naming of a particular school (11) an immediate pointer of privilege, in contrast to their own school. Here, the teachers explicitly position the Statement as a document that does not speak for Countrytown High and its students, indicating a certain disjunction between the curriculum policy and the teachers. This indeed has been an emergent issue as the meeting progressed, and language appears to be quite central to it.

5.3 Connecting with new curriculum policy: How language was consequential

The preceding analysis of meeting episodes indicate the following predominant interactive purposes in the teachers' work:

- becoming informed about the key ideas, textual structures and purposes of the Statement and Profile
- comparing content in the Statement with content in the current Countrytown curriculum, in an attempt to validate previous curriculum decisions
- examining the representation of norms in the Statement and Profile
- locating Countrytown students and content in relation to policy expectations.

These interactive purposes suggest two overarching goals: a general goal of becoming familiar with the new curriculum policy documents, and a more specific one of locating the school's existing and planned curriculum within the authoritative categories set up within the policy. This combination of goals supports the view that connecting with new curriculum policy "poses two questions for a teacher. (1) What does this new curriculum proposal mean? (2) Is this new curriculum proposal appropriate for my students?" (Roberts, 1988, p. 44). Throughout the episodes, the teachers were implicitly responding to both questions, making concerted efforts to interpret curriculum policy in its own terms (question 1), and in terms of the local setting (question 2). This can be illustrated by reviewing the dynamic articulation of voice and text (section 3.1) and of voice and discourse (section 3.2). This leads to a view of language functioning in the teachers' work as environment, consciousness and tool-using (sections 3.1 to 3.3).

5.3.1 Connecting with new curriculum: Articulating voice and text

The various interactive purposes in this meeting typically required the teachers to engage in some kind of reflection, building up to what Schön (1983) refers to as a "reflective conversation." The analyses of the teachers' talk show how the interactive purposes were operationally constituted in language, and how specific issues within them were frequently

addressed through particular sequences of moves, such as initiate/respond/follow-up sequences (e.g., episode 5.1-3) and problematising sequences (e.g., episode 5.5-6).

Such sequences accord with the characteristics of several of the “forms of reflection” identified by Louden (1991)¹⁸, and indicate that these apply not only to individual reflection but also to collaborative reflection. In this scene, an enquiry form of reflection was the most common, occurring whenever the teachers took a step back from the main action to reflect on a particular feature, drawing on their professional experience (episodes 5.2-4, 6-7). Typically, enquiry reflections involved a focusing move to initiate the enquiry, backed up by a response and follow-up focus and response, and often concluding with a move distilling the new understanding of the original enquiry initiator. Where the reflective conversation became more intense, reflection occurred as spontaneity or tacit reflection, which occurred within the stream of experience, in other words with no stepping back. For example, at the start of episode 5.6, Carmen spontaneously discounted the official version of the Bands of schooling. Oscar’s focusing move (5-6) then took the group a step back from the stream of experience and into the more detached enquiry form of reflection, as they attempted to resolve the dilemma posed by Carmen’s counter proposition through a validity check against the text of the policy document, instantiating. When that failed, the teachers returned to spontaneity, mocking the written text (12-16). The teachers also used rehearsal, Louden’s third form of reflection, which he indicates is not as distant from the action as enquiry but not as close as spontaneity. The teachers used rehearsal when consciously exploring unfamiliar professional territory and trying to link it to their practice (episode 5.8). Each form of reflection was textually operationalised through distinct sequences of worded moves, indicating distance from the moment, and typically ending with some kind of conclusion, such as a distillation of understanding or a curriculum decision.

Each form of reflection also required the teachers to position themselves in particular ways in relation to each other, to the task and to the policy documents. For example, Carmen and Lytton positioned themselves in relation to each other as novice-expert (episodes 5.1-2), as well as working colleagues (e.g., episodes 5.5-6). Lytton also positioned himself in a managerial role to the others in episode 5.5, for example, while Oscar also took on that role when he led the others to empirically investigate the validity of Carmen’s proposition to situate Band C at Years 9 and 10 (episode 5.6). In relation to the task, teachers adopted various positions, including validators of school curriculum (Lytton in episode 5.3; all the teachers in episode 5.5), and interpreters of the Statement (all the teachers in episodes 5.5-9).

¹⁸ See Chapter 2.3.3: Places for language in a teacher agency perspective.

Through such forms of reflection, the teachers activated diverse voices in relation to the Statement – compliant, supportive and oppositional. For example, Carmen and Lytton adopted a compliant voice in the opening enquiry reflection (episode 5.1), while Lytton and Oscar adopted supportive voices (episodes 5.1 and 5.2). There were also instances of apparently complete concordance between the teachers and the policy, when practitioners even spoke with the very voice of policy, “ventriloquating” (Bakhtin, 1981). This happened, for example, whenever Lytton reproduced the policy ideology in his explanations, as in episode 5.1, or whenever a teacher read out parts of the documents in a conforming tone, as in episodes 5.5 and 5.6. There were also instances where policy and practitioner voices melded easily without debate, as in episode 5.5, when the teachers were readily able to link learning behaviours described in the Statement with required learning in their units of instruction.

By contrast, there were occasions when the teachers progressively put forward oppositional voices in regard to the Statement. This began quite mildly in episode 5.4 where the enthusiastically positive descriptors of student learning behaviours did not ring true to their experience. Later, in episode 5.6, they countered such representations by instantiating contrary experiences and setting them up in opposition to the generalisations made in the policy. These two contesting types of move were followed by another, which involved reading the words of the Statement using an intonation belying the intended meaning of the words. Bakhtin (1981) calls this “profaning” the authoritative discourse, taking it in vain, and turning it into a mere “object, a relic, a thing” (p. 344), bereft of its power. This episode affirms the assertion that “policy writers cannot control the meaning of their texts. Parts of texts will be rejected, selected out, ignored, deliberately misunderstood, responses may be frivolous, etc.” (Bowe & Ball, 1992, p. 22).

It is noticeable that when the teachers were in accordance with policy, they did not engage with its underlying discourses, whereas when they were uncomfortable with it, they did.

5.3.2 Connecting with new curriculum: Articulating voice and discourse

The two discourse communities directly involved across the episodes were (a) curriculum policy makers, represented by those who produced the Statement, and (b) science teachers, represented by the four Countrytown High teachers. While the power relations between these two communities changed several times over the period of the meeting, on the whole the power of the policy making community dominated, and its authority stayed “fused” (Bakhtin, 1981) to the text. Nevertheless, this authority was certainly undermined on several occasions.

Authoritative and internally persuasive discourses

Frequently the policy pronouncements were taken for granted by the teachers, as they sought validation of their work within it. For example, they raised no demur about its reification of one particular view of science through the allocation of content to five Strands, nor about its naturalised representation of this view. This suggests that their own understanding of science could be comfortably accommodated within the policy construction. In such cases, the authoritative discourse was also “internally persuasive” (Bakhtin, 1981) to the teachers.

By contrast, the authoritative discourse failed to be internally persuasive in regard to the Statement’s construction of the Bands of schooling and some of the descriptions of expected student behaviours. For example, the teachers were certainly not persuaded of the expectation that Year 8 students should be working in Band C. Having just matched their planned Year 8 curriculum against Band B and been reassured of its legitimacy, suddenly their analysis was thrown into confusion. Close study of Band C expectations in the Working Scientifically Strand led them quickly to the belief that the document was assuming a set of norms for student behaviours which did not match the norms they experienced in their own classes. They began to think that the representation of student norms in the Statement was drawn from a privileged sector of the community and that their own students were being marginalised in the process. This led them to deconstruct one of the central accountability structures of the curriculum policy – the Band allocations – proposing that Band B should be extended to take in their Year 8s, and that some of the expectations in Band C were unsuitable even for their Year 12s.

To suggest varying the Band allocations was to breach the discursive distance between the policy document and its subordinate readers, and to act against the authority embedded in the discourse.

[I]t is not a free appropriation and assimilation of the word itself that authoritative discourse seeks to elicit from us; rather, it demands our unconditional allegiance. Therefore authoritative discourse permits no play with the context framing it, no play with its borders, no gradual and flexible transitions, no spontaneously creative stylising variants on it (Bakhtin, 1981, p. 343).

Authoritative discourse sets policy up to be accepted as given. The sense is calcified, with the result that policy pronouncements may be interpreted only within a pre-determined frame of variation. Whilst authoritative discourse is typically associated with other types of discourses interpreting and applying it, the other discourses are not permitted to breach its boundaries. Should this occur, its monologic stance is demolished and it ceases to be authoritative. This is what happened in episodes 5.4 and 5.6-8, when the teachers’ lived experience ran counter to what they saw as the essentialist representations of student

behaviours in the Statement, for example students “relishing” and being “fascinated by” particular classroom activities.

Universalising and localising discourses

The descriptions of learner behaviours in the Statement concern an imagined group of young people, an “imagined community” (Anderson, 1983), existing only in relation to an abstract nominal context (Cornbleth, 1990). While this imagined community was represented through a universalising discourse, it evidently bore little resemblance to these teachers’ lived experience. This raised questions for them about the validity of the Statement’s constructions. They began to represent them as falsely normative and wrongly exclusive, using their own localising power (Fiske, 1993) to undermine the authoritative discourse. In episodes 5.4 and 5.6-8, the teachers specifically attacked the policy representations on the grounds that selective teacher experiences were being represented as universal objective fact. In this way they established a localising discourse to counter the universalising discourse in the policy.

This reflects a wider concern among educators that outcome-based education

fails to address family circumstances, socio-economic status, learning disabilities and other inequalities that do not allow for equality of educational inputs (such as curricula, resources) and therefore cannot result in equality of educational outcomes (Groundwater-Smith et al, 2001, p. 201).

Equality of educational inputs is a core issue in schools such as Countrytown High, which serve socio-economically disadvantaged and culturally diverse communities (Connell et al, 1991). It was also a teacher concern in the large survey and interview process undertaken for the New South Wales review of the Statements and Profiles (Eltis, 1995), where the universalising discourse in these documents came under fire. The Eltis findings indicated a high level of concern that outcome-based assessment profiles

set up the impression that schools can present precise standards and that these standards can be used to monitor schools across Australia, regardless of the local context – the racial, poverty, gender, rural isolation, inner urban and recent arrival pluralities of contemporary society (Crump, 1996, pp. 3-4).

This concern is very much about what Foucault (1977) calls the “power of normalisation,” which imposes homogeneity whilst simultaneously individualising, through measuring gaps, determining levels and specifying differences. Normalising discourses thus engender exclusion, and the Countrytown High teachers constructed both normalisation and exclusion as matters of concern in their work. The teachers’ view of the Statement as legitimately authoritative discourse was progressively undermined, because they could not see their own students in its pronouncements.

5.3.3 Connecting with new curriculum: Language as environment, consciousness and process

The analyses in this chapter have shown language to be consequential at each level of the framework developed in Chapter 3 and also in three different parameters of activity: reflecting key characteristics of activity: environment, consciousness and process. Language-as-environment was constituted in the material presence and represented discourses of the Statement and Profile for Science. Language-as-consciousness became apparent particularly in regard to teachers' endeavours to establish meanings for policy terminology (e.g., episodes 5.2, 5.5-6, 5.9), and the positions they adopted in regard to policy discourses and their own context of practice. Language-as-process was highlighted and made explicit through the analysis of forms of reflection in sections 2 and 3.1, as well as in the project brief discussed in section 1.2. These parameters of language show dialogue between reader and policy text as central to the curriculum development task, not only for making local meanings, but for connecting with the underlying discourses of science education.

5.4 Chapter review

The theme of this chapter has been the consequentiality of language in how teachers went about making connections with new curriculum documents. The analysis has highlighted language in three parameters of the teachers' work: as part of the *environment*, as a key *process* in conducting the work, and a vital aspect of *consciousness* in making sense of the work. This was evident in the school and policy contexts reviewed in section 1, as well as in the actualities of the meeting episodes presented in section 2. Section 3 of the chapter theorised the teachers' work as the dynamic articulation of text, voice and discourse in reflective conversation. The dialogue between the authoritative discourse built into the curriculum documents and the internally persuasive discourse stemming from teachers' lived experience was central in these first stages of connecting with new curriculum policy. This dialogue continues to take shape in the practical task of developing a unit of instruction, which is the theme of the next chapter.

Chapter 6

Developing a unit of instruction

The question of how language is consequential in developing a unit of instruction goes to the heart of everyday curriculum development practices in schools. Section 1 provides a thematic and discourse analysis of the policy document the teachers directly drew on, namely the Profile for science. Section 2 represents episodes of teachers' work on developing a unit of instruction, focusing particularly on establishing unit outcome statements and linking them to the outcome statements and indicators provided in the Profile. Data sources were: the Profile for science; ethnographic field notes; and a meeting transcript. Section 3 provides discussion of how language was consequential in the teachers' work, further illustrating some of what was identified in Chapter 5, as well as adding different sites of consequentiality.

6.1 Developing a unit of instruction: Contexts of influence and practice

The context of development for units of work for the junior secondary science classes at Countrytown High is the same as that described in the previous chapter, apart from the role of the Profile for Science. Consequently, this section refers only to the Profile for Science.

6.1.1 Science in state education policy: The Profile for science

The Profile for science is a tool “to assist in the improvement of teaching and learning and to provide a common language for reporting student achievement” (Profile, p. iii). Eight *Levels of achievement* are established in the Profile, each with 18 student outcome statements, totalling 144 in all, and a range of indicators (or pointers). Each outcome is identified numerically, first by Level number and then, after a decimal point, by the number of the sub-Strand. For example, 4.8 is the outcome for Level 4 in the Structure and Function sub-Strand of the Life and Living Strand, i.e., number 8 out of 18 across the Strands. Those numbers are particularly important for cross-referencing school-based curriculum, as we see in the second part of this chapter.

A glance at a page of the Profile for science (see Table 6.1 on the next page) shows the graphic layout the teachers are working with: the Strand name and Level are printed large at the top, with the sub-Strand names underneath, each with a numbered outcome statement followed by listed pointers marked by bullet points. The pointers listed under each outcome

Table 6.1: A Strand outcomes page (Profile, p. 60)

LEVEL 4 Life and Living		
<p>Level 3 outcomes:</p> <p>3.7 Maps relationships between living things in a habitat.</p> <p>3.8 Identifies external and internal features of living things that work together to form systems with particular functions.</p> <p>3.9 Explains why some living things have become extinct and identifies current endangered species.</p> <p>Level 5 outcomes:</p> <p>5.7 Describes the role of living things in cycling energy and matter.</p> <p>5.8 Presents evidence that plants and animals are made up of functional units called cells.</p> <p>5.9 Identifies features of groups of living things that enable them to compete successfully in their environments.</p>	<p>Living together</p> <p><i>At level 4, a student:</i></p> <p>4.7 Identifies events that affect balance in an ecosystem.</p> <p><i>Evident when students, for example:</i></p> <ul style="list-style-type: none"> Describe how populations are naturally controlled within an ecosystem. Investigate the effects of seasonal changes in a habitat within the school grounds. Investigate ways humans affect the stability of ecosystems through the use of chemicals, landclearing and other farming methods. Describe the work of quarantine and customs officers in controlling the movement of plants and animals in and out of Australia. Use a computer simulation to explore the effect on various populations of introducing a new species into an ecosystem. 	<p>Structure and function</p> <p><i>At level 4, a student:</i></p> <p>4.8 Explains the functioning of systems within living things.</p> <p><i>Evident when students, for example:</i></p> <ul style="list-style-type: none"> Compare the major systems of animals, including humans, such as the digestive, skeletal, respiratory and reproductive systems. Find out about the effects of some important diseases on body organs. Describe the transport of water in vascular plants. Compare the ways plant parts perform different functions (roots for storage, stems for climbing). Gather evidence on the effects of particular ways of life on human body systems.
	<p>Biodiversity, change and continuity</p> <p><i>At level 4, a student:</i></p> <p>4.9 Explains how living things have changed over geological time, using evidence from various sources.</p> <p><i>Evident when students, for example:</i></p> <ul style="list-style-type: none"> Draw up a chart showing changes in some animal families over time (the differences between ancient and modern horses). Explain ways in which biodiversity in Australia is unique. Illustrate and explain changes in some Australian animals now extinct (diprotodon, giant kangaroos). Investigate how scientists use fossil evidence to make links between extinct animals and present-day animals. 	

statement are “indicators or signals of the achievement of an outcome. [...] Unlike outcomes, pointers are only examples. Other pointers not mentioned could also indicate achievement of the outcome” (Profile, p. 5). They are thus an important guide for interpreting outcome statements, but not the basis for a program framework. Whereas the outcome statements describe generalised performance, which is not directly teachable or assessable, the pointers describe situated performance, readily teachable and readily assessable. The pointers add detail to the construction of the Level by indicating what the outcome might look like in practice.

The meaning structure in outcome statements and pointers

Each outcome statement in the Profile has a similar meaning structure, and usually the same grammatical structure. The grammatical subject of the outcome statement is “a student,” who successfully engages in (a) a required process, necessarily demonstrable and usually verbal, taking (b) a required perspective, within (c) a required scope of content topics or skill conditions. This is indicated through the examples in the table.

Table 6.2 Components of meaning structure in the Profile outcome statements

process	perspective	scope
Identifies	events	that affect balance in an ecosystem (4.7)
Comments on	the significance	of the cycling of matter as a change process (5.2)
Collects and records	information	as accurately as equipment permits and investigation purposes require (4.14)

Sometimes two distinct processes are required, as in the third example, with the result that in the 144 Profile outcome statements in Levels 1-8, there are 199 instances of a required process. An analysis of process and perspective items in the science Profile is included at Appendix 2 and will be referred to in following chapters.

Dot points or pointers are listed under each outcome statement as “indicators or signals of the achievement of an outcome” (Profile, p. 5). Whereas the outcome statements describe generalised performance, which is not directly teachable or assessable, the pointers describe situated performance, readily teachable and readily assessable. The pointers add detail to the construction of the Level by indicating what the outcome might look like in practice. The format of the pointers is the same as for the outcome statements – a process item, a perspective item and a scope item.

Table 6.3 Pointers for outcome 4.7 (see Table 6.1).

process	perspective	scope
Investigate	the effects	of seasonal changes in a habitat within the school grounds
Describe	the work	of quarantine and customs officers in controlling the movement of plants and animals in and out of Australia.

The main difference between these 4.7 pointers and the 4.7 outcome statement (“Identifies events that affect balance in an ecosystem”) is the conceptual reduction and specificity of the scope item. In the pointers, the scope item instantiates the concept of balance (seasonal changes/movement of plants and animals) in an ecosystem (school grounds habitat/Australia). In other words, the scope of the outcome is conceptually reduced through feature selection and specification. The perspective and process items in the pointers across the Profiles are much the same as in the outcome statements, with a few additional ones. The additional perspective items are often more specific, such as *the work*, *the transport*, *a chart*, *tests*, as are some of the additional process items, such as *give reasons* (a sub-process of *explain*) and *list* (a sub-process of identify). Among the process items, there is also a larger proportion of active processes, such as *investigate*,¹⁹ *find out*, *explore*, *take part in*, and *argue for*. This can be attributed to the classroom focus in the pointers as against the broader, more abstract focus in the outcome statements. Such process items reflect the constructivist priorities in the Statement, which are not so evident in the Profile outcome statements.

Further guidance in assigning Levels to students’ work is provided in the Profile document through annotated work samples or exemplars, illustrating connections between students’ written responses to assessment tasks and the particular outcome statements they attest to. In the early drafts, there were no annotated work samples, but feedback from trialling made it clear that all layers of description were necessary if consensus on the meaning of outcomes was to be achievable. According to Sadler (1987) verbal descriptions of outcomes can never be refined enough to precisely define a level of competence, and the annotated samples of student work provide an illustrative approach. They also provide a model and encouragement for teachers to analyse their students’ work in the same way.

¹⁹ Appendix 2 indicates that *investigates* is used only once as a process item in the 144 outcome statements, but a quick glance at the pointers indicates a much higher frequency.

6.2 Developing a unit of instruction: Teachers at work

NARRATOR: At this second meeting of the year, the teachers are preparing a curriculum outline for a unit of instruction, which is a six-week Year 10 unit entitled *Light and Sound*. It needs to be ready for Lucio to start teaching the following week. Oscar has taken on the role of scribe. This unit is to build initially on a four-week unit on Light which Carmen taught last year, so their first task is to identify the relevant outcome statements in the Profile. To do this, the teachers first need to decide which content Strand to look under: Earth and Beyond, Energy and Change, Life and Living, and Natural and Processed Materials.

Episode 6.1 Referencing to the Profile

Lucio	Leafing through the Profile document.	
	I'm not finding anything in here on light or sound.	1
Carmen	There wasn't in [Level] 4, that's for sure.	2
Oscar	Look in terms of Energy. That's probably the most likely.	3
Lucio	Yeah, I have.	4
Carmen	Reading out the first sub-topic. "Structure of the eye."	5
Lucio	That can be in "Life and living." OK. What did you do with the structure	6
	of the eye?	7
Carmen	We just did some notes on it first.	8
Oscar	Structure and function?	9
Carmen	Yep, structure and function, and then we did a few little activities with	10
	the eye, you know, focusing, and we looked at the blind spot and that	11
	sort of	12
	stuff.	
Lucio	Where would it be though? [Level] four. "Life and living." "Explains the	13
	functioning of systems within living things" (outcome 4.8)."Compare	14
	major systems of animals including humans, such as digestive system."	15
	"Find out about effects of important diseases on body organs." ²⁰	16
Carmen	Yeah. They do look at that. That was one thing we did.	17

OBSERVER: The teachers are initially looking in the Profile for the words "light" and "sound," to find a site against which they can pin their unit of instruction. They take the Energy and Change Strand as the most likely (1-4), but are unable to find any references.

²⁰ Pointers for outcome 4.8. See Table 6.1.

Focusing on one of the sub-topics, structure of the eye, suggests a possible connection with the Life and Living Strand (6, 13-16).

INTERPRETER: They are looking at pointers for an outcome to see if they can make a connection with the classroom activities Carmen did, and thereby justify choosing that outcome statement as the right one for their purpose.

Episode 6.2 Formulating a unit outcome from classroom activity (1)

Lucio	<i>With satisfaction.</i> We are going to “Explain the functioning of systems within living things.”	18 19
Oscar	Yeah. That’s it, that’s exactly. The eyes are a part of the living thing. And you look at the structure of the eye and the function of the eye.	20 21
Carmen	And also we cover diseases, put it this way.	22
Lytton	4.8 “Explains the functioning of systems within living things.” How can we reword that?	23 24
Lucio	“Explain function and structure.”	25
Carmen	Well, we look at the structure and the function of the eye.	26
Oscar	“Explain function and structure of eye.”	27
Carmen	Simple, ‘cos that ..	28
Lucio	Yeah, right. Go on, keep going, Carmen.	29
Carmen	The next .. Then we looked at things like short sightedness and all that sort of stuff. Short sightedness, long sightedness, so that would come under ..	30 31 32
Lucio	OK, “Life and living” again.	33
Lytton	What Level were you at? 4? 5?	34
Lucio	Mainly 5. Hopefully 5s.	35

OBSERVER: The teachers agree on the outcome statement at 4.8 on the basis of specific classroom activities (20-22). They then progressively re-construct this broad Profile outcome as a precise unit outcome. They retain the verbal process “explain” without questioning it, but replace “functioning” with “function and structure” (25) and “system” with “the eye” (26-27).

INTERPRETER: This re-construction involves reducing the scope of the outcome through conceptual specification. They reduce the cover concept “functioning” by selecting two component features, namely structure and function, and they reduce the cover concept “system” by specifying a single concrete example, the eye. It looks as though they are paralleling the processes exemplified in Profile pointers, which typically reduce the

conceptual breadth of the generalised outcome statement by orienting towards particular component features and specifying either topics or conditions (see analysis of Profile outcome statements at Appendix 2). These teachers are doing much the same. They are looking mainly at Level 5 and below, since Level 5 is what they believe is expected of Year 10s and they consider higher levels to be out of the question (see episodes 5.6-9).

Episode 6.3 Formulating a unit outcome from classroom activity (2)

Oscar	Where did you start with that, Carmen? With Light?	36
Carmen	Well, I really started last year with looking at the nature of light, images in a mirror and the law of reflection.	37 38
Oscar	So, is there an outcome that you would like to get from that? Would you hope that students can ..	39 40
Carmen	Well, basically be able to ..	41
Oscar	Describe the law of refraction and reflection.	42
Carmen	Well, they should start off with just, they should be able to detail the nature of light. That's not quite how I want to word it, but they should be able to note the speed, the direction .. travels in straight lines.	43 44 45
Lucio	Characteristics of light.	46
Carmen	Yeah. Characteristics of light.	47
Oscar	Students can describe properties? The fundamental properties of light. And they would be its .. What would you call them? Fundamental properties of light.	48 49 50
Carmen	That's it.	51
Oscar	Yeah. But if I put "i.e.," because some people might ..	52
Carmen	Well, speed, direction etc.	53
Lytton	Did you talk about its duality? weight or ..	54
Oscar	Year 10? I can see that in Year 12, in physics – particle duality.	55
Carmen	It would be beyond Year 10, I think.	56
Oscar	Oh, you might be able to mention it. In terms of the double helix experiment. I've shown the experiment. And also wave characteristics. That's how it shows wave characteristics.	57 58 59

OBSERVER: The teachers have stopped looking into the Profile for the moment and are concentrating on formulating their own unit outcomes directly from Carmen's work. Carmen's summary of content (37-38) covers three sub-topics, so when it comes to formulating an outcome she steers Oscar away from the last one (43) and brings the focus onto the first (44), the nature of light. This she concretises (44-45). Lucio and Oscar next

offer abstract phrases to cover her content: “characteristics of light” (47) and “the fundamental properties of light” (48-49). Then Oscar suggests adding some detail (52), which Carmen provides (53), resulting in a short discussion about whether or not it would be appropriate to include duality (54-59).

INTERPRETER: Once again, the teachers collaboratively formulate the needed unit outcome statement (39-53). This time generating it directly from the activity. They use “describe” as the verbal process, “fundamental properties” as a cover construct to indicate the required perspective, and specification to indicate scope, e.g., the eye, light, and limiting the characteristics to “speed, direction, etc.” (52-53) as guidance for new teachers. The difference of views on the introduction of concepts of duality and wave (54-59) may partly be a factor of differences in the teachers’ specialist knowledge base. Carmen’s field is biology whereas both the other two speakers have a background in physics. Oscar’s specialist knowledge of physics may also be a factor in his readiness to offer abstractions on this particular topic, whereas his preference across the corpus as a whole is for concretisation and exemplification.

NARRATOR: Teacher knowledge also affects the formulation of a unit outcome in this next episode, which follows some discussion on the third topic in Carmen’s unit: the law of reflection.

Episode 6.4 Formulating a unit outcome from classroom activity (3)

Oscar	So “Students can ..” [We] can’t put “understand.”	1
Carmen	Well, “can demonstrate,” not “demonstrate a knowledge” but ..	2
Lucio	“An understanding.”	3
Oscar	We can’t really use “understanding ..” “Students can ..”	4
Lytton	“Generate the ..”	5
Carmen	Well, what they actually do is they actually work out the law of reflection themselves. We set it up and you lead them through it till they	6
	get ..	7
		8
Lytton	So, “Students can generate the ..”	9
Carmen	“Law of reflection.” That they should be able to work it out.	10

OBSERVER: Oscar is asking for a way to formulate the outcome, and vetoing the word “understand” as a process word. The veto is not questioned, but the formulation by Carmen and Lucio (2-3) still does not conform. It is Lytton who comes up with “generate,” and Carmen’s concrete description (6-8) confirms his suggestion.

INTERPRETER: The teachers are collaboratively developing an agreed formulation, which not only fits their understanding of what a behavioral outcome statement should look like but also says what they want it to say. This means deciding on a process word which accurately represents what the students are to do. The avoidance of any term to do with understanding or knowledge (1, 2, 4) represents a basic requirement of behavioural outcomes design: that there must be an observable display of learning. Oscar later says he knows this from his teacher education program. Formulating the outcome as required leads the teachers to bring to mind the actual process students are to undertake, in this case to generate and articulate a principle (5-10). Carmen’s experience with the unit gives her the phrase “work out for themselves” (6-8, 10), but it is Lytton who comes up with the more precise term “generate,” perhaps reflecting his years of experience in constructivist teaching. “Generate” is frequently used in describing student behaviours in the Statement, particularly in the descriptions of process in the Working Scientifically Strand. However, nowhere is it a required assessable verbal process in the Profile for science, as the teachers themselves discover.

Episode 6.5 Formulating a unit outcome from classroom activity (4)

Oscar	Pencil at the ready, trying to formulate a unit outcome statement.	
	“Students can ..” Ah! Not “describe properly” but ..	1
Lytton	“Can GENERALISE about images in a plane mirror.” Because that’s	2
	what you want them to do, isn’t it? You want them to be able to produce	3
	these general rules .. of what this thing should look like.	4
Carmen	Whacking the Profile on the table. Not much in here about that.	5
Oscar	And “generate..”	6
Carmen	“The law of reflection.”	7
Oscar	“Through practical experience.” And none of those are in there. <i>Pointing</i>	8
	<i>to the Profile</i>	

OBSERVER: Once again it is Lytton who names the needed process word, “generalise.” Then both Carmen and Oscar comment on how the conceptual Strands in the Profile neglect three processes that they consider important in science: generalising (2-5), generating a principle (6 and previous episode) and learning through practical experience (8).

INTERPRETER: In this case the outcome they formulate clearly integrates process elements in the shape of students’ own construction of knowledge. However, neither “generating principles” nor “generalising” is mentioned once in the Profile Levels 4-6 in any of the five Strands, nor in the Statement for Band C (see Appendix 2). Learning through

practical experience is foregrounded in many parts of the Statement, but it is rarely visible in the outcome statements in the four conceptual Strands nor in the pointers associated with them. It is, however, integral in the process outcomes and pointers in the Working Scientifically Strand, so Carmen is not being quite fair to the Profile in her criticism (5 and 8).

Episode 6.6 Formulating a unit outcome from classroom activity (5)

Carmen	Then we looked at things like short sightedness, long sightedness and	1
	we did demonstrations using convex and concave lenses and obviously	2
	relating that to glasses. So we looked at how those lenses accommodated	3
	for those.	4
Oscar	So, what were you hoping [for] the students to achieve?	5
Carmen	Well, that they can .. that they can identify .. Well, that they can	6
	DIFFERENTIATE between long sightedness and short sightedness ..	7

OBSERVER: We have seen several instances of the teachers rejecting their initial choice of process word in their outcome formulations, and choosing a more precise verb. Here Carmen rejects “identify” (6) in favour of “differentiate” (7). In the previous episode “describe properly” (1) was replaced with “generalise,” and in the one before “demonstrate a knowledge” (2) was replaced with “generate a principle.”

INTERPRETER: All three of those changes represent a shift in the type of thinking required of students. In each case, the shift is from relatively passive reproductive thinking to more active constructivist thinking. Through their choice of process words the teachers are demonstrating what for them is valued learning achievement in science, in addition to the scientific concepts embedded in the topics they have chosen. In the course of this meeting, “differentiate” is used in discussion of five different unit outcomes. It is not used in any of the Profile outcomes or pointers in Levels 4-7 (see Appendix 2). Like “generate” and “generalise,” “differentiate” positions the student and the classroom not as passive sites of reproductive learning but as active sites of constructivist learning. By contrast, verbal actions such as “describe” suggest rather passive student engagement in learning. I think this is the point being made by Lucio (5) in what follows here.

Episode 6.7 Formulating a unit outcome from classroom activity (6)

Carmen	And then we did making a rainbow. And the pracs that we set up: we	1
	investigated how a prism and a beaker of water can produce a spectrum,	2
	and then we related this to the formation of rainbows.	3
Oscar	OK. So “Students can describe rainbow formation.”	4

Lucio	Boring.	5
Carmen	It's not boring! It's good!	6
Oscar	Yeah, using prisms.	7
Carmen	"Describe rainbow formation."	8
Oscar	Well, "Describe effects of .." What is it? It's refraction, isn't it?	9
Carmen	It's refraction.	10
Oscar	<i>Writing.</i> So, it's "Describe .."	11
Lytton	"The refraction of white light."	12
Oscar	<i>Scribing.</i> "The refraction of white light."	13
Carmen	"Using prisms and beakers."	14
Oscar	I don't think we need worry because, in effect, when you do it .. You're	15
	doing this just to describe it.	16

OBSERVER: From Carmen's review of classroom activity (1-3), Oscar quickly formulates a unit outcome statement "Students can describe rainbow formation" (4), which Lucio castigates as boring (5). His comment is attacked and he does not pursue the point.

Carmen apparently hears the comment as criticism of the activity, whereas I myself hear it as criticism of the wording of the outcome statement.

INTERPRETER: It may be that Lucio does not pursue the point because he cannot articulate how the word "describe" might be affecting the way he is hearing the outcome statement, nor point to the alternative "investigate," which was there in Carmen's own account (2). Later on when the others are formulating an outcome to "describe" the fundamental properties of waves, Lucio makes the comment that the work is boring "as I'm listening to it now." Oscar suggests this is because he does not feel comfortable with teaching physics, comparing that with his own feelings when teaching chemistry. Lytton, on the other hand, suggests that he is confusing the outcome statements with his teaching program, and goes on to say "How you turn these outcomes into day-to-day teaching, this is how you make it interesting." Lucio once again lets it go. He seems to be unable to make his point in a way that can be heard by his colleagues. Language fails him.

OBSERVER: The teachers progressively alter their initial formulation "describe rainbow formation using prisms" to "describe the effects of the refraction of white light" (9-13).

INTERPRETER: This is more scientifically precise, but a much more abstract formulation, more like the broad Profile outcome statements and less like the pointers, which usually give some idea of classroom activity. The first formulation evokes students holding prisms and very possibly engaged in constructivist learning. The second formulation

leaves the teacher free to choose a transmission pedagogy perhaps more readily than a constructivist one. Oscar’s comment that the activity with the prisms and beakers is done “only in order to describe it” (16) also suggests that he is not taking on board what Carmen is saying about students using prisms to investigate the effects of refraction, i.e., to construct knowledge rather than merely to describe it.

NARRATOR: The teachers’ commitment to establishing connections with Profile Levels has taken them away from the classroom and into the abstractions of Profile outcome statements. Carmen is concerned about this.

Episode 6.8 Investigating principles for wording unit outcomes

Carmen	Can I just ask a question? Just because it [our content] doesn’t necessarily appear in here under these outcomes, <i>jabbing at the Profile</i> , it doesn’t mean to say that we can’t PUT it underneath one of these outcomes. ... But ..	1 2 3 4
Lytton	<i>Overlapping.</i> No, but what we have to do is frame our outcome in a similar .. First of all, I think we have to work out the difference between 3.5, 4.5 and 5.5 and see what the wording, how they use their wording to graduate the Levels. And frame our outcome in that sort of same difficulty of wording. That nuance of how they made their difference in Level.	5 6 7 8 9 10
Carmen	But wouldn’t necessarily difficulty of wording then be translated into .. To me you’re just quibbling about .. I can see what you’re saying, but you’ve then got to translate those outcomes then into practical .. I mean, when I did this with the Year 10s last year ..	11 12 13 14
Lytton	Well, what we have to do is we have to transmit into [our] document the degree of hardness that we’re expecting from our Year 10s, don’t we? To be at Level 4 or Level 5. It is different from having a couple of kids with mirrors and saying “Here’s the sun and I can reflect it over there.” That might be Level 3. It’s different. Our Year 10s have to do something much more.	15 16 17 18 19 20
Oscar	Well, Year 10s actually work out the law, that’s the difference. But it’s the same outcome [in the Profile].	21 22
Lytton	We have to make certain our staff who are reading this, <i>points to Oscar’s notes</i> , and who have to read that, <i>pointing to the Profile</i> later, can figure out why we put it at Level 4.	23 24 25
Lucio	Ah ha!	26

Lytton	We have to build into there, the wording that says “This is what makes it difficult.”	27 28
Carmen	But sometimes the wording in Level 3 .. I mean the actual outcome here .. The way you then word the actual outcome there .. We don’t word our outcomes like this, we word our outcomes for OURSELVES. So, even though it might ..	29 30 31 32
Lucio	Well, in that particular case we’ll match it up to 3.5 but we want ..	33
Carmen	But the wording is different. I mean we word it for OURSELVES.	34

OBSERVER: At the start, Carmen makes the point that part of the curriculum development process is to use school-based content in the achievement of a given Profile outcome (1-4). She wants to build on that point to ask a question, but Lytton cuts her off (5) responding on the basis of a related concern of his own – wording “to graduate the Levels” (5-10). Carmen acknowledges but is not content with Lytton’s argument, “I can see what you’re saying, but ..” (12). However, she has trouble articulating her position, giving up on a number of half-finished utterances. She suggests that conceptual difficulty would be indicated through the translation of an outcome into classroom activity (11-13). Lytton concurs (15-20), having first re-iterated his concern – to “transmit the degree of hardness” (15-16) so that other staff can understand the reasoning (23-25) through the wording (27-28).

INTERPRETER: Lytton might reasonably assume that the outcomes in the Profile are deliberately worded to represent progressive difficulty, since the Profile clearly says that “[o]utcomes describe in progressive order the various skills and knowledge that students typically acquire as they become more proficient in the area” (Profile, p. 5). However, Oscar’s comment (21-22) suggests that if the students “work out” or “generate” the law of reflection, they are using more complex linguistic thinking than is indicated in the 3.5 outcome. He is implicitly suggesting that a higher Level outcome statement is needed, while also bearing out Lytton’s belief in the importance of wording at the different Levels.

OBSERVER: Carmen then tries to make a point about the audience for the wording being different in the Profile and their own curriculum development (29-32; 34), but her point is not taken up.

INTERPRETER: As I understand it, Carmen does not believe the wording of Profile outcome statements should determine the wording for unit outcomes, because the Countrytown High curriculum framework should serve the interests of the teachers (30-32; 34). The

brief for the curriculum project explicitly mentions conveying to inexperienced or transient teachers a picture of what should be going on in the classroom, e.g., using prisms and beakers. It is worth noting that the teachers have not specifically discussed together their purposes in formulating unit outcome statements. Later on, the department's curriculum adviser for science will tell them they should be writing not outcome statements but learning objectives formulated to meet the interests of classroom teaching, precisely Carmen's point. However, at the moment Carmen is unable to achieve collaborative reflection on the issue that she senses in their work, and in my view it is language that fails her, since neither status nor gender were ever observed to stop her gaining a hearing on other occasions.

NARRATOR: It may also be a question of group focus. When the teachers all have the same focus, and when several of them argue against a particular position, collaborative reflection seems to occur more readily. We see this in the next episode, where the teachers have to make a connection between Carmen's original unit on Light, and the additional topic in the proposed new unit, which is Sound. The teachers are concerned about how to generalise what is common to light and sound without abstracting too far from concrete experience. They have no pre-prepared materials to shape their thinking, but must make decisions from scratch.

Episode 6.9 Negotiating content selection and concerns

Lucio	We had better put "Sound" in here as well. <i>Gesturing towards Oscar's notes.</i>	1 2
Lytton	Light and energy. Making a connection between light and energy?	3
Carmen	Electromagnetic sound and all that.	4
Lytton	Yep, but light, and light being used to transmit voice or you know, telephone stuff.	5 6
Oscar	I don't see me trying to stand up and explain that!	7
Lytton	But isn't that one of the keys? Isn't the key to using light that they should be able to extrapolate when they talk about all the other sorts of electromagnetic waves that they can't see? And particularly manipulate, because we can't do it at school. This is really a simple thing to say, "Radio waves, blah, all act in a similar sort of way except the trouble is we can't work with them as easy as .."	8 9 10 11 12 13
Oscar	<i>Pencil poised.</i> "General properties of waves."	14
Lytton	Yeah. Well, we've got to make the connection with waves as being a mechanism for transmitting energy.	15 16

Oscar	<i>Turning back to the first page of his notes (see episode 6.3: 49-50)</i>	
	What about changing “Describe fundamental properties of light” to	17
	“the fundamental properties of waves?” Because we need to do sound	18
	waves and light waves.	19
Lucio	<i>Slightly alarmed.</i> You want to look at radio waves, you’re saying	20
	now? Microwaves?	21
Lytton	But do you see what I’m getting at?	22
Carmen	<i>Dubious.</i> Yeah! But ..	23
Lytton	This seems to say that light there is all by itself. Really, it’s only one	24
	special kind of waves that we humans can manipulate. And it happens	25
	that schools are set up to manipulate light waves, we’re not set up to	26
	manipulate microwaves or the broad spectrum.	27
Lucio	X-rays.	28
Lytton	X-rays.	29
Oscar	Gamma rays.	30
Lucio	Well, if we go through the whole lot, then we’ve cut out a lot of this.	31
	<i>Gesturing towards Carmen’s folder.</i>	32
Carmen	<i>Cradling her folder.</i> No, you don’t.	33
Lytton	No, it’s still there because what you’re talking about with colour	34
	mixing is band width and frequency shifting and blah, which is	35
	equivalent to if you want to work with television, radio waves, they	36
	are still there. Bit hard for me to describe it, eh?	37
Carmen	How about you teach it!	38
Oscar	<i>Gesturing.</i> You’re talking up here and the kids are down here and I’m	39
	about here! <i>Indicates a point half way between the two.</i>	40
Lucio	I’m down here! <i>Indicates a point below Oscar.</i>	41
Oscar	No, I’m lost!	42
Lytton	Well, what? Light and sound are put together because they’re ..	43
Oscar	<i>Overlapping.</i> Both a wave.	44
Lytton	They’re waves. And what are waves? Mechanisms for transmission of	45
	energy.	46
Lucio	Fine.	47
Oscar	<i>Pencil poised.</i> Right, how can we say that?	48
Lytton	They are fundamentally different sorts of waves.	49
Oscar	<i>Overlapping.</i> One’s a longitudinal and one’s ..	50

Lytton	And it happens to be that humans react to both of those, that area of the spectrum.	51 52
Lucio	<i>Overlapping.</i> Because it's easy for us to look at.	53
Lytton	And because humans react to it, that's why we've got it in a lab. We don't need detectors and stuff. We can just use our eyes and ears to see and hear it.	54 55 56
Lucio	Oh, right.	57
Lytton	So, what I'm saying to them is .. We don't ever say to them there's a bigger picture. That these two are simple ways of us describing some of this bigger picture.	58 59 60

OBSERVER: Before we look at the discussion itself, I want to point out the change in the turn-taking pattern. In the first half of the meeting, the turn-taking was very even, with Carmen slightly dominating. Now, the one who takes the most turns and the longest ones is Lytton, followed at some distance by Oscar, and then Lucio.

INTERPRETER: Previously, Carmen took the lead because of her first-hand experience of teaching the unit. Now, when the group comes up against the unknown, Lytton, the person with the most experience in science teaching takes the lead, with Oscar, as the physics specialist, also leading, and Lucio contributing as the one with the most immediate practical interest, since he is about to teach the unit.

OBSERVER: Lucio initiates two focusing moves (1, 31) in this episode, and is otherwise actively following along, as indicated by his question on waves (20-21) and a subsequent flow of brief comments (28, 31, 41, 47, 53, 57). This lengthy episode is a mixture of argument, knowledge construction and counter-argument, marked by the frequency of explicit countering with "but" (5, 8, 23, 24) and "No" (34, 35) as well as implicit countering as in "(but) really" (11, 24) and the sequences of utterances (7, 20, 31, 38, 39, 43). Lytton makes six arguing moves (8-13, 15-16, 24-27, 34-37, 54-56, 58-60); Oscar makes three distilling moves, constructing knowledge according to what has gone before (14, 17-19, 44) and two contesting moves (7, 39-40); Carmen makes one contesting (38). On a larger scale the episode is shaped by the formulation and reformulation of Lytton's position (8-13, 24-7, 43-60).

INTERPRETER: It is very much a constructivist position, wanting students to be led to make connections beyond the immediate, and looking to develop broader understandings. The others are concerned not so much about the position itself as about pedagogical issues. This has to be seen within the context of the broader curriculum development project and

participants' different interests. The three science teachers are chiefly concerned about their own knowledge and skills and face-to-face dealings with students, as in "I don't see me trying to stand up and explain that!" (7), and in the sequence beginning "How about you teach it!" (38-42, and also about whether or not content should be cut (31-33). By contrast, Lytton is concerned about making broader scientific understandings available to students, as in "Isn't the key to using light that they should be able to extrapolate [...]?" (8-11), and "We don't ever say to them there's a bigger picture" (58-60). The different emphases may not only reflect differences in experience, but also differences in job specifications. Lytton has a very small teaching load, with his main commitment to staff development and administration. The other three have nearly full teaching loads. So the curriculum development project is being constituted in different ways. The science teachers are constituting it primarily in terms of classroom teaching while Lytton is constituting it primarily in terms of curriculum goals.

OBSERVER: That may account for what seem to be instances of partial misunderstanding between them, which shape the way the talk progresses. For example Oscar's "I don't see me trying to stand up and explain that!" (7) is apparently assuming a greater depth of explanation than Lytton intended, judging by his response, "This is really a simple thing to say." (11). Another partial misunderstanding is Lucio's alarmed "You want to look at radio waves, you're saying now? Microwaves?" (20-21), which similarly assumes a greater increase in content depth than was intended, judging by Lytton's subsequent reformulation of the argument which emphasises breadth not depth (24-27).

INTERPRETER: The three science teachers are constructing Lytton's position as a demand impossible for them to meet in the classroom (7, 20-21, 38-42), and expressing their anxiety. They shift into spontaneous forms of reflection, which bring Lytton to rearticulate his opening position, elaborating it as the application of a pedagogical principle (8-13).

OBSERVER: Lytton tries to make an off-the-cuff connection back to the work on Light, and is forced to acknowledge its conceptual complexity, "Bit hard for me to describe it, eh?" (36-37). The teachers take this as an opportunity to make their concerns explicit (38-42) and the next reformulation of Lytton's argument is collaboratively developed (43-60) and achieves acceptance.

INTERPRETER: The two with the least knowledge of the subject, Lucio and Carmen, are the ones most concerned at the thought of enlarging the content scope (20-21, 23, 31-32, 33). This is not just a factor of their lack of a knowledge base in physics but of their relationship to the unit of instruction and the task itself. Carmen has a commitment to

maintaining the integrity of her original four-week unit on Light, which she previously professed herself well satisfied with. And, as Oscar reminds Lytton ten minutes further into the meeting, “Lucio’s got to teach it next week, poor fish. [...] Let’s get this one done so he’s alright.” In its immediate context, that primarily constitutes a directive towards closure on the unit before the end of the meeting and an expression of solidarity with a colleague. In the broader context of other meetings, it can also be seen as an attempt to transmit to Lytton some of the urgency the teachers associate with the curriculum development project, and their concern with completion in preference to what they call “philosophising.”²¹ This condition of their work also shaped some of the places where language was consequential.

6.3 Developing a unit of instruction: How language was consequential

The main object of the teachers’ work presented in section 2 was the development of a unit of instruction to be taught quite soon, so the pressures of teaching were part of the conditions of text production, as were the textual requirements of the curriculum framework: to indicate content selection, learning outcomes, recommended learning activities and proposed assessment. Across the episodes, the following interactive purposes contributed to achieving the object of the meeting:

- locating intended content in the matrix of Strands and Levels in the Profile document (e.g., episode 6.1)
- cross-referencing the unit to the Profile in terms of Profile Level and outcome statement (e.g., episode 6.2)
- formulating unit outcomes, to accurately express classroom intentions and to function as pointers for the achievement of a generalised Profile outcome (episodes 6.2-7)
- investigating principles for wording unit outcomes (episode 6.8)
- deciding on content (episodes 6.3 and 6. 9).

These interactive purposes together provide a frame for locating places where language was consequential in this particular meeting.

6.3.1 Developing a unit of instruction: Articulating voice and text

Achieving the interactive purposes of this meeting involved particular language strategies such as: talking about prior instruction (6.2, 6.3, 6.6-7); formulating unit outcomes (6.2-7);

²¹ Interviews and informal conversations with the science teachers. On Lytton’s own saying, he was temporarily out of touch with the pressures of teaching (personal communication in 1995 when he was teaching a full load in a different school).

negotiating differences of understanding and opinion (6.6-6.9), as in episodes 6.16-20; and negotiating choices of content (6.3 and 6.9). Most of the places where language was consequential in managing interaction that were identified in Chapter 5.3 were also present in these episodes. It was the teachers' work in "curriculum making" (Clandinin & Connelly, 1992) that provided additional places, and put a different quality of agency into the places already identified.

Curriculum making and teacher concerns

Curriculum making at Countrytown High was not entirely plain sailing, and the teachers explicitly voiced a number of concerns. These can be categorised as "self concerns," which relate to teachers' feelings in the face of professional demands, "task concerns," which focus on practicalities, and "impact concerns" which relate to the effects of teachers' actions (Hall & Hord, 1987). Most of the concerns in this scene were task concerns, relating to what content should be included or excluded (e.g., 6.2: 54-59; 6.9), how to cater for other teachers (e.g., 6.2: 52-53), differentiating levels of difficulty in the unit outcome statements (6.8: 5-10, 15-28), and what priority to give local content and formulations (e.g., 6.8). In the last episode, Lytton voiced two impact concerns: "Isn't the key to using light that they should be able to extrapolate [...]?" (6.9: 8-11), and "We don't ever say to them there's a bigger picture" (6.9: 58-60). However, his concern with impact was not matched among these recently graduated teachers, who tended towards self concerns relating to their personal capacity to understand and explain this bigger picture to Year 9 students (6.9: 7, 36-42). They were not at the time highly accomplished teachers who could be expected to

move easily between detailed information, everyday examples and larger ideas or theories. They provide connections and coherence between these levels that enable students to develop enhanced understandings. They use a variety of means to keep these big questions before their students in an exciting way so that the power and wonder of the ideas are continually emerging, thus preventing the students getting lost in the detail (National Association of Science Teachers of Australia, 2002, p. 19).

To do this in their unit, the Countrytown High teachers needed the relevant subject knowledge, such as wave properties and energy transmission; the appropriate pedagogical knowledge (Shulman, 1987a), such as the value of having students extrapolate from one area to another, and also the reason why light and sound provide a sensible introduction to waves. Episode 6.9 illustrates Hall and Hord's (1987) finding that experienced teachers tended to prioritise impact concerns, while inexperienced teachers frequently prioritised self concerns and task management concerns. However, it also suggests factors other than experience at play. These teachers' concerns were also shaped by their material circumstances, their immediate relevant context (Cornbleth, 1990), including what lay ahead each day in their workplace.

Twice in this meeting we saw the importance of having the language to gain a hearing and share a concern effectively. For example, when Lucio tried to voice an impact concern in regard to a particular kind of outcome formulation emphasising “describe” as a key student process, he was not able to put the concern into words that could be heard by the others, merely producing the word “boring” (6.7: 5), in a way that was interpreted as criticism of the teaching idea rather than of the outcome formulation. Similarly, Carmen tried to voice a task concern without ever being able to express it successfully (6.8). The successful voicing of teacher concerns was typically followed by one or other of the forms of reflection discussed in Chapter 5.3, but this did not happen when the concern went unheard.

Selecting process words for outcome statements

In this meeting, a recurrent task concern for the group as a whole related to formulating unit outcome statements in ways that accurately reflected their intentions. At such moments, language itself became an object of attention and decision making, as when the teachers were attempting to formulate outcome statements for their unit of instruction. Considerable care was accorded the selection of “generate” (6.4), “generalise” (6.5) and “differentiate” (6.6). The teachers diligently searched through the Profile for a process word that would reflect their practice in regard to generalising from observations and generating a law or principle (6.5). To generate the law of reflection students have to work out for themselves the pattern of relationships between conditions and events observed. Then, to display that knowledge for assessment they have to articulate their thinking as a scientific principle and be able to word it appropriately. The teachers all persisted in looking for the right word to reflect such processes, indicating that they saw a direct connection between the wording of the outcome statement and their classroom pedagogies, and that the former needed to represent the latter.

As part of a separate departmental project on addressing the literacy expectations in the Profile for Science, these teachers established a clear need for themselves and their students to have a better understanding of the meaning of recurrent verbal processes required in learning outcomes. Teachers in the project were concerned about students not knowing what was required in a task, and not constructing tasks in accordance with the expectations implicit in the given process. They gave examples such as students giving more information than called for and yet not addressing the question itself, or restating information rather than reconstructing it to meet the purposes of the task. Teachers noted the limited number of process items used recurrently in outcome statements and the difficulties students frequently had with some of these. They came to the conclusion that this should constitute process items as part of the learning content in science education.

[Y]ou're going to find the same words coming up, whatever level, whichever Band you look at .. And what I've found is that students do have difficulty. ... They do have problems between the words *describe* and *explain*. They do have problems with the words *listing* and *describing*. They do have problems with *comparing* and *contrasting*. And I think that the classic problem is "interpret this graph." They will say "As the time increases, so does the temperature." And nowhere is there an interpretation of the graph. ... And it would help me if I were able to, you know, to actually tell students what is the difference between those words. It would be helpful to have these keywords and some teaching strategies that we could use (Transcript c18694pm).

The teachers agreed that, "we need to be able to articulate it in order to tell our students." They wanted to know what people do when they *explain*, *identify* and so on, and "How do we know when they have done it?" They wanted to know how these processes related to each other, in terms of (a) co-occurrence, such as *compare and contrast*, (b) relative complexity, e.g., *identify* as less complex than *analyse*, although used across the whole spectrum of schooling (see Appendix 2), (c) variation according to focus, e.g., *explain why* and *explain how* and (d) subordination, e.g., *identify* as a component in *describe*, and *describe* as a component in *explain*.

The teachers' attention to process items in outcome statements suggests that they believed the wording should reflect the learning and teaching process, which for them was predominantly constructivist. It should not merely indicate the display of knowledge required for assessment purposes. This in turn clearly suggests that the teachers were well aware of language as consequential in this particular aspect of their work.

6.3.2 Developing a unit of instruction: Articulating voice and discourse

What the teachers wanted the students to achieve through this unit of work was knowledge construction, not merely knowledge reproduction. Requiring students to generate knowledge is a feature of a constructivist teaching approach, where content and pedagogy are seen as inseparable (Tobin, 1994), and where students' dialogic meaning making is valued and specifically assessed through related observable behaviour. The fact that the teachers had difficulty finding in the Profile the process items they wanted for their outcome statements suggests possible tensions between its reproductive learning discourse and their own constructivist discourses.

There were thus some discursive tensions between (a) designing outcome statements in accordance with the Profile models, and (b) designing outcome statements to reflect classroom practice. Content is dominant in the Profile outcome statements, while in a constructivist classroom, as in the constructivist discourse dominant in the Statement, content and pedagogy are inseparable.

The teachers' constructivist understandings of process items are a reminder of Whorf's notion of linguistic thinking, as "a complex of mental processes intimately associated with conceptual activity of a distinctively human and shareable kind" (Lee, 1997, p. 4). Whorf does not suggest that there is no thinking without language, but that the distinctively human style of thinking is linguistic thinking, where thought and language are integrated, not merely influencing one another as separate processes. Whorf stresses that metalinguistic awareness, and the finer calibration of agreement which it makes possible, is also crucial to the advance of science.

Such words as "analyse, compare, deduce, reason, infer, postulate, theorise, test, demonstrate" mean that, whenever [scientists do something they] talk about this thing that [they do]. As Leonard Bloomfield [1887-1949] has shown, scientific research begins with a set of sentences which point the way to certain observations and experiments, the results of which do not become fully scientific until they have been turned back into language, yielding again a set of sentences which then become the basis of further exploration into the unknown (Whorf, cited in Lee, 1997, p. 20).

I believe the teachers' concern over the process words in their outcome statements suggests an awareness of the importance of language in scientific thinking and in students' apprenticeship into the scientific discourse community.

Turning now to the authoritative nature of policy discourse, as discussed in Chapter 5, we find that the teachers understood their accountability in the education-labour relationship to require them to structure unit outcomes in accordance with the Profile outcome statements and a discourse of outcome-based education. By positioning Carmen's unit on Light as the originating source for developing outcomes for the new unit, the teachers position policy as secondary to their previous local curriculum decisions. This contradicts one rather important principle of outcome-based education – that outcome statements should precede curriculum, and be the basis of curriculum development. What the teachers are doing here is not unique to themselves, however. Research studies demonstrate that other educators sometimes "write outcomes about existing curricula instead of designing curricula that facilitate intended outcomes" (Spady, 1992, cited in Willis, 1995, p. 8). Related to this, a study by Hargreaves and Earl (2001) of 29 teachers actively engaging with outcome-based curriculum policy in Grades 7 and 8 found that "[p]lanning worked best when it moved inside out from teachers' practice and experience and their connections to students, not outside in from abstract statements" (Hargreaves & Earl, 2001, p. 36).

In the Countrytown High project, the teachers started from their own priorities, not from the policy dictates, and were thus engaged as much in "choice and action emanating from the practical" (Hannay & Seller, 1990, p. 240), as in "policy brokering" (Elmore & Sykes,

1992). Their practitioner discourse is consequently that of “curriculum making” (Clandinin & Connelly, 1992), as suggested at the start of this section.

6.3.3 Developing a unit of instruction: Language as environment, consciousness and process

As in the previous chapter, the analyses in this chapter have shown language to be consequential in three parameters of activity. Language-as-environment was constituted in the material presence of the Profile for science, and particularly in its textual representations of student learning outcomes. The textual design of the Profile document was an important factor in (a) locating the content the teachers planned to include, (b) cross-referencing the unit to the Profile in terms of Profile Level and outcome statement, and (c) constructing unit outcomes. Particularly important features included: the naming of Strands, the graphic representation of the matrix of Strands and Levels, and the linguistic structure of the outcome statements in terms of process, perspective and scope (see Table 6.1 and Table 6.2). Language-as-consciousness was central to the teachers’ discussion of process items for outcome statements, which in turn sparked places for language-as-consciousness in student learning. These same discussions extended the notion of language-as-process in teachers’ work, focusing on how it functioned in developing a unit of instruction and making connections with classroom activity.

6.4 Chapter review

The theme of the teachers’ work in this chapter was developing a unit of instruction for junior secondary science, taking account of the requirements of the Profile for science, as well as the teachers’ own pedagogical priorities. The tensions between the two placed considerable demands on the teachers’ facility with language, and the analysis of language consequentiality built on a textual analysis of relevant parts of the Profile (section 1), as well as the episodes presented in section 2. The selection of verbal processes in student outcome statements was a particular focus of tension, and was linked in section 3 to competing discourses of education. Section 3 further constructed the teachers’ work as curriculum making, as against policy brokering, highlighting teacher concerns and curriculum decision making processes.

Chapter 7

Including Aboriginal perspectives in curriculum

This chapter introduces a curriculum focus that, at the time, was still in the early stages of its development: the inclusion of Aboriginal perspectives across the school curriculum. Section 1 introduces the relevant policy and key discourses, as well as describing some culturally inclusive initiatives at Countrytown High. Section 2 shows the teachers discussing what it might mean to include Aboriginal perspectives in the science curriculum, and what some of the issues might be. The chapter concludes by locating some of the places where language was consequential in this work. Data sources include the Statement and Profile for science, transcripts from a curriculum project meeting and a professional development meeting, a diary entry from one teacher, and interviews with all participating teachers.

7.1 Including Aboriginal perspectives in curriculum: Contexts of influence and practice

To fully consider Aboriginal perspectives as a policy context for curriculum, one would need to review the whole history of Aboriginal Education in Australia, however here it is only possible to review key current educational policy and locally relevant practices. As a general framing, it needs to be said that there was conclusive evidence at the time of this study to indicate that

in general, Australian schools are not meeting all the educational needs of Aboriginal adolescents. [...] There is a documented lack of educational achievement of Aboriginal students when measured on levels of attendance, retention and attainment (Groome & Hamilton, 1995, p. xii).

Including Aboriginal perspectives across the curriculum was one strategy designed to respond to this situation. It specifically reflected Recommendation 290 of the 1991 Royal Commission into Aboriginal Deaths in Custody, “It is essential that Aboriginal viewpoints, interests, perceptions and expectations are reflected in curricula, teaching and administration of schools.”

7.1.1 Aboriginal perspectives in state education policy

Two of the nine national goals for schooling in Australia suggest reasons for the inclusion of Aboriginal perspectives. One of these goals is “[t]o promote equality of educational opportunities, and to provide for groups with special learning requirements.” The other is “[t]o provide students with an understanding of and respect for our cultural heritage including the particular cultural background of Aboriginal and ethnic groups, and for other

cultures” (Statement, pp. 43-44). This goal, using the universal plural “students,” suggests a discourse of cultural pluralism, valuing cultural diversity and opposing racial antagonisms. Those two goals encapsulate one of the key tensions in catering for diversity in student populations. On the one hand lies affirmative action for groups that are not well-catered for in mainstream schooling; on the other lies transformative action for the student community as a whole. Both of these goals are addressed in various ways in the Statement for Science, while not being addressed at all in the Profile. In other words, they are addressed in terms of curriculum content and pedagogical options, but not in terms of assessment and reporting.

Aboriginal perspectives in the Statement and Profile for science

In the Statement for Science, Aboriginal perspectives are referred to in several sections. As part of *Contexts of learning science*, teachers are encouraged to develop “[s]cience curricula which include the experiences, contributions and achievements of Aboriginal people and Torres Strait Islander people, supported by culturally sensitive teaching practices” (p. 12). Under *Key science curriculum principles for curriculum developers*, the sub-section on *Valuing ways of understanding the world* asserts the value of exploring contributions to science from diverse cultures, of relating scientific understanding to other areas of human endeavour and other ways of understanding the world. This point is then elaborated specifically in regard to Australian Indigenous peoples.

Aboriginal traditions and Torres Strait Islander traditions of knowledge production have some similarities with western scientific tradition and some differences from it. Among other things, they share a commitment to explaining and understanding the world, they both create models to explain natural phenomena, and they both use complex classification systems. There are important cultural differences, however. For instance, Aboriginal traditions and Torres Strait Islander traditions of knowledge production are less likely to be quantitatively based and less likely to separate the empirical from the aesthetic, spiritual, and social. An understanding of these ways of knowing will help teachers to treat sensitively these aspects of Aboriginal cultures and Torres Strait Islander cultures in the science curriculum (Statement, p. 9).

The extract refers to western scientific knowledge production as a singular universal “tradition,” whereas it refers to Aboriginal and Islander knowledge production as plural “traditions.” This contrasting use of singular and plural raises questions of interpretation. Which of the two is the ideal reader intended to value most? In the context of this document, it seems likely that the singular is to be valued since it suggests consistency over time and space. Similarly, the ideal reader is presumably intended to respond unfavourably to the phrase “less likely” in reference to core values of western science – quantification and empiricism. Having set this valuation up, the Statement swiftly glosses over any difficulty in the inclusion of Aboriginal perspectives within a western scientific curriculum frame by

putting the onus on teachers first to understand Indigenous ways of knowing and then to treat them sensitively.

The only advice given to teachers on how to achieve this occurs in the paragraph following the above excerpt.

Examples and contexts relevant to Aboriginal cultures and Torres Strait Islander cultures should be included in a science curriculum so that the curriculum is more relevant and accessible for Aboriginal students and Torres Strait Islander students, and increase all students' appreciation of these cultures (Statement, p. 10).

Thus the inclusion of Aboriginal perspectives is constructed only in terms of examples and contexts, the previous paragraph having already located Aboriginal and Islander knowledge production as outside the realm of science content. This view of science content is endorsed in the Profile for science since Aboriginal and Islander knowledge is not represented anywhere among the outcome statements. Borrowing a notion from Cummins (1999) used in regard to language rights among Indigenous peoples, the above quotes suggest a case of Orwellian “double-think” in the way the Statement speaks of science and Indigenous ways of knowing.

The Statement refers to western scientific knowledge production as a singular universal “tradition,” whereas it refers to Aboriginal and Islander knowledge production as plural “traditions.” While acknowledging the multiplicity of Indigenous groups is essential (Luke, Nakata, Singh & Smith, 1993), contrasting it with a singular universal, as is done here, as if there were no variation and no multiplicity of western scientific traditions, implicitly positions the singular as stronger. Similarly, when the Statement says that Aboriginal and Islander traditions of knowledge production are “less likely to separate the empirical from the aesthetic, spiritual and social,” the use of “less likely” indicates a more favoured position for western scientific traditions. Had the wording been turned around as “more likely to take a holistic and ecological view of the world, and to reject binary distinctions such as material/spiritual,” the deficit voice would have been subdued. However, such a wording might have been seen as undermining the western paradigm that was explicitly required in the brief for the Statement and Profile (Jenkins, 1992). The Statement denies scientific validity to Aboriginal and Islander ways of knowing by using wording that privileges western science, rather than a more open and less marginalising wording. This reflects research from across the world indicating that Indigenous knowledges have been framed in western curriculum documents as subjugated knowledges (Brant Castellano, 2000; Semali, 1999).

The Statement excerpt also glosses over several sources of difficulty in the inclusion of Aboriginal perspectives within a western scientific curriculum frame. For example, it refers

to three similarities in knowledge production – commitment to explanation, models of explanation, and complex classification systems – yet it fails to acknowledge that these similarities carry their own tensions, since commitment to models of explanation and classification suggests commitment to those models valued in their respective communities. Indeed, since the Statement is fully committed to the model of western science, it describes differences in knowledge production merely to require teachers to treat them sensitively. Thus, in terms of this document, Aboriginal and Islander traditions of knowledge production do not count as science. That is borne out by the fact that Aboriginal and Islander knowledge production is not represented anywhere among the outcome statements in the Profile for science, which provides the basis for assessment and reporting.

7.1.2 School context for including Aboriginal perspectives in curriculum

The Aboriginal Education program at Countrytown High included a strong Aboriginal Studies component, and a network of resource people for the Aboriginal students, including an Aboriginal Education coordinator and two part-time Aboriginal Education Workers, as well as a committed Aboriginal parent body and some well-informed and racially sensitive non-Aboriginal staff. The resource provision particularly emphasised supporting inter-cultural and inter-racial understanding across the school, supporting staff in relating to their Aboriginal students and families, developing strategies for responding to the learning and literacy needs of Aboriginal students, and supporting their participation in the social life of the classroom.

One prevalent strategy designed for students who were transient or who have missed periods of schooling or attend irregularly was to establish individual programs for students to provide an opportunity for continuity and for students to complete a cohesive unit of work. Usually Abigail, the white Aboriginal Education coordinator, set these up by working subject teachers to make the best possible links with what was being taught for the class as a whole. The students then worked on their programs under supervision in their normal classes or in the Aboriginal Studies Room.

Carmen found that when the three remote community students in her Year 8 class were away a lot, they used to lose touch with what the rest of the class was doing. She then had to decide whether to try to put them in the picture, knowing that they might not come again for a week or more, or whether to aim rather for some continuity in their individual learning and the completion of some activity that could be meaningfully assessed. The issue was exacerbated by the fact that their English language skills were not yet well developed, and reading and writing at Year 8 level was not possible for hem. To address this, Carmen began

using a series of primary school books on animals and typing out questions for the students to answer, and while she was not happy with that as a solution, she felt that it did provide a coherent piece of learning.

By the end of the book they have learned how to describe an animal, their habitat, their lifestyle – they will keep coming back to that. I notice they re-read stuff they have written before. So they are in fact getting more of a sequential, consolidated, in depth piece of work than if they were coming every few lessons [and trying to pick up on what the class is doing] (Transcript 1894.2).

The concept of individual or alternative program encouraged by Abigail and adopted by Carmen suggests that one aspect of including Aboriginal perspectives was to provide learning opportunities that students could engage with as irregular attenders and still experience a “sequential, consolidated, in depth piece of work.”

The above initiatives indicate that of the dual policy goals of affirmative action for Indigenous students and transformative action for non-Indigenous students, Countrytown High was more concerned with the former.

7.2 Teachers at work: Including Aboriginal perspectives in curriculum

NARRATOR: In this meeting of the curriculum development team, the Aboriginal Education coordinator, Abigail, has been invited to help map possible sites for including Aboriginal perspectives. Although Abigail has little science background, through in-class support of Aboriginal students and developing individual programs for some students, she does have a non-specialist familiarity with some units.

Episode 7.1 Seeking Aboriginal perspectives (1)

OSCAR	I can't see any [Aboriginal perspectives].	1
ABIGAIL	Well, this is what I want to find out and I've actually written up electricity as an individual program.	2 3
OSCAR	What you did with Amy?	4
ABIGAIL	But that is still something we could do as a class, you know.	5
OSCAR	But I think we do that kind of thing, I mean we did a “How does electricity affect you?” thing and that was the stuff we were talking about with Amy, wasn't it? About electricity at home and locating things that use electricity. But I didn't think that was taking into account an Aboriginal perspective.	6 7 8 9 10
ABIGAIL	But, I made it take that perspective because I focused on her community.	11 12

OSCAR	On purpose. Ah. And plus on her. So if you're focusing on an	13
	Aboriginal student ..	14
ABIGAIL	I didn't really have any idea of what skills, understandings you were	15
	teaching. I was just trying to get her in, I guess.	16

OBSERVER: Oscar is engaging with everything Abigail says, first contextualising it within his own experience (4, 6-10) and then finally distilling it (13-14). This is in the context of himself not having been able to find any sites for including Aboriginal perspectives in the unit (1).

INTERPRETER: What they achieve through the dialogue is a mutual understanding that Oscar's whole class learning activity can be given an Aboriginal perspective through (a) "a focus on community" (11-12) and (b) a focus on the student as an individual (13-14). Both of these require knowledge about the local Aboriginal population. For example, many of the Aboriginal students in the school live in a community settlement outside the town, but others live in the town itself. They come from different language groups, different communities, and different family experiences. All the teachers at this meeting know this, but only Lytton and Abigail have much understanding of the students' Aboriginal identities. In interview, the three science teachers readily admit that they are not always aware of their students' family and community experience, especially when students are transient or mobile. Also none of them has previously done any Aboriginal Studies or study of Aboriginal English, and none is yet familiar with the local Aboriginal groups and their traditional Lands. While Oscar knows Amy in terms of attendance and participation in classroom activity and assignments, he does not yet know her as member of an Aboriginal community. Abigail, on the other hand, does know all the Aboriginal students in his class, both as individuals and as community members.

OBSERVER: But she disclaims any attempt to teach science related skills. She asserts her goal as motivational only: "trying to get her in" (16). "Getting a student in" is a phrasing that occurs quite frequently in the teachers' talk about Aboriginal students at Countrytown High. It generally refers to helping a student become engaged with a particular learning activity or content area, but it also has shades of meaning relating to students' irregular school attendance.

INTERPRETER: One way teachers at Countrytown High have been able to "get students in" has been to do exactly what Abigail is talking about here. They focus on the student as individual and establish a personal relationship. Oscar has been doing this already with

other Aboriginal students in his classes, but Amy has been away having the baby since he took over these Year 9s.

NARRATOR: As the meeting progresses, we come across other ways teachers have been able to “get students in.” In fact, we come across one in this next episode, where the focus is on content selection and exemplification.

Episode 7.2 Seeking Aboriginal perspectives (2)

LYTTON	You could also mention alternative energy systems in remote areas:	1
	Coober Pedy has got a wind turbine, and it is working. It supplies	2
	something like between 20% and 40% of the town’s power. Then remote	3
	area stuff in general, and the Lands.	4
OSCAR	That’s something that could be put in.	5
LUCIO	It would be good to get some more detailed literature on that sort of stuff	6
	.. pamphlets.	7
ABIGAIL	Well, that’s something I could do for you.	8
LYTTON	Now, I think what Abigail is also getting at is the fact that you bother to	9
	mention some of those things .. to talk about Coober Pedy. All it has to	10
	do is spark the interest of one or a couple of kids, and they say, I come	11
	from Coober Pedy, and they might actually pipe up and say “I’ve seen	12
	the windmill, wind turbine” and say “It always breaks down” or	13
	something. But, that might be enough to .. Or they’ve come from	14
	somewhere else, and “We had a diesel generator.”	15
OSCAR	From a station or something.	16

OBSERVER: Lytton first makes a content suggestion (1-4), looking at more ways of generating electricity than were originally planned (1-5). Oscar and Lucio take this on board, although Lucio flags his unfamiliarity with the suggested content (6-7). Lytton then provides a rationale for the suggestion in terms of sparking students’ interest and offering them an opportunity to air their knowledge (9-15). He provides the rationale by mentally rehearsing, or “predictively storying,” a classroom scenario. It is a double-voiced story, peppered with ventriloquated student talk, so that it comes alive in a way that Oscar readily responds to (16).

INTERPRETER: Oscar, who grew up in a rural area, can contextualise in terms of outback stations (16), but not in terms of Aboriginal communities. City-bred Lucio can do neither, and is looking to replace personal experience with vicarious experience through some sort of written materials (6-7). Lytton is contextualising electricity in terms of the regions and

lifestyles from which most of Countrytown High’s Aboriginal students come, and with which he is familiar having lived in the area for a number of years. This is not only in line with expectations in the Statement, but with received understanding in the department about the learning styles preferred by many Aboriginal students. While cautioning against stereotypes, it is considered that “Aboriginal students respond best to contextualised learning where [...] the whole picture is taken as the starting point rather than a series of separate parts which one day may make sense” (Commonwealth Department of Employment, Education Training and Youth Affairs and the South Australian Department for Education and Children’s Services, 1996, p. 17.3).

NARRATOR: The emphasis on contextualisation and the whole picture takes the teachers now further afield into the local region.

Episode 7.3 Seeking Aboriginal perspectives (3)

LYTTON	But another area to tackle – could be politically – is the coal fields.	1
	Because there’s Dreaming. And there’s probably a [land] claim on that.	2
ABIGAIL	Oh yeah, there’s Dreaming Stories.	3
LYTTON	So the fact that there’s a big coal deposit there. Aboriginal people knew	4
	there was something interesting there, in order to create a Dreaming Story	5
	about it. I think there used to be spontaneous combustion – smoke coming	6
	out.	

OBSERVER: Lytton proposes an Aboriginal perspectives connection by linking the electricity topic to coal (1). He flags a potential political perspective through Aboriginal land claims against mining companies (2), as well as a Dreaming Story perspective (2; 4-6).

INTERPRETER: The Dreaming and the physical features of the Earth are inseparable in Aboriginal knowledge production. While the western scientific way goes “observe smoke coming from inside a hill and find the material causes behind it,” the traditional Aboriginal way goes “observe smoke coming from inside a hill and recognise the presence of a Dreaming.” When Lytton says that Aboriginal people “created” a Dreaming Story (7), he is viewing that Story from a western scientific tradition and denying the validity of the Aboriginal Dreaming tradition. Lytton’s long-standing habit of thinking scientifically dominates his more recent habit of thinking cross-culturally. On reading the transcript later on, he was immediately aware of the scientific position underlying the word “create,” and how habits of language use get in the way of keeping two mindsets running in tandem. A similar position on spiritual ways of knowing is indicated through the word “invent” used in the Statement: “Students find out about the evolution of ideas

about seasons and day and night and about some of the early stories invented to explain these events.” This, however, appears to be a firm position on the supremacy of western science and the irrelevance of spiritual views of the world in science education.

NARRATOR: Here, too, Abigail moves the teachers away from the Dreaming, bringing in a point she has already prepared.

Episode 7.4 Seeking Aboriginal perspectives (4)

ABIGAIL	The other social aspect of this unit is that the community didn't	1
	have electricity until relatively recently. Now, why didn't the	2
	community have electricity at the same time as the town? They	3
	were already settled there.	4
LYTTON	Well, it was straight racial discrimination, wasn't it?	5
ABIGAIL	Yeah, racism. And they still haven't got the same facilities. I mean,	6
	they've only just had the streets kerbed.	7
OSCAR	I haven't ever even been out there.	8
ABIGAIL	They don't have the same sewage facilities.	9
OSCAR	Can we go for a drive out there?	10
ABIGAIL	They are still on septic. They don't get their rubbish collected.	11
OSCAR	They don't?	12
LYTTON	Well, your start off point could be, "What did communities do	13
	without electricity before, historically?" And then, "What about the	14
	old white Australia pioneer people?" And then "the town," and then	15
	you say, "But the community didn't get it till 10 years later. Why	16
	not?" So, you compare what could be the classic sort of pioneer	17
	nice story to straight ..	18
OSCAR	<i>Overlapping. Racism.</i>	19
LYTTON	Racism. Institutionalised racism because it would have been a	20
	government decision not to put it out there.	21
OSCAR	Well, why did they not give them power? Did they think they didn't	22
	need it?	23

OBSERVER: Abigail is providing information about the lifeworld of the local Aboriginal community situated outside the town (1-4, 6-7, 9, 11), information which is evidently quite new to Oscar and engages him (8, 10, 12, 22-23). It also leads Lytton to rehearse a politicised storyline for the unit of work (13-21).

INTERPRETER: Lytton refers to “institutional racism,” showing himself to be in touch with theorisations differentiating it from individual racism and cultural racism (e.g., Hall, 1990; Troyna & Rizvi, 1997) and constructing it in terms of structures and policies designed to maintain the advantages held by the dominant social group (Rizvi, 1993). By constructing institutional racism as an Aboriginal perspective in subject science (5, 6, 19, 20), the teachers are in line with the Statement’s position that “All students should be able to critique developments in science and to examine the social implications of science ideas and their likely applications” (p. 13).

At the same time, the teachers are also constructing the community as an “other” world. The sense of distance between the world of Countrytown and the world of the Aboriginal community is symbolised by the phrase “out there” (8, 10, 21) used even though the community is only a ten-minute drive from the school. The point is that, while the physical distance and time to go there is not great, for a non-Aboriginal person to go there needs an invitation and a personal connection of some kind; it would not be at all appropriate to simply drive in and look around.

OBSERVER: Oscar twice attempts to gain a hearing for his wish to personally visit the community. He makes the attempt indirectly the first time (8) and as a direct request the second time (10). There is no response.

INTERPRETER: In fact, Oscar comes back to the idea of visiting twice more in this meeting, being quite explicit in his last attempt to gain a hearing. “I think it’s important that we should go out. The science teacher should have an actual look. I’ve never been out there.” This finally wins him an answer. He is told that the Aboriginal Education Worker who drives the school bus will take him “out there.” This is perhaps not quite the support he is looking for. It seems to me he is asking for a structured and institutionally supported means of crossing a cultural boundary and getting himself into unknown territory.

OBSERVER: There is evidence for that in his assertion that “The science teacher should have a look.” Both the generalising use of “the” and the appraising use of “should” suggest that he sees a visit as a professional requirement for all of them, and therefore something which the institution should support.

INTERPRETER: But telling him the AEW will take him puts the onus on Oscar to initiate action, and does not take account of his uncertainty about the visit and his concern about treading on Aboriginal sensitivities.

Episode 7.5 Negotiating uncertainty about discussing racism in class

OSCAR	If you're going to talk about it to the kids, you'll have to be very clear about what you're going to say.	1 2
ABIGAIL	But what you do is you get the Aboriginal people from the community to come in and talk about it. Don't attempt to do that sort of stuff by yourself. I'm really nervous about that happening.	3 4 5
OSCAR	I know. That's what I was just thinking, the same thing.	6
ABIGAIL	And there's plenty of people out there that are clear.	7
OSCAR	But are those people that will come in .. Are they going to put across .. obviously that they were hard done by and stuff .. but are they racist against the white people?	8 9 10
ABIGAIL	Well, I've had quite a few guest speakers come in and they've never really been. I mean you have to tell them what you want them to talk about. You don't want a scientific presentation from them, you just want a social .. a history of when they lived at the community. So, give them a stretch of time. OK, back in the 1950s, what was it like for you? And compared to 1990s. Just give them a short little thing to think about and talk to the class.	11 12 13 14 15 16 17
OSCAR	It just seems that if there are kids in the class whose parents didn't have electricity, and they're white, then their parents would be just as good to come and talk about the same thing.	18 19 20
ABIGAIL	No, not necessarily, because what we're talking about here is not individual, we're talking about two communities. Two separate big communities. Not individual cases.	21 22 23
LYTTON	Maybe that's the way to introduce it? Is to get some people from the community to say what did happen before. And then you slyly, quietly slip in the fact that ..	24 25 26
OSCAR	But that's what I want to focus on. It's that, rather than the government said "We're not giving it here." Focus on the electricity and what it was like without electricity rather than the politics of the whole.	27 28 29 30
ABIGAIL	It's not really the politics, it's the social aspect of it.	31
LYTTON	What we're skirting around now is that Science and Technology has a cultural baggage.	32 33

OSCAR	Yeah.	34
LYTTON	And some of it ..	35
OSCAR	Is it appropriate to bring it up?	36
ABIGAIL	It's brought up in other subjects across the curriculum, I can't see why science ..	37 38
LYTTON	Yeah, you have got to address it.	39
ABIGAIL	Of course you do.	40
LYTTON	And the easiest way you can say it is "That happened and the two councils are trying to fix it all, to upgrade the facilities."	41 42
OSCAR	Yeah, I know. And if I could say it like that, well, that's fine. Like quickly.	43 44
LYTTON	The difference is blaming. What you've got to say is "It happened." It's no one's fault. Or you present the historical facts and wait for the kids to ask the question "Why this time lag?" And then you throw it back to them and say "What do you think?" And that's another way of tackling it. Honestly, I agree with you. I've not ever tried to tackle it myself.	45 46 47 48 49 50
OSCAR	No, it just worries me a bit, that's all.	51
ABIGAIL	Of course it's going to worry you, but you can't keep saying "Well, I'm not going to talk about it."	52 53
OSCAR	I mean, if the kids bring it up and talk about it. You can't, you don't shun it. Obviously. It just worries me that it's not going to be done right.	54 55 56

OBSERVER: Oscar is consistently expressing anxiety about mentioning racial politics in the classroom (1-2, 6, 8-10, 18-20, 27-30, 36, 43-44, 51, 54-56). He is familiar with and accepts the idea that science has a cultural baggage (32-34) but is making clear that he does not know how to deal with it. He is concerned that things should be "done right" (55-56).

INTERPRETER: That concern about doing things right came up several times in interviews with him over the year and is clearly a personal and professional characteristic. Not long after this meeting, I asked Lytton how he himself would present the time lag between town and community access to electricity. "Hard one," he replied. "I'd present it that part of the thinking of the time was that Aboriginal people didn't need electricity because they were desert people, nomadic. I'd also want to go the next step .. asking students to see if

there are parallels in what is happening now, for example in medical provisions, number of eye problems, AIDS, etc.” While Lytton has the knowledge and confidence to do this, Oscar clearly does not. Nevertheless, the policy position is that “All students should be able to critique developments in science and to examine the social implications of science ideas and their likely applications” (Statement, p. 13). However, this raises another dilemma, also implicit in this episode, which is the question of how much weighting should be given to social content in science.

OBSERVER: Oscar does not seem to want to weight it at all (18-20, 27-28, 36), preferring to focus on what electricity does in daily life (27-30). He has a unit outcome in mind, which is that students “Write a story comparing their energy use and way of life with that of 100 years ago.” This is one of the pointers under the Profile outcome 4.4 “Compares energy options available for particular purposes in the community.”

INTERPRETER: Both the outcome and the indicator assume generalised sociocultural norms: a unified way of life 100 years ago, and a unified community now and then. There is no immediately visible space either for diverse experiences among different groups of people, or for issues of racism. This allows Oscar to voice the view that white parents “would be just as good” to talk about life without electricity (18-20), but Abigail counters that view by distinguishing between whole communities and individual cases (21-23). This would seem to be a key principle underpinning her understanding of Aboriginal curriculum perspectives.

OBSERVER: Frequently in this episode, Oscar is putting forward a personal view on the issues, and it is being responded to by advice or counter view, either by Abigail (3-5, 7, 11-17, 21-23, 31, 37-38, 40, 52-53) or Lytton (24-26, 32-33, 39, 42-42, 45-50). In this episode the two coordinators are not only making space for diversity and racism, they are putting pressure on Oscar (37-40), giving quite a bit of practical advice (3-5, 8, 11-17, 24-26, 41-42, 45-48), and also showing their awareness of the difficulties inherent in dealing with it (3-5, 27, 49-50, 52).

INTERPRETER: The key issue is whether or not it is appropriate for science teachers to discuss the cultural baggage attached to science (32-40). Oscar sees this as politicising science (29), whereas Abigail sees it as incorporating the social aspect of science (31). A pedagogical element at issue involves how to manage possible anti-white attitudes and blame (9-10, 45-46). Recommended strategic elements for conflict avoidance include: the importance of Aboriginal people as information providers (3-4), the importance of non-Aboriginal teachers holding back on presenting Aboriginal experience (4-7), using the classroom majority white experience in preference to black experience (18-20), playing

down information which might cause disagreement “you slyly, quietly slip in the fact that” (25-26) and avoiding blame or fault (45-46). The teachers’ discussions here show them to be grappling with racism as a complex concept, adding an additional dimension to Lytton’s earlier concern (episode 6.9: 58-60) that students should be shown “the bigger picture.”

NARRATOR: Later on, as the meeting winds up, Carmen wants to know where their ideas on Aboriginal perspectives are taking them in terms of the curriculum development project.

Episode 7.6 Including Aboriginal perspectives in the curriculum outline

CARMEN	These ideas that we’ve got. Are we now going to add this in as .. Where do the ideas go into the units that we’ve already typed up?	1 2
OSCAR	Yes, we want to. We’ll put, I don’t think they’ll be outcomes, as such.	3
LYTTON	No, OUR outcomes.	4
LUCIO	We can still address their outcomes.	5
LYTTON	The outcomes in the National Profile talks about “cultural differences,” or something anyway. ²¹ So you can simply write it in that “science is viewed from a second cultural perspective” or something.	6 7 8
OSCAR	But when we put in a possible lesson plan and stuff, we could say this is one way .. If you have this type of class, this is perhaps a good way to make this part of the course culturally inclusive to those Aboriginal kids you’ve got.	9 10 11
ABIGAIL	Yeah, I mean it’s not going to suit all classes.	12

OBSERVER: Carmen’s initiating move (1-2) sparks off a discussion about how their ideas on Aboriginal perspectives count in terms of the curriculum outline – as unit outcomes (3-4), as broader outcomes (5-8), or as pedagogical options (9-11). Lytton appears to be suggesting initially (4) that some of the ideas could be included in unit outcomes, but this is lost as he goes on to propose a generalised phrase to conform with the curriculum policy (7-8). Oscar then locates Aboriginal perspectives at the level of a sample lesson plan, constructing them as optional content, not core content, which is endorsed by Abigail (12).

INTERPRETER: In other words, they decide that Aboriginal perspectives in science need only be included in classes with Aboriginal students, as affirmative action, but not as part of cultural learning for all students, as transformative action. Thus they are addressing only one of the relevant national goals for schooling that frame the Statement for science. In

²¹ It is in fact the Statement that makes such a reference, there is no reference at all in the Profile outcomes.

addition, they are constructing Aboriginal perspectives as illustrative content, not core content, and thus limiting the scope of their inclusion.

NARRATOR: Confining Aboriginal perspectives to illustrative content comes up again four weeks later, when the three science teachers are mapping out a unit of work on rock formation. Oscar suggests including something on “how the [range] relates to the Aboriginal people .. its SPIRITUAL meaning.” However, the others are uncomfortable with the idea, and it falls by the wayside. A locally experienced colleague intervenes from the other side of the staffroom to tell them how the Aboriginal people traditionally used igneous rocks for making their implements, since sedimentary rocks were too brittle, and how they used sedimentary rocks such as ochre for preparing body decoration pigments. The teachers are excited to find what they see as a scientifically relevant Aboriginal perspective.

However, when trying to formulate an outcome statement they run across difficulties. The first attempt reads: “Identify uses of each type of rock from an Aboriginal perspective.” Carmen suggests that it should read “Aboriginal and EUROPEAN perspective,” and Oscar responds with “Let’s not include it then. Right? We’ll put it in BRACKETS.” There is an interruption at this point, and when they re-focus, Carmen asks if Oscar has written both, and is told that the outcome now reads “Identify uses of rocks (include Aboriginal perspectives).” Carmen sounds concerned: “Noo! Then it makes it sound as if it was tacked on .. just put Aboriginal and European.” But Oscar’s response is negative: “Well then, why put it at all?” Carmen retreats, speaking sharply and rapidly: “Right, doesn’t matter. Alright.” But then Lucio comes in to keep the debate open, and shortly after Carmen tries to put her position more clearly: “We should really put ‘Include European perspective.’ It sounds demeaning, to them, I think. You know, like, taken on: ‘And don’t forget the Aboriginals’.” Oscar was clearly at a loss as to how to respond: “Well, what do you want me to put? ‘Include Aboriginal and European perspective.’ But that just ..” There was another interruption at this point, and they come back to the issue in the episode below.

Episode 7.7 Inscribing Aboriginal perspectives in an outcome? (1)

CARMEN	We haven’t actually mentioned Aboriginal perspective in there, have we?	1
	What do you think?	2
OSCAR	We do, we mention it.	3
CARMEN	<i>Light tone.</i> We’ve got YOUR racist statement there.	4
OSCAR	<i>Softly.</i> Ohh, it’s not racist! For Christ’s sake. It’s only racist ..	5
CARMEN	<i>Lightly.</i> Sacreligious.	6

OSCAR	Oh, and sacreligious then too.	7
CARMEN	<i>Conciliatory tone.</i> Alright, so are you going to mention something about spiritual ..	8 9
OSCAR	Yep.	10
CARMEN	Some of the Dreamtime stories .. or ..	11
OSCAR	How can we put that in an outcome?	12
CARMEN	“Students can write their own Dreamtime story based on the original Aboriginal ..”	13 14
LUCIO	<i>Laughs.</i>	15
OSCAR	Oh, if that’s not bloody .. racist!	16
CARMEN	<i>Astonished.</i> No-oh! That’s not! How can you say that? How on earth can you possibly say that?	17 18
OSCAR	<i>Raising his voice aggressively.</i> Why CHANGE it?	19
LUCIO	<i>Whistles for peace.</i>	20
OSCAR	<i>Increasing volume.</i> Why make FUN of Aboriginal ..?	21
LUCIO	<i>In a steady tone.</i> Hang on, chaps!	22
OSCAR	<i>Maintaining volume.</i> By getting every kid to make UP one!	23
LUCIO	<i>Loudly.</i> Stop fucking arguing!	24
OSCAR	<i>Marginally reducing volume.</i> As if they’re made UP!	25
LUCIO	<i>With heavy calmness.</i> Oscar .. What was .. In Year 8 Maths, right? We had to do the Aboriginal flag for design and construction.	26 27
OSCAR	<i>Curtly.</i> True.	28
LUCIO	What was the outcome for that?	29
OSCAR	<i>Grumpily.</i> It wasn’t an outcome based on Aboriginal .. it was the Design and Construction outcome. All we did was put in that, so it made some relevance to the Aboriginal kids.	30 32 33
CARMEN	Yeah	34
OSCAR	It was something we programmed, not something we outcomed.	35
LUCIO	OK.	36
OSCAR	We don’t need to put anything.	37
LUCIO	So we PROGRAMMED in there ..	38
OSCAR	We’re not .. this isn’t a PROGRAM.	39
LUCIO	I know it’s not ..	40
CARMEN	<i>Simultaneously.</i> Oh Oscar.	41
LUCIO	I know it’s not, I’m just saying .. We need to program so we DO include the Aboriginal perspective, rather than put it in as outcomes.	42 43

CARMEN	Yeah, perhaps you're right.	44
OSCAR	I totally agree.	45

OBSERVER: Labelling Oscar's outcome statement "racist" (4) is yet another attempt by Carmen to make herself understood, but even though she did not name Oscar himself as racist, he reacts strongly (5, 7). Carmen then lets it go abruptly (8) and shifts the talk towards Oscar's earlier suggestion for making a connection with Aboriginal spiritual connection with place.

INTERPRETER: The move both sounds like and appears to function as a conciliatory move, recognising a mistake in dialogic interchange. Her earlier attempts to make herself understood built on multiple experiences as a feminist of critically deconstructing similar wordings in regard to women, particularly women in science. Calling the statement racist was evidently a last resort.

OBSERVER: Carmen's conciliatory move leads her into an ill-considered off-the-cuff suggestion for an outcome relating to students writing their own Dreamtime story (13-14).

INTERPRETER: That is something which has sometimes been done in primary schools in South Australia, with the approval of some of the Aboriginal staff in the Aboriginal Education Unit and in schools.²² The reasoning is that in this way at least the Dreaming Story is validated as oral text and at least non-Aboriginal students come in contact with the Dreaming through this approach and are encouraged to read the traditional Stories and see them as part of their country. However, it is not an approach encouraged in recent years.

OBSERVER: Oscar quickly stigmatises the idea as racist (16), and raises his voice to argue against it (16, 19, 21, 23, 25). Carmen is completely silenced, and Lucio tries to restore peace and find a way out of the impasse. Lucio takes them back to a unit of Maths instruction they have all taught (26-27), and asks what the intended outcome was (29), thereby encouraging Oscar to reflect (30-35).

INTERPRETER: Lucio has provided Oscar with the opportunity to make a distinction between core content, on the one hand, and the use of the Aboriginal flag as a vehicle for teaching that content, on the other. In this way they establish the Aboriginal perspective as merely illustrative content, not core content. This justifies seeing it as content that should not be

²²Personal communication: South Australian Aboriginal Education Unit librarian

“outcomed,” as Oscar put it (35), but merely included in the program as one possible interpretation of the outcome. In this way, an opportunity is lost to make an Aboriginal perspective evident and valued as content.

NARRATOR: The teachers continue their work and shortly afterwards Oscar suggests another outcome statement, which this time does incorporate an Aboriginal perspective.

Episode 7.8 Inscribing Aboriginal perspectives in an outcome? (2)

OSCAR	How about “Describe the formation of the Ranges” and that would be	1
	“from scientific and Aboriginal perspectives”? I mean “scientific” is the	2
	plate tectonics, “Aboriginal” is the big snake.	3
CARMEN	Haven’t we just agreed that we weren’t going to put it in the outcomes?	4
OSCAR	Ah, well, you’re right. We don’t have to. I just thought it might be a good	5
	idea to. We could put that in without sounding racist.	6

OBSERVER: Oscar appears to be making a conciliatory move towards the others by proposing the wording “from scientific and Aboriginal perspectives” (2-3) as a formulation that would not risk “sounding racist” (6).

INTERPRETER: And in doing that, he sets up the possibility of formulating an outcome statement to include reference to Aboriginal perspectives in the *scope* component that concludes the sentence (see section 1.1). This is a possibility that was open to them before, but language failed them. For example, they could have written “Identify uses for each type of rock in traditional Aboriginal and European lifestyles,” or something to that effect. The reason why language failed them may in part have been their fixation on the term “Aboriginal perspectives” as being the only way they could refer to Aboriginal knowledge and experience. In this instance, by constructing “Aboriginal perspectives” in opposition to “scientific perspectives,” the formulation does in fact lay itself open to “sounding racist,” certainly to ears attuned to the domination of western scientific discourses.

NARRATOR: Later on, when Oscar actually comes to teach the unit, he encounters a different kind of issue, which he raises during a professional development workshop on critical literacy in science, nine weeks after episodes 7.1-6 and five weeks after episodes 7.7-8.

Episode 7.9 *Sharing concerns about including Aboriginal perspectives*

OSCAR	I'm teaching rock formation at the moment. And I started talking about	1
	Ayers Rock ²³ and about how it's solidified magma and all the topsoil is	2
	eroded away, and whatever whatever. And then I thought, "Well, the	3
	Aboriginal kids, I wonder what they're thinking." You know, they've been	4
	brought up to think it's a .. a wombat or I don't know .. I don't know the	5
	Aboriginal Dreamtime ²⁴ about Ayers Rock, but I'm sure it's something	6
	about a mythical animal of some sort that has .. I think ..	7
OTHER	But it's not been a MYTHICAL story for this particular group.	8
OSCAR	Yes. Well, it's going to be different for perhaps different groups of	9
	Aboriginals and we've got different groups of Aboriginals here all at the	10
	one school.	11
OTHERS	Yes. Yes.	12
OSCAR	And it just made me wonder whether, for them, what I was saying was	13
	questioning their actual CULTURE. Whether they take that and think:	14
	"Well, who do I believe? Do I go home and say, "Well, listen, you're	15
	wrong." I think that's a problem.	16

²³ Ayers Rock is the colonial name for Uluru, one of the most sacred sites of Aboriginal culture, situated in the very heart of the continent. Many educators now use the name Uluru in acknowledgement of Aboriginal Australia.

²⁴ Using the term Dreamtime to refer to Aboriginal creative epoch has a long history and is still widely accepted, although the more recent term Dreaming is more accurate (Stanner, 1987), and the one generally used by people working in Aboriginal studies. Mudrooroo (1995) says there is no adequate English rendering for this "complex metaphysical and spiritual concept" (p. 41), but the reasons for replacing Dreamtime with Dreaming are particularly relevant to Oscar's teaching topic – rock formation. Edwards (1994) says Stanner proposed the name change in acknowledgement of the fact that the Aboriginal creative epoch cannot be understood within a Western framework of linear time. While there is a sense in which The Dreaming activities occurred at the beginning of the world, and are past, there is a sense also in which they are still present. Through ritual, humans are able to enter into a direct relationship with The Dreaming. The Aboriginal concept of time is therefore cyclic, rather than linear, but in the sense that each generation is able to experience the present reality of The Dreaming (Edwards, 1994, p. 67).

Since the scientific account of rock formation works in linear time, it runs contrary to Aboriginal cyclic time. The scientific account is a closed system, whereas the Dreaming is an open system, which over the millennia has been able to account for many changes in landforms, animal and plant life, and climate. The concept of The Dreaming does not assume the creation of the world from nothing, a *creatio ex nihilo*. It assumes a pre-existent substance, often described as a watery expanse or a featureless plain. Spirit Beings lay dormant under the surface of this substance. [...] The Spirit Beings, on emerging from the formless substance, moved over the surface of the earth. [...] As they travelled, they and their tracks, artefacts and activities were transformed into the rocks, mountains, waterholes, caves, sandhills, trees, watercourses, stars and the other phenomena of the environment. [...] The whole of the landscape is conceived as having been formed through the activities of the Spirit Beings. The whole environment is viewed as the arena in which the dramatic events of The Dreaming were and are enacted (Edwards, 1994, p. 68).

Thus, another feature of the scientific account that runs contrary to the Dreaming is the separation of the material and the spiritual, the geological construction of inorganic rock and the cultural construction of manifold power. The scientist's understanding of how Uluru was formed originates in a world where the spiritual is separated from the material and where time has linear value. The Aboriginal understanding of how it was formed originates in a world where "[o]ur connection to all things natural is spiritual" (Silas Roberts, as Chairman of the Northern Land Council, cited in Edwards, 1994, p. 65), where the spiritual and natural are one and where time has a cyclic value.

	Maybe it's not even that. It might just be, if you're talking about a sacred	17
PRESENTER	site of another culture, then HOW you actually talk about that cultural site,	18
	you can actually be stepping on certain protocols and certain	19
	understandings that that cultural group actually has. It mightn't be a direct	20
	attack on their understanding.	21
OSCAR	And I just couldn't see how I could get around it. I mean, I could ask for	22
	their Stories ²⁵ and all that type of stuff, but when it comes down to it, I	23
	think what I believe is FACT is not perhaps what the Aboriginal culture	24
	sees as fact for that particular rock formation. And I wasn't quite sure how	25
	to tackle it. And I didn't know, if I showed them both, and the kids go,	26
	"Well, which one do you think?" And I think, "Well, the scientist	27
	KNOWS."	

OBSERVER: Oscar begins by rehearsing a recent classroom concern and his reflections at the time (3-7, 13-16, 22-27), identifying the concern explicitly as he nears the end. His speech is marked by frequent use of terms indicating mental processes, chiefly "think" (3, 4, 5, 7, 14, 16, 23, 27), along with "wonder" (13), "see" (22, 24), "know" (5, 26, 27), "believe" (15, 24), and "question" (14).

INTERPRETER: He is both reporting on his reflections and reflecting-in-action, in other words in the action of talking with peers. He is speaking from a western scientific position, which, on the basis of scientific evidence, allows him to "know" incontrovertibly the formation of Uluru. He intimates that he would be unable to present both views and respond to student demands for a truth without implicitly devaluing the Aboriginal perspective. And that is the crux of the problem. While the Statement affirms that an understanding of Aboriginal ways of knowing "will help teachers to treat sensitively these aspects of Aboriginal cultures" (p. 9), Oscar has concerns about how that can be done.

OBSERVER: Sensitive treatment is what is at issue, it seems, when one of the participants picks Oscar up (8) on his use of the word "mythical" (7), in reference to Aboriginal creation beliefs.

INTERPRETER: There are several issues that Oscar is grappling with in that regard. One is truth and who holds the truth (4-7, 24-27). For Oscar, the scientist holds the truth (27), whereas the Aboriginal Dreaming varies according to different regional groups (9) and is

²⁵ The use of the word "Story" in reference to Aboriginal creation accounts is sanctioned by Aboriginal people within the broader frame of spirituality, and is capitalised to indicate that frame.

a matter of myth (7, 23). (This latter view is inconsistent with what he said to Carmen in episode 7.7 about the Dreaming Stories not being “made up,” indicating a certain confusion.) Other issues he is grappling with relate to different cultural ways of knowing, the student-school-family relationship, the importance of being socially inclusive, and issues in talking about sacred sites. He is concerned about questioning or undermining the culture of an Aboriginal student through presenting scientific knowledge as absolute truth (3-4, 13-16, 22). In part, this concern reflects a wider societal move towards reconciliation following 200 years of colonial history, and in part it reflects the history of western science and its stance divorced from spirituality.

Oscar is also concerned about teacher accountability and integrity, which leads us back to the frames provided by curriculum policy, where we find not one unified frame, but two contradictory frames (see 1.1). On the one hand, the Profile requires the teacher to present and assess western scientific knowledge about rock formation, which runs counter to Aboriginal knowledge. On the other hand, the Statement requires the teacher to “use examples and contexts relevant to Aboriginal cultures” (Statement, p. 10). Oscar’s dilemma shows that this is not a straightforward requirement. While Uluru/Ayers Rock is undoubtedly “relevant” to Aboriginal cultures, use of it to illustrate a teaching point may well be culturally inappropriate. Since it is a sacred site, teachers may be contravening certain protocols in the way they talk about it, and these may be different for different groups of students. Given Oscar’s concerns, the term “relevant” in the Statement would seem to need clarification.

NARRATOR: Like Oscar, Carmen at this time also reflects on her own practice in regard to including Aboriginal perspectives. She recounts one experience, regarding classification, in her term two diary.

Episode 7.10 Diary entry: “Classifying” cross-culturally

With my Yr. 8’s we were discussing the differences between living and non-living. I had given them the 10 or so criteria for living things, e.g., can reproduce, need oxygen (most). Then I put up an overhead with a series of twenty things for them to identify as either living or non-living. After they had time to complete the table I went through it. We discussed the criteria used to classify living organisms (a few kids LOVED to confuse this word with ORGASMS - such sexually sophisticated humour is scary!!). When we got to the Earth, I said it was non-living - and Abigail challenged me. I was somewhat mortified – how dare she challenge a science teacher!! It made me realise how I was virtually indoctrinating the students – I was horrified. Here I am thinking I’m so “critically aware” - and I’m not. Oh dear!

OBSERVER: Carmen recounts her experience in classic narrative style: setting the scene, introducing the complication “I said it was non-living – and Abigail challenged me,” and leading up to the resolution in terms of her own shift in understanding and her self-judgement.

INTERPRETER: This needs to be understood in terms of Carmen’s three-fold professional persona – as science specialist, as recently graduated teacher, and as lacking an education in Aboriginal perspectives. As a science specialist, she knows the blurry edges of the living/non-living distinction in current versions of western science. As a recently graduated teacher, she is learning how to present information in ways appropriate to the Year Level. Lacking an education in Aboriginal perspectives, she has not yet encountered the cultural exclusiveness of many of the distinctions made in western science. And that is the root of the problem. Her teacher education has not prepared her to be on the lookout for such cultural assumptions, nor to recognise them without help. As a professional, she accepts the information given by her colleague, despite her mortification, and shifts her own perspective, helped perhaps by her feminist history and her developing practice of critical awareness. In these episodes, she and Oscar are both confronting their own racial heritage and its potential effects on their practice.

7.3 Including Aboriginal perspectives in curriculum: How language was consequential

The teachers’ main object across the episodes was to take account of the policy requirement to include Aboriginal perspectives in the curriculum, and to do that in ways relevant to the school’s racial composition – the 19% Aboriginal student population in Years 8 and 9, many of whom exhibited low participation and irregular attendance. The three science teachers were very aware of their own limited understanding of Aboriginal communities, ideologies and practices. Knowledge generation was therefore a key sub-goal across the episodes, as indicated in the dominant interactive purposes:

- identifying curriculum sites for the inclusion of Aboriginal perspectives
- exploring the meaning of Aboriginal perspectives in curriculum
- clarifying teaching practice in regard to the inclusion of Aboriginal perspectives
- airing and addressing concerns about including Aboriginal perspectives in science.

In the early episodes the teachers were making conscious efforts to incorporate Aboriginal knowledges into the science curriculum, mainly by developing examples and contexts familiar to their Aboriginal students (episodes 7.2 and 7.3-7).

7.3.1 Including Aboriginal perspectives in curriculum: Articulating voice and text

At the meeting represented in episodes 7.1-6, the key focus was the inclusion of Aboriginal perspectives in curriculum content. In the Statement for science, content inclusion was constructed textually as: “the experiences, contributions and achievements of Aboriginal people and Torres Strait Islander people” (p. 12), “traditions of knowledge production” and “ways of knowing” (p. 9), and also “examples and contexts relevant to Aboriginal cultures and Torres Strait Islander cultures” (p. 10). In the teachers’ work episodes, it was such “examples and contexts” that were the starting point of the discussion, redolent of Recommendation 290 of the 1991 Royal Commission into Aboriginal Deaths in Custody, which specified “Aboriginal viewpoints, interests, perceptions and expectations.” Teachers referred to Aboriginal viewpoints on and perceptions of geological features (episodes 7.3, 7.8-10), energy systems (7.1-2), uses of different kinds of rocks (7.7), classification criteria (7.10), Aboriginal socio-political interests in regard to institutional racism (7.4), and Aboriginal expectations in regard to social services such as electricity provision (7.4). Through such content inclusion, the teachers were clearly attempting to meet Aboriginal expectations for an educational provision that would make space for their funds of knowledge (Moll, Amanti, Neff, & González, 1992).

During this meeting, the teachers had no policy document to refer to, and so were not making meanings from printed text as they did in regard to the Statement and Profile in Chapters 5 and 6. Here, the policy presence took the form of the slogan “including Aboriginal perspectives” or, as Oscar put it (episode 7.1: 9-10), “taking account of an Aboriginal perspective.” This policy presence was additionally channelled through the voices of the Aboriginal Education coordinator and the Acting Junior Secondary Curriculum coordinator (Lytton), their positions and knowledge giving their utterances extra force, through what Fairclough (1989) calls “power *behind* language.” As Ball (1994) points out, some policy texts may not be read by the teachers who are to implement them, but are mediated by another staff member whose role demands a good understanding (p. 17). Through their mediating role, both these teachers were providing a professional development opportunity for the science teachers. They took longer turns and spoke authoritatively, initiating topics (episodes 7.2: 1-4, 9-15 and 7.3-4) and responding to concerns expressed by the science teachers (episodes 7.1, 7.5-6), mainly Oscar.

The teacher concerns can be grouped according to the types proposed by Hall and Hord (1987) and discussed in Chapters 2.3.3 and 6.3.1. Task concerns included Lucio wanting information about alternative energy sources in remote areas (episode 7.2: 6-7), and Carmen wanting to capture their ideas in the curriculum outline (7.6). Impact concerns emphasised

(a) student participation, e.g., in episode 7.1 Abigail emphasised wanting to “get her in,” and in episode 7.2: 9-15 Lytton mentioned the need to “spark the interest” of students, and (b) the treatment of Aboriginal perspectives related to curriculum content.

The impact of this latter was the cause of particular concern and anxiety to Oscar. For example in the case of introducing what Lytton referred to as the “cultural baggage” (7.5: 33) of science and institutionalised racism (7.4: 20), he was concerned about the need “to be very clear about what you’re going to say” (7.5: 1-2), about possible anti-white attitudes from Aboriginal people coming in from the community (7.5: 10), and about whether it was “appropriate to bring it up”

(7.5: 36) or to focus on “the politics” (7.5: 30).²⁶ He summed up his concerns with: “It just worries me that it’s not going to be done right (7.5: 55-56). Both Abigail and Lytton were adamant that the cultural baggage of science did have to be addressed as an integral part of including Aboriginal perspectives in the curriculum (7.5: 21-23, 32-33, 37-40, 52-53). A related impact concern came up nine weeks later as Oscar reflected on the incompatibility between what he believes to be fact – what “the scientist KNOWS” (7.9: 27) – and “what the Aboriginal culture sees as fact for that particular rock formation” (7.9: 24-25). This links to a broader concern regarding teacher respect for students’ understandings of natural phenomena and the issue of correcting them if they are scientifically wrong (Jenkins, 2000, p. 602).

Oscar again evidenced a related impact concern in his outburst regarding the construction of Aboriginal Dreaming Stories as “made up” (7.7: 16-25), as did Carmen in her concern about “indoctrinating” her students through her lack of awareness in categorising the Earth as non-living (7.10). Both Oscar and Carmen were concerned about imposing a Eurocentric worldview on knowledge – what Battiste (2000) calls “cognitive imperialism” and Rains (1999) calls “intellectual apartheid.” As the examples indicate, the use of emotive terms by the teachers was a distinctive textual feature of these impact concerns, indicating that self concerns were also at play.

In addressing task and impact concerns, the teachers used various forms of reflection and persuasion. Several episodes included enquiry forms of reflection linked with replay and rehearsal as a means of contextualising ideas. Episode 7.1, for example, started off with enquiry and moved to replay, while episode 7.2 involved rehearsal and episode 7.5 a

²⁶ Incorporating political issues in the science curriculum assumes the Aboriginal students’ willingness to participate in critical investigation. However, in interview (Department of Employment, Education, Training and Youth Affairs, 1996), two experienced researchers, W. Baarda and R. Hoogenraad separately suggest that Aboriginal students may not wish to participate, given that in Aboriginal communities moral, ethical and social issues may be spoken of primarily through community procedures where making judgements is confined to particular senior members. The sort of discussion proposed in episode 7.5 may therefore be more familiar and acceptable to non-Aboriginal than Aboriginal students, and therefore participation might well be unequal and white perspectives dominant.

reflective replay. Forms of persuasion used by Abigail and Lytton as authoritative voices included suggestion (7.2: 1, 9; 7.3: 1; 7.4: 13; 7.5: 3-4, 12-17, 24-5, 41-42, 45-49, 7.6: 7-8) and assertions (7.5: 21-23, 32-33, 37-40, 52-53, 7.6: 12). These were typically successful. Forms of persuasion used by the three science teachers similarly included suggestions and assertions, but not voiced with the same authority and dignity, and frequently without success. For example, Oscar's suggestions for a visit to the nearby Aboriginal community, whether indirect (7.4: 8) or direct (7.4: 10), were not given a hearing, and he had to make two further attempts. Likewise Carmen's suggestions for formulating an inclusive outcome statement were not taken up, and her assertion that the formulation was racist (7.7: 4) was certainly not successful. Lucio's appeals for calm during the ensuing argument were quite ineffectual (7.7: 20, 22, 24) until he became more dignified and introduced an inquiry form of reflection (7.7: 26-27), which allowed Oscar to distance himself from his spontaneous reflection and its source. Lucio's final assertion: "We need to program so we DO include the Aboriginal perspective, rather than put it in as outcomes" (7.7: 42-3) met with agreement from both the others, and effectively resolved the interactive trouble. Lucio was the most senior of the three teachers, and his use of language here showed a progression towards a more professional expertise in dialogic practice.

By contrast, there were several examples of inexpert dialogic practice in regard to the inclusion of Aboriginal perspectives, which appear to derive from western habits of language use. For example, Lytton referred to a Dreaming Story historically being "created" by Aboriginal people (episode 7.3); Carmen implied that Dreaming Stories could be made up in the classroom (7.7); and Oscar referred to the Dreaming being "mythical" (7.9), and at the same time used the colonial name (Ayers Rock) for an Aboriginal sacred site (Uluru). This endorses the view of one educator, that such "teachers need a personal 'radar' that recognises Western assumptions" (Commonwealth Department of Employment, Education Training and Youth Affairs and the South Australian Department for Education and Children's Services, 1996, p.1.8). Carmen experienced such a radar in action when the Aboriginal Education coordinator challenged her categorisation of the Earth as non-living (7.10). Oscar demonstrated an emergent radar in episode 7.9 as he reflected on the nature of fact. However, developing such a radar requires ongoing professional development for teachers; access to Aboriginal people willing and authorised by their communities to give information and advice on curriculum and student support; and the development and dissemination of locally relevant material resources for use by teachers and students. Some of this was already in place at Countrytown High, but the three science teachers had had no professional development on the issues prior to episodes 7.1-6.

Episodes 7.6-8 linked up through another aspect of language use – how to textually represent the inclusion of Aboriginal perspectives in the curriculum outline. In episode 7.6 Carmen was concerned that the ideas developed through the meeting should not be lost to the curriculum outline (7.6: 1-2), seeking a way of representing them within the units of instruction. At that time, Lytton (7.6: 4) implied that the unit outcomes should make mention, while Oscar suggested a place at the level of lesson plans (7.6: 9-11). It was only in the actual preparation of a unit of instruction that the issues came to a head in attempts to formulate unit outcome statements inclusive of Aboriginal perspectives. Part of the problem was that the abstract term “perspective” was being used as a sort of shorthand for all the previous discussion. The teachers were modelling the form of their unit outcomes on the discourse of the Profiles, which was generalised enough to cover a wide range of interpretations across different schools. However, by so doing they lost their own vision. What they really wanted the students to do was “Identify uses for each type of rock in Aboriginal and European lifestyles,” or something to that effect. But having adopted the term “perspectives,” they seemed unable to look for alternative wording, and they had never had unit outcomes modelled for them with “Aboriginal perspectives” translated into something more specific. There is no guidance to that effect in either the Statement or Profile.

7.3.2 Including Aboriginal perspectives in curriculum: Articulating voice and discourse

The dominant discourse in the teachers’ work presented in section 2 can be said to be what McCarthy (1994) calls “benign” pluralism and cultural relativism (p. 95). However, from time to time the discussion also began to border the edges of what McCarthy refers to as a critical approach.²⁷ This occurred when the teachers attempted to inform content selection by a political and ethical principle of positive social justice (episodes 7.3; 7.5), and also when they touched on the idea of constructing curriculum from the standpoint of “those who carry the burdens of social inequality” (Connell, 1988, p. 68), as in episodes 7.5; 7.7 and 7.9. I see these tentative forays into a critical approach as indicative of something that might be called a “discourse of cultural dialogue,” where predetermined curriculum content is reviewed from the standpoint of Indigenous students and community members and varied to value Indigenous knowledges and ways of knowing. Such a discourse of cultural dialogue opens up Indigenous learning pathways through the dominant curriculum, facilitating access to the learning outcomes set down in curriculum policy. However, it does not directly support Indigenous students to develop their own intellectual standpoint from which to read and

²⁷ A strong critical approach would require content “rooted in the social bases and experiences of oppressed groups” (McCarthy, 1994, p. 95), and the diffusion of critical knowledge across the science curriculum through a “common learnings” approach (Connell, 1988).

understand western systems of knowledge (Nakata, 1998; 2002a), which requires a more deliberately critical stance.

One might legitimately assume that a constructivist curriculum would facilitate a discourse of cultural dialogue and options for a critical Indigenous standpoint, since constructivism sees knowledge as inseparable from the knower and the culture in which knowing occurs, and also “takes into account the possibility of multiple frames of reference and different ways of viewing the world” (Tobin, Tippins & Gallard, 1994, p. 48). However, the Statement for science leaves unresolved the disjunction between multiple frames of reference in a culturally diverse society and the western scientific tradition that is required of teachers (section 1.1). This, together with the paradoxes and tensions uncovered by the teachers (section 2), suggests the importance of attempts to uncover “ways in which all knowledge traditions, including Western technoscience, can be compared as forms of local knowledge so that their differential power effects can be explained but without privileging any of them epistemologically” (Turnbull, 2000, p. 6).

The Statement leaves it to school-based science educators to decide whether to present science in the traditional way as an objective truth based on measurable evidence, or whether to open it up as one among other subjective truths each based on differently valued information. However, the positivist frame in the Profile outcome statements, where outcomes are pre-determined according to western scientific ways of knowing, provides no space for multiple frames of reference, thus, exemplifying the dilemmatic relationship “between the inclusion agenda and the ‘standards’ agenda” (Clark, Dyson, Millward, & Robson, 1999, p. 174). This endorses the view (May & Aikmaan, 2003; McCarthy, 2003) that initiatives aimed at infusing Indigenous knowledge into public schooling are not compatible with forces of educational standardisation and accountability, despite the claim that such forces are intended to address equity issues. Indeed, one might legitimately ask to what extent the policy directive on including Aboriginal perspectives in curriculum is merely a legitimisation of public concern (Elmore & Sykes, 1992, p. 187) in regard to the low retention rates of Aboriginal students in schooling, rather than an instrument for accomplishing tangible results.

The position that Aboriginal knowledge and experience is to be included in the curriculum only in terms of “examples and contexts” (Statement, p. 9) represents what McCarthy (1994) refers to as “a professional discourse of content addition” (p. 94), or what Garbutcheon Singh (1994) calls an infusion strategy, “modifying the existing curriculum by ‘mainstreaming’ and ‘including’ some ‘Aboriginal’ content” (Garbutcheon Singh, 1994, p. 27). This is in stark contrast to the more recent, and as yet rare, approach of “inverting the curriculum” and representing multiple standpoints, “whereby the starting point for changing

the social injustices in a curriculum is the social and economic interests of the disadvantaged, rather than those whose social interests are already advantaged by the existing curriculum” (pp. 29-30). A strong version of a critical approach, for example, would require content “rooted in the social bases and experiences of oppressed groups” (McCarthy, 1994, p. 95), and the diffusion of critical knowledge across the science curriculum through a “common learnings” approach (Connell, 1988). A more dialogical approach is based on Turnbull’s (2000) view of a “transmodern” state “where knowledges from differing traditions, non-Western and Western, can be enabled to work together” (Gough, 2002, p. 7). This links to post-colonial science theory, which

organises its concerns and conceptual frameworks from outside the familiar eurocentric ones [. . . detecting] features of different cultures’ scientific and technological thought and practices that are not visible from within the familiar western accounts of science. This new kind of account does not merely add new topics to conceptual frameworks that are themselves left unchanged. Instead, it forces transformations of them (Harding, 1998, p. 8).

While a post-colonial, transmodern, placeless curriculum vision is well outside the discourses of the Statement and Profile, the teachers were certainly grappling with issues related to such a possibility. The paradoxes and tensions uncovered by the teachers (section 2) and evidenced within the Statement (section 1.1) suggest the importance of attempts to uncover “ways in which all knowledge traditions, including Western technoscience, can be compared as forms of local knowledge so that their differential power effects can be explained but without privileging any of them epistemologically” (Turnbull, 2000, p. 6).

7.3.3 Including Aboriginal perspectives in curriculum: Language as environment, consciousness and process

This chapter has expanded the notion of language-as-environment in teachers’ work by showing how a single phrase or word that has a powerful place in the discourse of a community can shape activity by its mere presence in the location. We saw this with the policy slogan “Including Aboriginal perspectives” and with the use of the term “racism” in episode 7.4 and “racist” in episodes 7.5 and 7.9. Once the term was used, it brought with it a whole history of meanings that were a factor of its place in the environment rather than in any particular utterance. While this is true of any term, and as Bakhtin (1981) attests, “[t]he word in language is half someone else’s” (p. 293), some terms have a stronger influence on interaction than others. There is a direct link here with language-as-consciousness, which concerns how each individual responds to a particular term or to the challenge of appropriating a term and making meaning for it. Language-as-consciousness was also implicated in the cultural assumptions made by the teachers as they spoke of the Dreaming being “created,” “made up” or “mythical,” and in the inconsistency with which Oscar, for

example, approached the Dreaming as both “not made up” and “mythical.” In these instances, language-as-process obscured western cultural assumptions and acted against the functioning of a cultural “radar.” Language-as-process was noticeable as a factor in gaining, or failing to gain, a hearing, building knowledge and reaching decisions.

7.4 Chapter review

The notion of policy-as-discourse (Ball, 1993) was powerfully present in this chapter through the single slogan “including Aboriginal perspectives,” and in the attempts of the Statement and of the teachers to bring the broader policies of Aboriginal Education into play. In sections 1.1 and 1.2, and across episodes 1-10, meaning for “including Aboriginal perspectives” was progressively made in terms of (a) student participation, (b) content inclusion and (c) “culturally sensitive teaching practices” (Statement, p. 12).

While the Statement assumed understanding of ideas such as cultural ways of knowing, and what it means to “treat sensitively” issues associated with them, the teacher data here suggest that such an assumption was not well-grounded. Nevertheless, the ideas put forward in episodes 7.2-4 do suggest a move against the “placeless” curriculum (Gruenewald, 2003) presented in the Statement and Profile, even though, in episode 7.6 and again in 7.7-8, at a later meeting, the teachers reached the conclusion that Aboriginal perspectives were not core content, but merely illustrative content, and therefore not to be incorporated in the unit outcomes.

In the episodes in section 2, there was no transformative step towards recognising Aboriginal scientific traditions, nor any attempt to find ways that western scientific traditions might co-exist with those traditions, as Turnbull (1997) suggests, rather than displacing them. Nevertheless, the episodes definitely do evidence a burgeoning awareness of alternative conceptual frameworks and of the pedagogical importance and challenge of inclusivity as a curriculum priority.

Chapter 8

Incorporating a literacy focus in science

Chapter 8 concludes the representation of data in this study. Data sources include the Statement and Profile for science, transcripts from two teachers' curriculum development meetings, and one teacher's diary notes. Section 1 reviews the state and school contexts for incorporating a literacy focus in science, making reference to policy and practice in recent years. Section 2 shows the teachers talking about how to incorporate a literacy focus in their curriculum, and the literacy demands implicit in some of the Profile outcome statements. This takes us back to some of the teachers' concerns about what an outcome statement looks like in practice (Chapter 6.2). Section 3 discusses how language was consequential in the teachers' work, taking account of the teachers' explicit attention to literacy as the theme of their discussions.

8.1 Incorporating a literacy focus: Contexts of influence and practice

Since the 1970s, the importance of language in learning and teaching has been strongly featured in most educational policies in Australia, as well as in school support structures and in professional development for teachers. The following factors have become increasingly recognised among educators:

- each subject area entails particular kinds of language and literacy
- the language and literacy competencies of students shape their learning
- instructional and assessment practices shape the language and literacy options for learners.

Alongside this, a language and literacy dimension of educational disadvantage has also long been recognised. This includes the extent to which the language of schooling constitutes a barrier to learning (e.g., Christie & Harris, 1985; Creber, 1972; Holt, 1968; Hull, 1985; Richards, 1978), and the nature and effects of discontinuities between the language of schooling and the language of home and peer group (e.g., Bernstein, 1971; Freebody, 1992; Freire, 1979; Heath, 1983; Lankshear, 1987; Luke, 1988; Rosen, 1977). Despite such concerns, secondary school teachers in South Australia are not required to have any

professional qualifications in literacy education, and few actively participate in literacy professional development.²⁸

8.1.1 Literacy in state education policy

From the 1970s, education authorities in South Australia have consistently required all teachers to take responsibility for students' English language development. In addition, a Writing-Based Literacy Assessment (WBLA) is in force for senior secondary school students as a pre-requisite for the South Australian Certificate of Education. The WBLA requires the satisfactory presentation of a folio of four pieces of writing (minimum 250 words each) from at least two different subjects and using more than one style of writing or format. This requires secondary school teachers to pay attention to the literacy elements of their curriculum, and the requirements of the nationally developed Statements and Profiles. On the introduction of these curriculum documents, the South Australian education system initiated a Literacy in the Profiles Project to develop materials to assist schools and school faculties. At Countrytown High, Lytton and the science teachers became participants in this project, linking it to their own school-based curriculum development project.

Literacy in the Statement and Profile for science

In the Statement, the *Principles for effective learning* specifically highlight the link between language and learning.

The language students use, whether speaking, writing or drawing, is a critical part of their learning as they try to express their ideas, grasp the ideas of others, and extend their understanding. An important objective of science learning is to help students become more competent in the scientific genre. ... Use of technical scientific language should not be an end in itself, however, but should be regarded as a means of developing a greater understanding of and more precise ways of communicating about science (Statement, p. 8).

²⁸ Enrolment figures in government-initiated staff development programs had consistently shown a lower uptake in secondary schools than in primary schools, and only a very small percentage of secondary teachers overall participated in staff development on language and literacy. For example, enrolment figures in the Literacy and Learning in the Middle Years (LLIMY) Project, which was intended for teachers in the middle years of schooling, showed that only 16.4% of junior secondary teachers in South Australia had participated up to 1991, compared with 83.6% of primary teachers (Barnett, Johnson & Badger, 1992). The greatest uptake of professional development on language and literacy at secondary level typically occurred in schools serving communities experiencing socio-economic disadvantage, particularly the schools supported by the Commonwealth Disadvantaged Schools Program. However, a statewide survey in the same period (Comber, Barnett, Badger & Peters, 1991) demonstrated that such teachers were frequently dissatisfied with their experience of language and literacy inservices because program content took insufficient account of their workplace contexts. This was reported in regard to both the content and the organisation of inservices. One subsequent state project that managed to avoid this was the Literacy Focus Schools Project, which operated inside schools and through networking similar schools. Countrytown High was one of these schools.

Here language is constructed as an important part of the learning process, and scientific language is constructed both as an object of learning and a means of further learning and communication.²⁹ The two subsequent paragraphs require, on the one hand, that the everyday language students bring to the classroom be used to promote learning, and, on the other hand, that the technical language of science be developed as a core element of curriculum content. The tensions between these two requirements is not addressed.

Also under the *Principles for effective learning*, tucked away in the sub-section on “Complementing learning in other areas,” is the assertion that “language competence is inseparable from scientific competence” (p. 7). That would seem to be an important philosophical position, closely linked with a learner-centred approach, although its location in a sub-section suggests otherwise, as does the lack of reference to language in the “Key science curriculum principles for curriculum developers” (p. 7) and solitary reference to language in “Contexts of learning science,” in regard only to students for whom English is a second language (ESL students).

They are not only learning another language, English, but also the specialist language of science. There is a need, therefore, for explicit teaching of, for example, how one explains, describes and reports in science (Statement, p. 12).

This is an acknowledgement that verbal processes have particular criteria for successful accomplishment, which in turn suggests that knowing how to perform such verbal processes is part of becoming “more competent in the scientific genre” (Statement, p. 8). However, there is no guidance in the Statement on this, as the teachers themselves found when they searched the document (Transcript, Literacy in the Profiles project meeting). Even though the Working Scientifically Strand in the Statement’s Band descriptions consistently includes a paragraph on communication, it does not mention the verbal processes required.

Students communicate to a range of people (teachers, peers, community groups) and in a range of forms (reports, articles, oral presentations, posters) about these matters. They use scientific and mathematical conventions, symbols, computer simulations and models and take part in community debates on practical issues (Statement, Band C, p. 31).

Only in the principle about using scientific language is there reference to language for learning, whereas language for communication is highlighted in the goals and the Working Scientifically Strand. The emphasis there is on scientific language for communication, access to knowledge and capacity to display it, but not language for creative or critical thinking even though critical thinking is a feature in the goals of science and constructivism is the theory of learning underpinning the Statement.

²⁹ Nowhere in the Statement is language explicitly seen as a tool for critical thinking, which is a key element in commonwealth and state definitions of literacy. By contrast, already at the start of the year Lytton had conducted workshops on critical literacy across the school and was keen to have science teachers take it up.

By contrast, the verbal processes in the Band descriptions, as discussed in Chapter 5.1, do connect closely with constructivism.

8.1.2 School context for incorporating literacy across the curriculum

As mentioned in Chapter 4.2.1, Countrytown High had for several years been in receipt of funding to support literacy development among students. A key factor in the school's successful application to the Literacy Education R-10 Focus School Program (in operation during the time of this study) was the earlier SKIL project, which had actively lived up to its name – Successful Kids Independently Learning. This was because “literacy in all subject areas was seen as one of the keys to independently learning” (interview with principal). SKIL was originally funded as a result of a school submission indicating concern about “low retention, participation and attainment among disadvantaged groups.” The funding was to target students with “low-level language skills, itinerant students, and students alienated from mainstream curriculum” (project grant application). This language of deficit in the submission is in stark contrast to the naming of the project itself, which staff had deliberately designed to affirm participating students and avoid linking them with disadvantage or risk of educational failure. This reflects similarly affirmative language in the naming of the Commonwealth Disadvantaged Schools Program (DSP) funding in the South Australian state education systems, where it was re-badged as the Priority Projects Program.

Shortly after I first visited the research site, I conducted a survey with all staff at Countrytown High to gain some insights into views teachers held about developing students' literacy. According to the survey, the views that pushed teachers towards taking responsibility were:

- a belief that literacy and subject learning are interconnected and that literacy skills form an integral part of the subject curriculum
- a belief that their students have inadequate literacy skills for successful learning in their subject, based on one or other(s) of the following:
 - failures in written work for the SACE matriculation
 - student difficulties in following task instructions and completing assignments
 - failures in the Year 11 Writing Based Literacy Assessment (WBLA)
 - recent data from the state department
 - application of the school's literacy inservices
 - confidence in their own personal literacy skills.

The key views that pushed teachers away from taking responsibility were:

- a belief that literacy is the responsibility of primary schools
- a belief that literacy is the responsibility of the English faculty
- an assumption that all students have adequate literacy skills for successful learning in their subject
- concern that a focus on literacy will undermine the focus on subject content
- an assumption that students do know how to write but choose not to (an assumption which fails to make a connection between literacy difficulties, learning difficulties and student behaviour)
- lack of confidence in their own personal literacy skills.

Addressing these latter views subsequently became the object of staff development at Countrytown High, in the hope of turning them around and developing whole-school responsibility for literacy.

I later conducted a separate study at Countrytown High of Year 9 subject teachers' views on their students' literacy development (Comber, Barnett, Badger and Peters, 1995). The teachers all considered that student success and failure in literacy was closely linked to attendance patterns. According to them, because the assessment task often grows out of a unit of work taken over several weeks, irregular attendance means that the component literacy events, such as information gathering, selection of information and note taking, journal keeping, assignment planning and design may not be carried out. Students who miss the early part of a unit of work do not know what to do, students who miss the middle part cannot catch up, and students who miss the final part hand up no work. Teachers noted that many of the regular attenders, although not all, had well developed literacy skills, while nearly all of the irregular attenders had poorly developed literacy skills. They made reference not to the possible effects of low literacy on attendance patterns, but rather to the perceived effects of irregular attendance on literacy.

The teachers construed task completion as one important measure of literacy success and failure, and it was a concern for them in regard to at least half the students. They described completion in terms of fulfilling the task requirements, including the prescribed word quantity and due date. The teachers were concerned that students who do not complete tasks may not be learning, and that without completed tasks there was not enough demonstration of learning on which to base an assessment and report.

For the majority of students at Countrytown High, Standard Australian English and its literate practices were part of new academic learning as they progressed through secondary

school. A whole-school literacy focus was consequently a key objective in the School Development Plan, a key school-based policy framing teachers' work in South Australian schools. The objective was "to develop skills in listening, speaking, reading and writing for all students in all subject areas" (School Development Plan). Constructing literacy as more than just reading and writing conformed to state definitions of literacy, although teachers initially had to be frequently reminded of this broader definition. Implementation of this School Development Plan objective was also identified as a key strategy for achieving Goal 14 of the South Australian Aboriginal Education Policy: "to enable Aboriginal attainment of skills to the same standard as other Australian students throughout the compulsory schooling years."

Because the School Development Plan objective specifically referred to "all students" and "all subject areas," it meant that responsibility for students' literacy development rested with all teachers in the school. However, the science teachers had not been prepared for this in their pre-service education, and had little understanding of how to engage with literacy development. Nevertheless, having entered their second year at the school, they were well aware of their students' literacy issues, and were beginning to grapple with them.

The flavour of the whole-school literacy focus that was promulgated through staff development at Countrytown High can best be captured in the words "making explicit." Countrytown High teachers who were committed to the literacy focus made their instructions explicit, made content explicit, and required students themselves to make their meaning explicit and their planning explicit. For example, in their assessment tasks several teachers provided worded frameworks for student self-assessment of literacy.

8.2 Incorporating a literacy focus: Teachers at work

NARRATOR: In this scene, the question at issue is how the whole-school literacy focus is to be played out in the new junior secondary science curriculum. What will a literacy focus mean in Years 8-10 science at Countrytown High? We join the three teachers and Lytton towards the end of the first meeting of the year, after they have finished the process of familiarising themselves with the new Statement and Profile for science (Chapter 5). They have in front of them draft outlines of the units of instruction prepared last year. The outline pro-forma includes a small heading, which reads "Language and Literacy Features." It sits in a prominent position right under the heading "Aim" at the top of the page and before the list of expected learning outcomes for the unit.

Episode 8.1 Constructing what counts as literacy (1)

LYTTON	Now the other thing I was keen for us to do is identify key literacy steps on the program. Didn't we put on there some language and literacy features?	1 2
OSCAR	We mainly looked at words.	3
CARMEN	Oh, no, I mean it depends on how you did it. I actually put down different activities.	4 5
LUCIO	<i>Reading from a unit on Water he developed the previous year.</i> "Written and oral report on Countrytown's drinking water, creating a concept map, writing a science report, flow charts .."	6 7 8

OBSERVER: One after the other, the three science teachers report on how they have used the Language and Literacy Features heading. Oscar has used it for words (3), Carmen has used it for activities (5), while Lucio has used it for text types, such as reports, concept maps and flow-charts (6-8). Lucio's use is closely linked to Carmen's, while both contrast with Oscar's.

INTERPRETER: We can see by looking at Oscar's unit outlines, that by "words" (3), he means technical terms associated with specific topics and practices of science. Such teaching has long been a feature of science education, because understanding technical meanings is seen as integral to understanding the scientific concepts themselves. However, the Statement for science clearly expects science teachers to develop students' language skills more broadly, distinguishing between everyday and technical language both in terms of words and text types³⁰ such as technical reports, drawings and graphs (Statement, pp. 7-8).

³⁰ The term *forms of communication* is one of several terms used in the Statement and Profile to refer to chunks of spoken or written discourse which take a regular recognisable form. Examples in science classrooms include: a poster, a set of notes, an essay, an oral presentation, a brainstorm, a science fiction story, a prac. report, a textbook chapter, a worksheet, a class discussion. Other terms used in the Statement and Profile with apparently the same meaning are *forms of presentation* and *forms of writing*. Here I have used the term "text types," which I believe to be the most evocative term.

Episode 8.2 Including text types in the curriculum outline (1)

LYTTON	Right. Now what I'd like to see there with the Features .. somehow we	9
	highlight spots that are mandatory. For example, this concept map ..	10
	<i>Picking up the unit on Water.</i> We might make the concept map in <i>Water</i>	11
	basically mandatory, so someone teaches how to construct a concept map	12
	then. So that's very similar to our "pre-requisite" skills in Year 8. You	13
	know, one of the first things they have to learn is to manipulate the	14
	glassware and bits and pieces, so they build up skills. We need to make	15
	certain that we've got particular rungs built in to say, you know, everyone	16
	teaches thoroughly a concept map. Other places might, you might use it as	17
	an adjunct, but THERE we're really going to stress it. That would be the	18
	stress point. Do you follow what I mean?	19
CARMEN	Mm. Mm.	20
LYTTON	Because I think what sometimes happens is, people have different stresses	21
	and ideas themselves, and then eventually no one teaches it.	22
CARMEN	Yeah.	23

OBSERVER: Taking the floor again, Lytton uses "Right" to close off the preceding exchange, and "Now" to mark his intention to channel the topic in a new direction and take an extended turn. He introduces the new topic firmly "Now what I'd like to see there" (9) whilst also making it clear that he is uncertain how to bring about his plan. He is using tentative terms, as in "somehow" (9), "might" (11, 18) and "I think" (21). And he is inviting participation, using words like "we" and "you know" (used twice, 14, 16-17) and then a direct appeal for response in "Do you follow what I mean?" Carmen is making affirming noises, backchannelling (20, 23), but the others are not responding. Lytton is making a number of points. First, he introduces the notion of literacy outcomes in the curriculum outline as either mandatory (10, 12) or adjunct (18). Second, he introduces the notion of scaffolding within a series of literacy outcomes (15-17). In this he likens literacy skills in using text types to manipulation skills in working with science equipment (13-16), where some skills are prerequisite to ongoing participation in the science classroom.

INTERPRETER: Lytton is enacting his role as Literacy coordinator, and voicing his level of concern with phrases like "need to make certain" (15), "rungs built in" (16), "everyone teaches thoroughly" (16), "stress point" (18) and "eventually no one teaches it" (22). These are phrases born of past experience in diverse schools and a consciousness of the

evidence of recent literacy surveys at Countrytown High and across the state. Last year the school conducted a trial of the new Writing-based Literacy Assessment (the WBLA), which showed that their Year 10 and 11 students were well below the norm across the trial schools. Also the Writing and Reading Assessment Project (Education Department of South Australia, 1992) two years earlier showed very clearly that only a very narrow range of text types was being taught in science across the state. Lytton is keen to turn that position around and sees the curriculum outline as one pathway to achieve this.

Episode 8.3 Including text types in the curriculum outline (2)

LYTTON	It's written in here. <i>Taps the literacy heading on the unit outline.</i> It's a nice idea. But I want to make certain that stuff like concept maps and	24
	prac. reports, and turning what I call "talk language" into written, third	25
	person language, is taught .. Outright ..	26
		27
OSCAR	<i>Overlapping.</i> Explicitly.	28
LYTTON	Explicitly, and you ..	29
OSCAR	<i>Overlapping.</i> And that could almost come in a general statement	30
	BEFORE a list of all the units, and then, "These are the literacy features	31
	that have to be looked at .."	32
LYTTON	<i>Overlapping.</i> Yeah. Priority for Year 8.	33

OBSERVER: In this episode, we start to hear overlapping talk, and new meanings being collaboratively generated. Oscar supplies the word "explicitly" to complete Lytton's sentence (29). He then interrupts Lytton's monologue, breaking new ground with a concrete suggestion (30-31). He proposes a general statement indicating key literacy features, to come at the start of the curriculum outline.

INTERPRETER: Here Oscar starts thinking together with Lytton. The exploratory monologue is broken and collaborative reflection begins. Oscar is responding to the management issue implicit in achieving Lytton's goal. So there is now a shared concern here, and a joint commitment to addressing it. What Oscar is proposing is a regulatory mechanism for incorporating a literacy focus.

Episode 8.4 Including text types in the curriculum outline (3)

OSCAR	Like <i>Water</i> could be .. concept map, <i>Forces</i> could be .. short story. Oral	34
	report in something else.	35

LUCIO	But you couldn't just, say you .. <i>Water</i> would be your concept map focus.	36
	You wouldn't only just have it in your one topic, though, would you?	37
	That'd be something that would need to be carried on.	38
LYTTON	But what I'd expect here is that we almost need a separate sheet that says	39
	"How do you go about teaching a concept map?"	40
LUCIO	Right.	41
LYTTON	Yep. So you have to start from the beginning. Now you might find a kid's	42
	moved from primary school, and they know what it is. But it might also	43
	be some kid who's got no idea. Then you'd draw it on the board and	44
	they'd say, "Oh, you mean web diagram." And you're away.	45
CARMEN	Yeah.	46
LYTTON	But then there's also the kid that's travelled from another state, who sits	47
	there blankly and says ..	48
OSCAR	"Never done one."	49
LYTTON	"Never done one. How do you put the ideas into it?" So you say, "Well	50
	you start with the centre thing." – What's the right word? – You then say,	51
	"What's the other things that come into your head about water and any	52
	other things connected with that?" And then you build it up. "Does this	53
	thing have anything to do with that?" "Yes." So you draw it in and link it.	54
	So you explicitly teach. So maybe that's .. Maybe we need a little thing in	55
	here, or as you said, a separate sheet that says "In general, Year 8 .."	56
LUCIO	For what needs to be explicitly taught, we have to work out what needs to	57
	be taught earlier on. Scientific reports – you wouldn't wait till fourth term	58
	to teach them.	59
LYTTON	No.	60
LUCIO	You'd want to do it early.	61
LYTTON	So that's what I'm getting at. It might not be .. It might not be worth	62
	pinning it to <i>Water</i> .	63
OSCAR	Would you rather say that you have to do two examples throughout the	64
	first semester?	65
LYTTON	Yeah. And the first one you do, you have to explicitly teach.	66
OSCAR	And it's up to you when ..	67
LYTTON	Because the <i>Garden</i> .. we might pin it to the <i>Garden</i> , but someone's got to	68
	do <i>Garden</i> in term 4, and again you don't want to explicitly teach concept	69
	map there, because effectively as you were saying you can't have used it	70
	any other time.	71

OSCAR	I think it's probably best that it's up to individual teachers where they do it.	72
LUCIO	As long as it's documented.	73
OSCAR	Exactly.	74
LYTTON	And, to some extent we have to make certain they know HOW to teach it.	75
	We have to work out for ourselves what we ..	76
LUCIO	What we expect.	77
LYTTON	What a scientific concept map is, and how we might go about teaching it	78
	to the kids.	79

OBSERVER: Lytton pursues his idea of defining and illustrating text types so that teachers and students are aware of the literacy demands inherent in them. Lucio, meanwhile, brings up some concerns about sequence in expected learning outcomes: “something that would need to be carried on” (37-8), and “we have to work out what needs to be taught earlier on” (57-9). His concerns are not taken up on the first attempt, but the second attempt leads the other two to collaboratively formulate a possible management practice (62-72) to which Lucio adds a final caution “as long as it’s documented” (73).

INTERPRETER: It seems to me that Oscar and Lytton are interactively flying a kite while Lucio is pulling back on it, trying to link it to practicalities. In the end Lucio and Oscar have together reached a conclusion on what should happen in their junior secondary science curriculum, sparked by the initial input from Lytton, but going beyond that. Carmen has been attentive but not forthcoming.

OBSERVER: This episode is striking as an example of collaborative reflection in full flow. Oscar and Lucio each introduce new ideas (34-35, 36-8, 57-59, 64-5, 74). Carmen and Lucio affirm some points made by Lytton (42, 47), and Oscar and Lucio each demonstrate their involvement by completing one of Lytton’s sentences (49, 77). The coherence is altogether very noticeable, since 16 of the 23 turns are linked at the start with anaphoric references. These include: repetition (50, 77), confirmations (41, 42, 46, 60, 66, 74); contrastive “but” (36, 39, 47); subordinate “so” (42, 62), “because” (68) and even the opening “like” (1); and finally, either singly or in conjunction with one of those mentioned, is the additive “and” (66, 67, 75), and substitutions “that’s what” (62), “first one” (66) and “it” (73). As you would expect from so many cohesion signals, there are no major topic shifts, although the internal thematic focus is shifting around within its limited frame.

INTERPRETER: You can see that the focus shifts in relation to different situational goals, since Oscar and Lytton are focusing primarily on the design of the curriculum outline, while Lucio is focusing on tying it to its context of practice. Oscar is keen to establish a clear set of instructions for teachers to program from, and Lytton wants not only that but also information to inform and support teachers in their practice. In addition, cyclic and continuing development is a matter very dear to Lytton’s heart. At a later meeting he says “I believe we have a responsibility to do that, because I want a nice general sweep of skills and writing ability across the whole year.”

NARRATOR: Here Lytton continues the discussion on text types by randomly selecting an outcome statement to investigate the possible text types that teachers might require.

Episode 8.5 Constructing a verbal process in terms of text types

LYTTON	“Uses models to describe ..” Our answer for Year 9 would be,	1
	probably, CONSTRUCT it. “Construct a model for electricity.”	2
	“Construct an actual working model or a plasticine model.”	3
OSCAR	And they might be able to say, “Well, the electron moves, it can go	4
	from here to here, but these are drawn together.”	5
LYTTON	And then on our model, there would be little paragraphs glued on to	6
	demonstrate. Now, in Upmarket High, that <i>describe</i> might be a two-	7
	page essay. Do you see what I’m getting at? So, I’m not saying that	8
	what we come up with will be definitive. But there are some things here	9
	that, we know, most of us will tend to teach towards, producing this or	10
	that in order to demonstrate our outcome. See, the task you set up to do	11
	a number of these things will determine how the student is able to do	12
	that stuff. If you ask them to do a poster, then to <i>describe</i> is different	13
	from if you ask them to do an essay.	14
CARMEN	I know it will come down to personal interpretation, though.	15
OSCAR	But it can be done in so many different ways. Like you said, someone	16
	at Upmarket High, maybe the majority of the class, would do a two-	17
	page essay, where we would have the majority of the class do a model.	18
	But, out of that, there might be one or two who would rather do a two-	19
	page essay. And in Upmarket High, there might be one or two that	20
	would rather make a model and do it that way.	21
CARMEN	They would expel those kids, they would get rid of them!	22

OBSERVER: Each turn throughout this episode adopts a slightly different stance towards clarifying verbal processes and moves the task along another step. The first step is to situate the discussion at Year 9 in relation to a particular topic and outcome (1-3). From there, Oscar suggests possible student output, which indicates his expectations in terms of conceptual demands (4-5). In the third step, Lytton links back to expectations in terms of literacy demands (6-8) and makes the point that the meaning of a verbal process is dependent upon the learning activity and text type associated with it (11-14). This leads in to Carmen stressing the importance of personal interpretation (15). Oscar next adds the parameter of alternative text types for different students in the one class (16-21), and then Carmen humorously throws in the issue of contrasting school-based standards (22). To summarise, their process has been to: situate the discussion, set science expectations, set literacy expectations in association with learning activity and text type, and implicitly contrast standards across schools.

INTERPRETER: In regard to standards, all three teachers understand the naming of Upmarket High as a metaphor for high socio-economic status in the state education system. They also have shared perceptions of the contrasts between classes at such a school and classes at Countrytown. These are based on knowledge widely available to the teaching community. For example, students at Upmarket High generally have formal science education at primary school, have access to sophisticated equipment and materials at secondary school, have access to academic literacies and resources in the home, and often experience strong family support and high academic expectations. So there is a factual basis to their stereotyping of Upmarket High students and teacher expectations. There is also a factual basis to their refusal to accept it as universal, since Countrytown High students have generally not experienced formal science education at primary school, do not have access to the same level of resources at school and at home, and may not have adequate levels of literacy. Less than half of Oscar's Year 9 students are completing essays when set; the others either hand nothing in, hand up just a cover page and some headings and perhaps some notes, or write a few paragraphs without developing an essay structure as such. Some of Carmen's Year 8 Aboriginal students from remote communities know little English and are not yet able to write more than a few words. For them, a describing task involves drawing and labelling.

NARRATOR: As the meeting continues other text types are briefly explored, and then the teachers focus back on the question of where the literacy might be in a particular verbal process in a particular outcome statement.

Episode 8.6 Clarifying “describe”

LYTTON	But what I’m getting at is, then, the literacy involved in being able to “describe” in that outcome, becomes being able to define some key terms, isn’t it? As teachers, we will know that they can “describe subatomic structure” when they use those words [electron, proton], nucleus, [neutron, free electrons] movement of electrons. When they use those keywords correctly and they are able to define them.	1 2 3 4 5 6
OSCAR	So you’re saying that is what we should be looking for?	7
LYTTON	So therefore, the literacy in that outcome is being able to use and define keywords.	8 9
OSCAR	Yeah, it must be, with all of them.	10
LYTTON	Well, maybe not in all of them.	11
OSCAR	Well, almost.	12
LYTTON	Because to write a short story relating to electricity, yes, that would probably be the same thing. But then also ..	13 14
OSCAR	They would all have to have keywords in it, I mean, if they didn’t have the word “electricity” in it, the story ..	15 16
LYTTON	But then there’s more stuff to that. Short story implies that there’s character development. There’s a plot, there’s a climax, there’s some. So, there’s more to it than just keywords.	17 18 19

OBSERVER: At the start, Lytton takes the literacy in a *describe* outcome as being able to both use and define the particular keywords, or technical vocabulary, relating to the theme given (1-6, 8). Oscar endorses this (10, 12, 15-16). Lytton however wants to make the point that in a short story, literacy would not only involve keywords, but also other features (17-19).

INTERPRETER: *Defining* is seldom used as a verbal process in Profile outcomes and pointers (see Appendix 2), perhaps because it is quite limited as an outcome, or perhaps because it is assumed to be implicit in *describe* as Lytton suggests (2, 6), which requires the correct use of technical terms in a sequential piece of text. *Describe*, on the other hand, is the second most frequent verbal process in the Profile for science, following after *identify* (see Appendix 2). While an English teacher might see *describe* not as story but as merely part of story, these science teachers readily ask students to tell a story when they want a description of process or when they are trying to elicit the required description in a way that students might respond to positively. Oscar, for example, asked his Year 9 class to

write an imaginary story entitled Life as a Tomato Pip, in order to assess the unit outcome “Students can describe the digestive system.” Setting a story for this *describe* outcome resulted in a better hand-up rate than for more formal assignments, notably a 12 paragraph story from an Aboriginal girl who had handed up nothing at all over two terms (see Appendix 3).

However despite Oscar’s vehemence in episode 8.6 as to the centrality of keywords, when setting the Tomato Pip assignment, he did not stipulate the terms he wanted students to use, leaving it open. He reported later that he thought he should have done so, because while some of the “top” students had used scientific terms others had mainly used everyday terms. On the other hand, by not stipulating that scientific terms should be used, Oscar opened up the possibility for the Aboriginal girl to approach the task with confidence and excel in a genre she was comfortable using. Oscar commented that in her case the terminology had to wait “until I get her motivated and on side” (Literacy in the Profiles Project meeting). Thus the choice of text type and task requirements is multi-faceted. This means that having chosen a text type for assessment, the literacy parameters need to be carefully considered, as Lytton suggests in this next episode.

Episode 8.7 Constructing what counts as literacy (2)

LYTTON	Once you figure out how you’re going to assess it, then you can start to ask, “What are the demands, the literacy demands, in it?”	1 2
OSCAR	A lot of these [text types] are intrinsic in the actual outcome itself. But a lot of them aren’t: they have a number of ways of doing it. Writing a short story is self-explanatory. The assessment piece is “Write a short story.”	3 4 5
LYTTON	“Produce a pamphlet called Safety with Electricity.” But what are the literacy demands and what are the criteria for this pamphlet? What are we looking for to say that this is a pamphlet?	6 7 8
OSCAR	What makes it different from just a piece of A4 paper, what makes it a pamphlet?	9 10
LYTTON	Yes.	11
CARMEN	<i>Determinedly.</i> Aren’t you always getting back to the fact that you have got to identify and be able to define keywords? I mean to me, that’s the whole crux of every science unit that we do. Because if kids don’t actually understand and can manipulate and use those keywords in every unit, then they are just not going to grasp it, are they?	12 13 14 15 16

OBSERVER: As Oscar indicates, (3-5), a text type is specifically indicated in some of the verbal processes in the Profile outcome statements and pointers, but not in all.

INTERPRETER: Across the Profile, text types are seldom specified in the broad outcome statements, but are quite a regular feature in the pointers. In Levels 3-5, text types are specified in the pointers 49 times, often in clusters of two or three. Of these instances, 18 are at Level 3, 15 at Level 4 and 16 at Level 5, giving a fairly even spread. There are 14 instances of “list,” four of “diagram,” three each of focus questions, map/chart and story; two each of flow chart, graph, poster, role play, table, and one each of article, chain [food], concept map, interview, model, pictograph, questionnaire, recount of procedures, report, survey, tourist brochure. Of the 14 instances of “list,” six are at Level 3, four at Level 4 and three at Level 5, decreasing in number as the Level advances. In their unit outlines, when no text type is indicated in the outcome statement, the teachers have been suggesting a variety of text types. Individual teachers can then choose one or more among them to use as an assessment piece.

OBSERVER: While Lytton and Oscar are considering the pamphlet as a text type (6-11), Carmen is not participating. She suddenly comes back into the conversation with a strong comment (12-16), linking back to points previously made about the importance of key content terms.

INTERPRETER: What Carmen sees as the central concern in learning science is understanding, manipulating and using the keywords of each unit of work (15-16). This runs against the grain of the previous turns, which focused on text types and their distinctive features. Twice in this discussion Lytton has briefly affirmed that part of the literacy in an outcome “is being able to use and define keywords,” but each time he has turned back to discussing different text types.

NARRATOR: Shortly after this episode, Lytton agrees with Carmen’s position, but stresses the additional literacy in different required assessment pieces, or text types.

The vocabulary is our first starting off point, often, isn’t it? ... Then we want them to be able to use that. And the use of it in a short story is quite different from a safety pamphlet. Then there is another sort of literacy in a topic test. What we’re trying to do is explore the key elements to the assessment piece so that you can say, “This is what we’re trying to aim for.”

This raises the question of teachers individually programming for text types, and Oscar explains to Lytton how they have been making suggestions in the curriculum outline but not specifying particular text types as a mandatory requirement.

Episode 8.8 Including text types in the curriculum outline (4)

OSCAR	<i>Pointing to the unit outline.</i> See, these are just examples so someone might choose, depending on the class, you might say, “Right, I want a short story, or with this class I’ll have an essay.”	1 2 3
LYTTON	Yeah, I appreciate that. But then, across our Year Level, we also want our Year 8’s to have experience in a number of different writing elements. So, what I would like to avoid is, if I’m an essay specialist, that every piece of writing I give my Year 8s is an essay. ... Just repeating the same essay or same style of writing, is not what we want our Year 8s to do. We want them to have a crack at a humorous short story with a scientific flavour to it. Or a scientific, science fiction. ... Then, you can start to explore what science fiction is versus a short story. The science has got to be correct.	4 5 6 7 8 9 10 11
OSCAR	I would like to, maybe as a start to all the units, have this as an outline, and write down the key literacy aspects of all these different .. [text types]. Because if we write them in here, somewhere we should define them. A page of definitions of what is a short story, what is an essay. If new teachers get this and they go “Oh, project – what is involved?”	12 13 14 15 16
LYTTON	[...] So, we can, you’re right, what we’ll do is we’ll end up with a booklet that goes with our units to say, “When you see a short science fiction story, these are the elements that are in it. When we want a crossword, we want words and definitions.”	17 18 19 20
OSCAR	Versus wonderword.	21
LYTTON	A crossword and maybe an example of where it could be used.	22
OSCAR	Science dictionary or literacy ..	23
LYTTON	It would be a Countrytown High science literacy dictionary, exactly. And that’s what we try and develop, and then as we go, we’ll also be trying to say “What does ‘identify’ mean in science? What does ‘describe’ or ‘distinguish’? We might be saying we want them to “present,” or “compare and contrast.”	24 25 26 27 28

OBSERVER: Oscar shows Lytton the text type suggestions in the unit outline (1-3). However, while appreciating that the teacher can choose (4), Lytton again presents the need for some regulation or mandatory teaching (7-8) as well as the need to identify the core

elements of different text types (10-11). Oscar then comes up with a proposal to list and define the required text types so that teachers can have a resource to refer to (12-16).

INTERPRETER: That links back to his earlier idea (episode 8.3: 31-33), which was to have a list, at the start of the curriculum outline, of all the literacy features that science teachers should be taking into account at each Year Level. He would like to establish authoritative resources and readily accessible support for teachers.

OBSERVER: Oscar's initial idea gets embellished and expanded (17-24) until it becomes a "Countrytown High science literacy dictionary" (24). Lytton then affirms that as a potential goal (25) and adds a second goal relating to verbal processes (25-28).

INTERPRETER: He is itemising the two elements that a Countrytown High science literacy dictionary should include. One element is a set of features and examples of the different kinds of text types that might be used in assessment pieces at Countrytown High (5-7), with "maybe an example of where it could be used" (9). The other element is a set of definitions for the verbal processes used in unit outcome statements at the school, for example: *identify*, *describe*, or *distinguish* (13-15). From the preceding discussion, it is clear that both elements are intended to assist teachers not only in knowing the literacy demands of any assessment piece, but in making criteria explicit to students and in assisting students to develop necessary skills.

NARRATOR: The idea of defining the characteristics of process items in outcome statements is taken up at a subsequent Literacy in the Profiles meeting, where participants tried to make meaning for some of the items. They first used lexical matching, attempting to find synonyms, such as *pointing out* for *identifying*. They went on to use component analysis, looking for component knowledges and skills. These included other verbal processes, such as *differentiating* or *describing*, as possible components of *identifying*; and *recognising relationships*, as a component of *classifying*. They also used two kinds of comparative analysis. They compared the verbal process in an outcome statement against the verbal processes specified in either (a) the pointers intended to indicate its achievement, or (b) the Band descriptions in the Statement document. Next they used a feature analysis of the language involved in performing the verbal process. For example, as key features in *describing*, they cited naming and the use of adjectives, as well as the use of scientific terminology. They also contrasted the combination of *explain how* and *explain why*. They then discussed whether it would be helpful to develop some kind of systematic feature analysis for teachers.

Episode 8.9 *Justifying a focus on verbal processes*

MARY	I think so, because you're going to find the same words coming up,	1
	whatever Level, whichever Band you look at .. And what I've found is	2
	that students do have difficulty. If you ask them to <i>explain</i> , they might	3
	<i>describe</i> .	4
OTHERS	Mm.	5
MARY	If I ask them to <i>explain</i> what this graph is telling the reader, they will	6
	<i>describe</i> to me the results. They do have problems between the words	7
	<i>describe</i> and <i>explain</i> . They do have problems with the words <i>listing</i> and	8
	<i>describing</i> . They do have problems with <i>comparing</i> and <i>contrasting</i> .	9
	They will just write. They will <i>describe</i> . And maybe, if we are focusing	10
	on literacy, we actually make a point of telling the students when we use	11
	these words <i>compare</i> or <i>analyse</i> . That it actually has some meaning and	12
	you need to know what it is, in order to answer the question.	13
LYTTON	So, you're saying we SHOULD struggle with this because we need to be	14
	able to articulate it in order to tell our students.	15
MARY	Well, I quite often, when I've been marking exam papers, thought, when	16
	I've been marking students' work from matriculation papers, if the	17
	question said <i>explain</i> , they can write two pages and nowhere is there an	18
	explanation. There is a description. And it would help me if I were able	19
	to, you know, to actually tell what is the difference between those words	20
	.. to the students. And I think that the classic problem is "interpret this	21
	graph." They will say "As the time increases, so does the temperature."	22
	And nowhere is there an interpretation of the graph. So, you know,	23
	really, for me, it would be helpful to have these keywords and some	24
	teaching strategies that we could use and other people could maybe use,	25
	to teach kids the difference between the two.	26

OBSERVER: Mary puts her case at length (1-13, 16-26), giving four distinct reasons for clarifying verbal processes. First is their recurrence across the Profile (1-2). Second is her experience of students having difficulty in performing them (2-10, 16-18, 21-23). Third is the need for explicit teaching of the required processes (10-13). And fourth is teacher needs (a) for understanding the required processes themselves, and (b) for strategies to assist students (19-20, 23-26).

INTERPRETER: Throughout Mary's argument her own experience is the core source of supporting evidence, which is strongly student centred. She is saying that students are not constructing the task in accordance with the expectations implicit in the verbal process they have been asked to engage with (18-19, 21-23). For her the value of having an analysis of the verbal processes is "to teach kids the difference" (25-26), and for Lytton similarly, "we need to be able to articulate it in order to tell our students" (14-15).

NARRATOR: In the discussion that followed (see Appendix 4), some of the other participants give additional examples of the difficulty their students have in performing required verbal processes. The teachers' concern is that students do not always know what is required in a task. For example, they give more information than called for and yet may not address the question itself, or they restate information rather than reconstructing it to meet the purposes of the task. The teachers then use the whiteboard to list the verbal processes that they consider need to be explicitly taught to students. These are, in the order listed: *discuss, explain, describe, interpret a graph, analyse, assess* (as in "assesses conclusions"), *outline, evaluate, apply, compare and contrast* (which they write as one).

On several occasions the teachers briefly rehearsed a classroom learning activity that called on the verbal process in question, and then directly investigated its component skills or language features. Such contextualising rehearsals allowed them to use their knowledge of practice in constructing pedagogical meanings for the verbal process. Several different kinds of pedagogical meaning were debated. There was the question of a hierarchy of complexity (a) across different verbal processes such as *name, list, record, describe, explain, and analyse* (see Appendix 2), and (b) within the same verbal process used at different Profile Levels. There was also the question of what should count as an appropriate task to demonstrate a *describing* outcome, and also what assessment criteria should be established, particularly in regard to the use of terminology. While this meeting was not part of the teachers' school-based curriculum development, it took place concurrently and, along with the other meetings in that project, did have an influence on how literacy was constructed in the Countrytown High science curriculum.

8.3 Incorporating a literacy focus: How language was consequential

In this chapter, the interaction was structured by the question of what was to count as a literacy focus in the Countrytown High junior secondary science curriculum. Lytton's interests as Literacy coordinator were a key factor in establishing this problem space, and it was he who initiated it. Nevertheless, the other teachers were all actively engaged, raising

associated issues, proposing action, and problematising proposed action. The approach encompassed three main interactive purposes:

- constructing the literacy features to be addressed in junior secondary science
- devising a means of ensuring systematic and recurrent teaching of the literacy features
- making sense of process items from outcome statements.

The interactions in this scene focused as much on problem investigation as problem solution, featuring the forms of reflection already noted. There was some monologic reflection on the part of Lytton as he floated his ideas and tried to engage the others. This was consistently followed by collaborative reflection and exploratory talk as the teachers joined in more collaborative knowledge building from a shared base of uncertainty.

8.3.1 Incorporating a literacy focus: Articulating voice and text

Participating in problem investigation occurred more readily the less abstract the problem. For example, in the first episode, when the teachers were asked to report on how they had used the heading Language and Literacy Features on the unit outline sheet, participation was immediate and confident. Then when the topic shifted to the unfamiliar concept of including text types in the curriculum outline, in episodes 8.2 and 8.3, participation only occurred after some effortful monologue from Lytton, describing the concept, illustrating it, and appealing to teachers' pedagogical experience. Once engaged with the problem, the three science teachers used a range of moves to present different perspectives on it, and to counter positions put forward by others (8.4-8.8). The moves sometimes suggested the push and pull of a kite on its string, occasionally yawing suddenly from one direction to another. The teachers drew heavily on their classroom experience and on their understanding of scientific process at junior secondary level. They engaged in enquiry forms of reflection and also rehearsal to help them bring their concerns alive (e.g., episode 8.4).

Three complementary constructions of literacy evolved through the episodes in this scene:

- literacy as “keywords,” or the technical terminology representing scientific concepts that students had to be able to define and use
- literacy as the “text types” or forms of writing and speaking students were required to use in learning and in demonstrating their learning, e.g., concept maps (episodes 8.1-4), story (8.4; 8.6-8) and pamphlet (8.6)
- literacy as “verbal processes,” meaning the types of linguistic thinking and production which students were expected to achieve, as specified in an outcome statement.

In the end text types and verbal processes took precedence over technical terminology in what counted as a literacy focus, since technical terminology came to be seen as fundamental to the teaching and learning of all junior secondary science, and therefore not a literacy focus as such. Each construction of literacy required a different knowledge base on the part of the teachers. In this meeting, the three science teachers were most readily attuned to the construction of literacy-as-terminology, definitely open to literacy-as-text-types, and least readily attuned to literacy-as-verbal-processes. This low attunement to the idea of literacy being related to the verbal processes is in some ways contrary to the teachers' clearly high attunement to the differences in cognition associated with them, as shown in Chapter 6. It suggests a lack of appreciation of the connections between language and cognition, and the role of language in learning.

A central dilemma for the teachers was how to plan for the inclusion of text types so that “a nice general sweep of skills and writing ability” could be developed within and across Year Levels, since the Literacy coordinator considered this fundamental to addressing the broader standards agenda of public education. Three very different kinds of teacher knowledge were brought into play. First, teachers needed to be aware of, and responsive to, students' learning needs, especially their literacy learning needs. Second, they needed to be aware of the content sequences in the curriculum and make connections across them. And third, they needed to be aware that sometimes the curriculum sequence changed due to the alternation of resources among different classes at the same Year Level, as in the *Garden* unit. These were all knowledges related to the local context of practice.

8.3.2 Incorporating a literacy focus: Articulating voice and discourse

The core underlying discourse throughout this scene was a language-across-the-curriculum discourse, which was widespread in Australia at the time (e.g., Hasan & Williams, 1996; Macken-Horarik, 1996), and which has since extended to literacy across the curriculum (Sawyer & Watson, 2001). This discourse was institutionalised at Countrytown High in various ways: by embodying it in an objective in the School Development Plan, by participating in state government literacy projects, by obtaining additional funding for language related staff positions, and by generating school-based professional development and accountability. This discourse insists on teacher responsibility for teaching the literacies of their subject area (e.g., Atweh, Bleicher, Christensen & Lankshear, 1995; Dumbleton & Lountain, 1999; Lemke, 1990; Stoll Dalton & Tharp, 2002). This is because “academic varieties of language are integrally connected (actually ‘married’) to complex and technical ways of thinking. They are the tools through which certain types of content (eg biology or social studies) are thought about and acted on” (Gee, 2004). A language-across-the-curriculum discourse requires enactment through teachers' work in ways such as we saw in

this scene, for example, in the attempt to map out the mandatory teaching and assessment of particular text types needed for science learning. This Countrytown High literacy focus suggests some support for the view that “paying more attention to language is one of the most important acts that can be done to improve the quality of science education” (Wellington & Osborne, 2001, p. 1).

Alongside the language-across-the-curriculum discourse, and integral to it, is a discourse of language for learning, which has been developing internationally over recent years (e.g., Hasan, 2002; Wegerif & Mercer, 2000; Wells, 2000). This language-for-learning discourse is implicitly taken up in the Statement for science through its recommended constructivist pedagogies, but it is not spelled out. For example, it is only in regard to English as a Second Language learners that a call is made for explicit teaching of process items such as how to explain, describe and report in science education. There is no such call made for teaching such verbal processes as classroom content in their own right. Nevertheless, while the language-for-learning discourse is only palely reflected in the Statement, it is taken up rather more by the teachers under Lytton’s guidance. The idea of a Countrytown High “literacy dictionary” for teachers and assessment criteria for learners is a long way ahead of the Statement.

The teachers all held the position that what counted as literacy should be relevant to the learning agenda for classes at Countrytown High, and compatible with its philosophy of education. This meant linking terminology, text types and verbal processes directly to their practice of science education in Years 8-10, both its conceptual content and the ways students were expected to engage with that content. This context of practice, as we have seen earlier, valued constructivist pedagogies as well as explicit teaching and locally relevant content. The teachers indicated a whole continuum of specific contextual connections for verbal processes, by linking them with outcome statements, units of instruction, Year Levels, individual classes and students, the school as a whole, and even stereotypic categories of socio-economically advantaged and disadvantaged schools.

In addition, the teachers recognised that a single process item can be realised in different text types to suit different students or different learning and teaching styles, and they believed that it was appropriate to call on students to produce text types within their current literacy proficiencies and ones that might motivate them to take an interest in science (episodes 8.5-6). This is in tension with normative curriculum such as that outlined in the Profile for Science, which anticipates that all schools will have similar expectations of learners at any one Profile Level. It invites local variation in terms of the details of content, but not in terms of substantive learning. However, to ask for model construction from students with low literacy skills, as against essay writing for students with high literacy skills, is a substantive

variation, given that skills in extended writing are fundamental in senior secondary school. Pedagogically, it matches task demands to learning readiness; politically, it prioritises a learning agenda over a standards agenda.

Through their discussions, the teachers were constructing the student as both a literate being and a literacy learner, whilst simultaneously constructing expected learning outcomes and assessment tasks as literate practices. In this way, they were consistently constructing subject science as literate activity, which we also saw, though not explicitly, in regard to the choice of process items for unit outcome statements in Chapter 6.

8.3.3 Incorporating a literacy focus in science: Language as environment, consciousness and process

In itself, incorporating a literacy focus in science indicates an appreciation of language-as-environment for school-based curriculum development, highlighting the students' use of language as an integral feature of the workplace. Understanding the students' language proficiencies (i.e., their proficiencies in language-as-process for learning and for communication) was central to understanding how to develop science activities for them, and how to consider language factors in assessment. Language-as-consciousness emerged as important in the construction of what should count as literacy in the science curriculum and in how the teachers debated the question – shifting between science as priority and literacy as priority. Language-as-process in the teachers' work was characterised in this chapter by the use of meta-language – terms used to talk about the language students were to use in science classes – and by forms of reflection to investigate ideas and problems.

8.4 Chapter review

In investigating the theme of literacy as a focus in the science curriculum, some differences in the construction of literacy became evident among the Statement, the Profile, Countrytown High literacy projects, and individual teachers. These were mainly to do with the priority to be accorded to (a) vocabulary or “keywords” essential for the understanding of scientific concepts, and (b) the development of skills in producing different verbal processes and text types relevant to science education. The idea of a Countrytown High “science literacy dictionary” was mooted as a means of supporting teachers and learners in this latter construction of literacy, whereas support was not seen as necessary for the “keyword” construction. The analysis suggests that a discourse of language across the curriculum could be sharpened through a focus on language for learning.

Chapter 9

Towards a dialogic perspective on school-based curriculum development: Teachers' work as language work

Chapters 5 to 8 showed language to be highly consequential in the teachers' work – in terms of spoken and written text, multiple voices in interaction, and overarching discourses framing the work. Participants articulated, dis-articulated and re-articulated the various information questions, tensions and dilemmas that occurred in their work, engaging both monologic and dialogic stances, yet themselves consistently tending towards the dialogic. It is this marked tendency, in the face of the monologic and sometimes competing discourses in influential policy documents, that leads me to propose a dialogic perspective on school-based curriculum development, as an alternative to the task, policy and teacher agency perspectives reviewed in Chapter 2.2.

As indicated in Chapter 3, Bakhtinian dialogism constructs dialogue not only as situated language activity but as a particular way of being, an epistemological stance open to diverse possibilities of meaning making (Bakhtin, 1981). What Bakhtin (1984) called “a fully realised and thoroughly consistent dialogic position” constructs the human being in terms of “independence, internal freedom, unfinalisability, and indeterminacy” (Bakhtin, 1984, p. 63). This contrasts with a monologic position, which refuses to entertain the possibility of alternative meanings. A dialogic perspective takes account of both positions as well as positions along a continuum between the two.

In developing my argument for a dialogic perspective on school-based curriculum development, I start from language as consequential activity, on the basis of the evidence presented in chapters 5 to 8. This allows me to investigate how the teachers' curriculum development activity constructed itself in language, specifically how it constructed the core elements of school-based curriculum development, namely “task” (section 1), “policy” (section 2), and “teacher agency” (section 3). I do this by building up a picture of each through characteristics of discourse, voice and text. On that basis, section 4 presents an argument for the relevance of a dialogic perspective on school-based curriculum development more broadly.

9.1 A dialogic perspective on the curriculum development task

As a key feature of the context of influence, state education policy monologically constructed the task through a range of priorities and principles, primarily embedded in the South Australian *Teachers' Work* document (Chapter 2.3.1) and in the Statement and Profile for Science (Chapters 5.1.1 and 6.1.1). In the context of practice, the school principal and colleagues constructed the task through a workload allocation (Chapter 4.2.4) and a project brief (Chapter 5.1.2). The project brief called for a written curriculum outline for junior secondary science, for use by all faculty staff, which was to include “student outcome statements for all units of work,” “a coherent progression” and the identification of “possible learning activities, resources and assessment activities.” In addition the curriculum developers were to bear in mind policy principles reflecting state education priorities, e.g., social inclusion, and particular local concerns, e.g., high staff turnover. The principal’s decision to assign three recently graduated teachers to implement the brief, with the support of a senior teacher as mentor, further constructed the task as part of the school’s “second curriculum” of teacher learning – in other words, as professional development.

Translating the project brief into action took place through a series of meetings, each generating their own goals and interactive purposes, and each shaped by what had gone before. In a very broad sense, these meetings constructed the curriculum development task as talk leading to writing, either within the moment or subsequent to it. More specifically, the teachers’ work constructed the task in terms of goal orientation: goal-oriented discourse, voice, and text production.

9.1.1 Task as goal-oriented discourse

The project brief directly generated key substantive goals for the teachers’ work, which were taken up as meeting goals. In this study, they were: becoming familiar with new curriculum policy (Chapter 5), developing units of instruction conforming to policy (Chapter 6), including Aboriginal perspectives (Chapter 7) and incorporating a literacy focus (Chapter 8). Additional discursive goals, distinct from substantive goals, emerged within the meetings themselves, progressively shaping and transforming the nature of the task. These discursive goals can be drawn out from the interactive purposes identified episode by episode in the transcript analysis, and summarised at the start of the third sections of Chapters 5 to 8. This is shown in Table 9.1, where the discursive goals are identified as: curriculum decision making, curriculum representation, and professional knowledge building, and strongly suggests that the relationship between pedagogy and the language processes prescribed in outcome statements might warrant further study.

Table 9.1 Interactive purposes and the discursive goals they evidence

Interactive purposes across the transcript data in Chapters 5 to 8³¹	Discursive goals³²
Airing and addressing concerns about including Aboriginal perspectives in science (Chap. 7)	Knowledge building
Becoming informed about the key ideas, textual structures and purposes of the Statement and Profile (Chap. 5)	Knowledge building
Clarifying teaching practice in regard to the inclusion of Aboriginal perspectives (Chap. 7)	Knowledge building
Comparing content in the Statement with content in the current Countrytown program, in an attempt to validate previous curriculum decisions (Chap. 5)	Knowledge building (Curriculum decision making)
Constructing the literacy features to be addressed in junior secondary science (Chap. 8)	Knowledge building (Curriculum decision making)
Cross-referencing a unit to the Profile in terms of Level and outcome statement (Chap. 6)	Curriculum representation
Deciding on content (Chap. 6)	Knowledge building Curriculum decision making
Devising a means of programming to ensure systematic and recurrent teaching of the literacy features (Chap. 8)	Curriculum representation Curriculum decision making
Examining the representation of norms in the Statement and Profile (Chaps. 5 and 6)	Knowledge building
Exploring the meaning of Aboriginal perspectives in curriculum (Chap. 7)	Knowledge building
Formulating unit outcomes, to accurately express classroom intentions and to function as pointers for the achievement of a generalised Profile outcome (Chap. 6)	Curriculum representation (Knowledge building)
Identifying curriculum sites for the inclusion of Aboriginal perspectives (Chap. 7)	Knowledge building Curriculum decision making
Investigating principles for wording unit outcomes (Chap. 6)	Knowledge building Curriculum representation
Locating Countrytown students and content in relation to policy expectations (Chap. 5)	Knowledge building
Locating intended content in the matrix of Strands and Levels in the Profile document (Chap. 6)	Knowledge building Curriculum representation
Making sense of process items for outcome statements (Chap. 8)	Knowledge building

³¹ The transcript data is only a small portion of the full data corpus, which contained many more examples of developing units of work, and hence many more examples of curriculum decision making.

³² The goals in brackets are less dominant than the others in relation to the interactive purpose with which they are connected.

Table 9.1 shows knowledge building to be quite predominant, occurring in every meeting, and thus bearing out the principal's original construction of the curriculum development task as teacher learning. Knowledge building was especially dominant in Chapters 5, 7 and 8, focusing on quite broad policy concerns, requiring teachers to develop both an information base and a values base for curriculum decision making and representation. Knowledge building was also a factor in Chapter 6, but quite tightly related to the unit of work on Light and Sound, and the production of written text for accountability purposes. In that meeting, which was the first of a number of meetings focusing on unit development in the larger data corpus, the teachers' work constructed the task primarily in terms of making content decisions and developing a set of outcome statements and activity ideas based both on previously existing units and a skeleton of ideas from an existing outline.

By grouping the interactive purposes in Table 9.1, it is possible to identify those that are central to each discursive goal.

Table 9.2 Discursive goals and key interactive purposes.

Curriculum decision making	Curriculum representation	Professional knowledge building
Engaging with concerns, uncertainties and dilemmas	Engaging with concerns, uncertainties and dilemmas	Engaging with concerns, uncertainties and dilemmas
Reaching curriculum decisions	Referencing local content to state policy	Interpreting and critiquing policy constructs (e.g., Band, Level); policy priorities (e.g., including Aboriginal perspectives and literacy development); and
Formulating unit outcome statements	Translating policy priorities into programming structures	Policy representations of learning behaviours (e.g., in Band descriptions and outcome statements)

Each of the meeting goals gives slightly different weighting to the discursive goals. For example, curriculum representation dominates in Chapter 5 on making connections with new curriculum, while in Chapters 6 and 7 making decisions about curriculum content is also important, and in Chapter 8 the focus is on making decisions about literacy pedagogy. As mentioned, the goal of building professional knowledge occurs right across the data corpus. The dialogic construction of the task as goal orientation thus suggests school-based curriculum development as the articulation of curriculum knowledge building, decision making and representation within the accountability framework of the education-labour relationship. Such articulation calls for a reflective stance in the work.

9.1.2 Task as goal-oriented voice

In order to make sense of their work, teachers need to be able to make use of the discourses available to them in policy and in their own professional histories (Grundy, Warhurst, Laird, & Maxwell, 1994, p. 120). This requires engaging with the tension between old and new ideas, which is the source of energy for reflection and interpretation (Olson, 1992, p. 80). In this study, reflection occurred most frequently in regard to activities such as interpreting policy, the selection of content and the formulation of outcome statements. This progressively generated a socially mediated construction of scientific literacy (Roth & Barton, 2004) in regard to Strands of science curriculum, Aboriginal perspectives and language use. Social mediation occurred not only through the worded dialogue among immediate participants, but through their interaction with currently dominant policy ideas and the traces of previously and potentially dominant ideas, whether enshrined in policy or active in the community.

The most frequent form of reflection in the teachers' work was what Louden (1991) refers to as an enquiry form of reflection, either seeking authoritative knowledge from a particular source or seeking the joint construction of knowledge through interaction. Enquiry seeking authoritative knowledge typically involved quite explicit enquiry, positioning one individual or the whole group as respondent (e.g., Lytton as a curriculum authority in episodes 5.1-2, 6.8; Carmen as the authority on what she taught the previous year (episodes 6.1-7), and the three science teachers on their own practice in identifying unit literacy features (episode 8.1). By contrast, enquiry seeking the joint construction of knowledge through interaction positioned every one as equal and ready to engage. This often arose out of a task requirement, such as matching the Countrytown High proposed curriculum topics against the Statement or Profile (episode 5.5), or making sense of a particular term, such as "Band" (episode 5.6) or "describe" (episodes 8.5-6). It was also a feature of making sense of each other's ideas (e.g., episode 5.5). All these instances show two features as central to the teachers' knowledge building dialogue, namely what Wells (2000, p. 75) refers to, in regard to knowledge building more generally, as "responsivity and the attempt to achieve enhanced understanding." These features were also represented in the frequent instances of what Louden (1991) calls "spontaneous reflection," which carried a greater degree of risk for the speaker. For example, by responding off-the-cuff to Oscar's concern about how the Dreaming might be mentioned in an outcome (episode 7.7), Carmen exposed herself to attack and ridicule. On another occasion, her spontaneous reflection that Year 8 should be in Band B rather than Band C (episode 5.6) led the group to carefully check the text of the document, before general agreement. In this case, spontaneous reflection led to other forms of reflection more detached from the moment.

The teachers typically used enquiry reflection for detached, “scientific method” reflection among themselves, whereas for more contextualised reflection they also used what Louden (1991) refers to as “replay and rehearsal.” These occurred most frequently in considering curriculum activities (episode 6.6 provides an example of replay, and examples of rehearsal can be found in episodes 5.8: 27-33, 7.2: 10-15 and 8.4: 42-54). Replays were, as in other autobiographical narrative, not merely “telling about the past, [...] but deciding what to make of the past narratively at the moment of telling” (Bruner, 1990, p. 122). The same can be said in regard to the rehearsals of imagined classroom scenarios, which were used to narratively make sense of a suggestion for classroom practice at the moment of telling. Thus both replay and rehearsal can be seen as an act of linguistic thinking (Whorf, 1964), where language creates a new understanding.

Taken together, these forms of reflection suggest the kind of exploratory talk that has been noted in constructivist learning programs in schools (e.g., (Barnes & Todd, 1995; Dawes, 1998; Fisher, 1997; Mercer, 2000; Mercer, Wegerif, & Dawes, 1999; Wegerif & Mercer, 1997, 2000). In exploratory talk, participants “engage critically but constructively with each other’s ideas” (Wegerif & Mercer, 1996, p. 59). In such talk, “control is a matter of constant negotiation, as speakers offer contributions which may, if partners are persuaded, determine the subsequent direction of collective thinking” (Mercer, 2000, p. 99). To engage in exploratory talk,

participants must not be primarily concerned with protecting their individual or joint identities and interests, but instead with discovering new and better ways of jointly making sense. [...] and] the joint but impersonal construction of explanations, answers or solutions (Mercer, 2000, pp. 102-103).

For the most part, protection of individual interests was successfully held at bay in the teachers’ work and they put energy into finding supportive ways of jointly making sense, failing on occasions (e.g., episode 7.7), but predominantly being successful. Their success supports the view that exploratory talk provides “one mechanism by which ZPD development might occur in a situation in which the participants have equal status and in which both [all] are struggling to develop an idea” (Fisher, 1997, p. 36). This was certainly happening in the talk building up to a suggested Countrytown High science literacy dictionary (episode 8.8), where Lytton and Oscar gave each other equal status, something that Linell (1990) suggests is an inbuilt feature of such dialogue.

9.1.3 Task as goal-oriented text production

Over the episodes, the turns for participation were not apparently a matter of concern for the teachers; there was no argument over the dialogic territory. Nevertheless it is evident that when Lytton was present, he took more and longer turns than the others, used more strategic

moves to manage the interaction, and introduced more topics and perspectives on topics, taking what Linell (1990) calls “semantic dominance” (p. 158). The other teachers accepted this and rarely interrupted, acknowledging his roles in the curriculum development task. When they did interrupt, it was either to add their own ideas on his topic (e.g., Oscar as the two of them built up to the idea of a Countrytown High literacy dictionary) or when they had concerns about where he was leading them (e.g., episode 6.9 on the concept of waves). Teachers generally provided each other with a zone for hearing that would not refract meanings unduly, so that some kind of shared position could be reached.

The many instances of successful give and take in the Countrytown High meetings demonstrate what sociolinguists call conversational cooperation. This involves developing “commonalities of thought” and coordinating interpretive strategies (Clark, 1992), thus providing a good hearing to all participants. However, we also saw occasional instances of conversational discoordination, where individual teachers either failed to gain a hearing (e.g., Lucio in episode 6.7: 5-6, Carmen in 6.8 and prior to episode 7.7, and Oscar in 7.4: 8-10) or, conversely, dominated the hearing space (e.g., Lytton and Abigail in episodes 7.2-4, Oscar in episode 7.9). Dominating the hearing space was typically associated with three features: greater knowledge of the topic, either in terms of specialisation knowledge or pedagogical knowledge; greater authority, as in the case of the policy actant and holders of senior positions in the school; and greater interest, as when arguing a case. To gain a hearing, teachers who lacked in any of these characteristics needed compensatory dispositions, such as determination and persistence, and compensatory capabilities, such as a strong command of language and of the voice box. Success and failure in manipulating dialogic space were shaped by the material circumstances at the time, by how participants’ constructed them as conditions for participation, and importantly by the adoption of epistemic responsibility.

Rommetveit (1990) defines epistemic responsibility as the “responsibility for making sense of the talked-about state of affairs and bringing it into language” (p. 98). In these teachers’ Australia-based discourse communities, taking epistemic responsibility was the duty and right not only of elders and experts, but also of children and novices. Since the Countrytown High teachers had different degrees of teaching experience as well as different science specialisations, distribution of epistemic responsibility was frequently related to differences in knowledge and power. Consistently, as senior teacher, Lytton either voluntarily took on epistemic responsibility (e.g., episodes 6.7, 8 and 10 in regard to constructing science content and outcome statements) or had it thrust upon him by others (episodes 5.1; 6.8). The Aboriginal education coordinator likewise took on epistemic responsibility as an invited expert (episodes 7.4-5). Even as a junior participant, Carmen frequently took epistemic responsibility in developing the unit of instruction (episodes 6.1-9), since she was the one

with prior experience of the unit and was drawing on her knowledge of what had been taught. On the other hand, Oscar, with a strong knowledge base in physics, took epistemic responsibility for going beyond the basic content (end episode 6.2 and in episodes 6.9-10). Those with less knowledge often took epistemic responsibility by seeking information (e.g., Carmen in episodes 5.1-2, 6.8, 7.6), or asking for clarification or confirmation of understanding (e.g., Oscar in episodes 5.5, 7.1 and 5). In this they could be said to have been taking on the dialogical role of the novice, which “is to grasp the meaning of what is being said by the expert and to bring together the concepts, facts and relationships that comprise the relevant action knowledge” (Wintermantel, 1991, p. 124). Also, perhaps because he had adopted the role of scribe, and perhaps as a personality trait, Oscar often took epistemic responsibility by distilling information or views that had been canvassed in the preceding utterances (e.g., 7.1: 13-14, 7.5: 54-56). Another way they all took epistemic responsibility was by putting forward their concerns (e.g., episodes 6.8-9, 7.5) and their views on the topic under discussion.

Having epistemic responsibility meant a certain dominance in the interaction in regard to number and length of turns. For instance, Lytton consistently speaks more than the others, and Carmen speaks far more in the Chapter 6 episodes on her unit of instruction than in any other. Those with less knowledge typically took more of the kinds of turns that would structure the interaction to meet their knowledge-building purposes. Throughout the data, the ones positioned to adopt epistemic responsibility readily took up the required position. Never once did someone say, “I don’t know” in such a case. This suggests accurate positioning, on the one hand, and acceptance of the duty and right of epistemic responsibility, on the other.

Taking epistemic responsibility frequently meant re-structuring the meeting topic in some way, and was signalled by the use of some kind of managerial language for focusing or re-focusing the group, such as Lytton’s “Right” and “Now” (episodes 8.1-2) and his “Alright, alright. Let’s look at ..” (episode 5.5). Such instances suggest “language used in order to establish and then change the nature of the relationship between A and B and the nature of the activity type in which they are participating” (Thomas, 1995, p. 194), and specifically of what Foppa (1990) calls intentional or strategic management of topic. Topic also shifted through expressions of emotional states, such as Carmen’s expression of frustration when, in episode 7.7, she castigated a written outcome statement as “your racist statement,” which shifted the topic from (a) how to word the statement, to (b) the word “racist”, (c) conciliation, (d) how to bring in an suggested spiritual Aboriginal perspective, and, somewhat explosively, (e) how *not* to represent the Dreaming. Such expressions of emotion “seem to be at least as important for the development of conversations as the more ‘intellectual’ strategic intentions” (Foppa, 1990, p. 197).

In addressing dilemmas, participants repeatedly attempted to bring their own perspective to bear and have it taken up and discussed in the group as a moment of discursive intersubjectivity (Rommetveit, 1990). Sometimes setting a perspective located a teacher in opposition to policy positions or to another teacher's position, requiring the language of argument or persuasion, of framing and re-framing. On the whole the curriculum development environment provided social support for dialogue, and a disincentive for conflict, so that text production was something all participants seemed to engage in with positive intentions.

9.1.4 Task from a dialogic perspective

A dialogic perspective on the curriculum development task as it has emerged from the above analysis is highly compatible with the notion of "curriculum making" (Clandinin & Connelly, 1992), based in a deliberative framework involving "choice and action emanating from the practical" (Schwab, 1969, cited in Hannay & Seller, 1990, p. 240). The teachers' work consistently involved deliberation on the underlying question, "What counts as science education?" in order to reach "a defensible decision [...] uniquely tailored to individual situations" (Roberts, 1988, p. 30).

In addition, the teachers' work from time to time showed itself as actively "transformative labour" (Connell, 1995), in other words decision making with the potential for transforming practice. We saw this, for example, in their choices of constructivist learning processes in the formulation of the outcome statements, and in regard to offering junior secondary science students the "bigger picture" of wave theory. Such meaning making is not a routine operation, but a matter of professional decision making set within a cultural-historical frame of structural continuities and discontinuities (Seddon, 1995, p. 402). It calls for the sort of emphasis on knowledge building that we have seen here in the teachers' construction of the task. The principal's second curriculum of teacher learning was not only central in the day-to-day construction of the curriculum development task, but taken up with a vengeance by these teachers. This corresponds with research indicating that professional learning opportunities embedded in teachers' work and as part of the culture of teaching appear to be highly effective (Day, 1999). Day (1990) explicitly advocates a professional development goal for school-based curriculum development, in addition to the immediate goals of decision making, text production and classroom action. He suggests curriculum development as "the servant of continuing professional development" (Day, 1990, p. 236), requiring the support of management and spaces for reflection, analysis and experimentation on the basis of which decisions for changing practice may be taken. This is exactly what the principal set up through her management process and how the teachers' work has in many ways constructed the task.

9.2 A dialogic perspective on state education policy

Across Chapters 5 to 8, policy manifested in two forms: as document – the Statement and Profile for science, and as slogan – “including Aboriginal perspectives” and “incorporating a literacy focus.” While the slogans provided a less material presence in the teachers’ work than the documents, they were highly pervasive and influential nonetheless. I have taken the notion of “slogan” from Seddon (1995), who suggests that contexts of education, such as “public education” can be sloganised for political purposes, “*to construct an image or story of the past, present, and/or future*” that crystallises the hopes, fears, possibilities and constraints associated with certain practices, and that mobilises people for or against them (p. 402). Such crystallisation and mobilisation was a feature of the teachers’ work represented in Chapters 7 and 8.

In investigating how the teachers’ work constructed these documents and slogans, I start from the position that while they are compositionally monologic, being produced without expectation of a direct verbal response, they are functionally dialogic, being produced in expectation of an education-labour response in particular workplace settings. This is in accordance with Bakhtin’s (1981) position that all texts that are monologic in their compositional structure nevertheless “are oriented toward the listener and his answer” (p. 280). We see this audience-orientation very clearly in the design of the Profile – the grid of Strands and Bands, the dot point presentation, the consistent patterning of the outcome statements, and so on. Also the very fact of a printed document and slogan signals an intention to act upon others and generate a response.

As a required framework for the teachers’ work, the project brief constructed state policy in two ways. First, the Profile was specifically referred to in the project requirement to write student outcome statements for all units of work and, where possible, cross-reference them to similar or higher order outcomes in the Profile. Second, the brief required curriculum development to take account of certain state policy priorities, including Aboriginal perspectives (Chapter 7) and students’ literacy development (Chapter 8). In this way, the brief can be described as the first in “an observable succession of transformations” (Huberman, 1993, p. 24), re-shaping state education policy to respond to the local context.

Both the project brief and the substantive goals of the teacher meetings, indicated in chapter titles, acknowledged state policy as a required framework, and specifically as state coordination of and control over curriculum development across schools. This suggests an appreciation of textual realities as “the ground of our contemporary consciousness of the world beyond the immediately known [...] integral to the coordination of activities among different levels of organisation, within organisations, and in the society at large”

(Smith, 1990, p. 83). The following discussion indicates that the teachers' work largely demonstrated acceptance of and compliance with this function of curriculum coordination for the policy documents and slogans. It constructed policy in terms of authority: authoritative discourse, voice and text production.

9.2.1 Policy as authoritative discourse

The teachers' work of relating existing and proposed curriculum topics and activities to the Statement (episodes 5.5-8) and to the Profile (episodes 6.1-2, 5, 8) constructed these policy documents as an accountability structure within the education-labour relationship. As the teachers saw it, what the school taught in junior secondary science needed to "fit" within the Statement and Profile framework, and they were relieved to find that this was in fact the case (Chapter 5).

The two curriculum documents were disseminated as the authoritative version of school science: the Statement for Science as a "framework for curriculum development by education systems and schools" (Statement, p. iii), and the Profile for Science as a framework for assessment and reporting, presented. The teachers' work typically endorsed this construction. Also, there was no quarrel with the construction of science in terms of Strands and levels of progression, and no quarrel with its construction entirely within a western frame, as required by the overseeing decision makers (Jenkins, 1992), excluding other ways of knowing from what could count as science. The documents provided a verbal construct of science and education as two intersecting super-categories of human activity (Harris, 2005) – specifically a compartmentalised construction of science and an outcome-based construction of education. This verbal construct had the features characteristic of authoritative discourse, being tightly formulated, stable, rigid, broad-based and communitarian (Holquist, 1997, p. 403).

On many occasions, the teachers' work accepted the discourse on its own terms, as having authority over them (e.g., episodes 5.1-3, 5.5, 6.1-2, 7.6). However, it became progressively apparent that this authority was multi-voiced and not necessarily consistent or transparent. For example, the conflicting voices of constructivist learning theory and outcome-based education meant that the views of school science formulated in the Statement were not necessarily reflected in the learner processes favoured in the Profile. On the one hand, the first of the nine goals for science education in the Statement mentions "the tenacious pursuit of evidence to confirm or challenge current interpretations" and the fifth refers to the "application and evaluation of scientific knowledge and understanding to construct and modify thinking" (pp. 3-5), and also the Working Scientifically Strand emphasises "the processes and methods of exploring, generating, testing and relating ideas" (Statement, p.

15). On the other hand, the process items in the concept Strands of the Profile do not reflect these positions at all, and those in the process Strand only to a limited extent. For example, “generating” knowledge is highly valued in the constructivist view of learning dominant in the Statement, yet unmentioned in the Profile. By its absence, certain perspectives on knowledge also go unmentioned. For example, the teachers wanted students to generate “the law” of reflection, but laws of science are not represented as a perspective in the Profile outcome statements. This tension undermined the construction of state curriculum policy as authority.

Another instance of conflicting voices in the authoritative discourse was taken up in the teachers’ work related to Aboriginal perspectives (Chapter 7). Authority in public policy builds on “the difference between the credibility granted to some sources and the treatment of others as mere opinion or as lacking credibility in some way” (Smith, 1990, p. 101). This is manifested in the requirement to include Aboriginal perspectives in science whilst simultaneously rejecting Aboriginal ways of knowing as having anything credible to offer in the construction of western science. Despite this low valuing of Aboriginal knowledges, teachers are somehow to avoid positioning them as deficient and to “increase all students’ appreciation” of them. The authoritative discourse thus places teachers in an untenable position, which is shown up several times in Chapter 7. The issue of valuing local knowledge systems is closely linked to the tension between upholding and maintaining cultural identity on the one hand, and producing equal outcomes on the other (Nakata, 2002b).

The Profile comes down in favour of equal outcomes, while the Statement avoids the issue by presenting Indigenous “traditions of knowledge production” unproblematically and inferring that western scientific ways of knowing are superior as well as dominant. The Statement thus passes over “the central contradictions associated with race and the curriculum” (McCarthy, 1994, p. 94), and merely promotes content addition and “sensitive treatment.” This might be seen as a discourse of cultural racism deriving from long-held and little-recognised beliefs – a subtle, implicit racism (Hall, 1990). It raised subtle, implicit dilemmas at Countrytown High.

The presence of curriculum policy as document and as slogan provided a means of apprenticing the teachers into authorised ways of looking at learners and content and thereby into the currently dominant culture of science education. Working with the documents also provided a means for the teachers to become aware of the authoritative discourses, to hold them up against their own practitioner experience, and to interpret and even contest them in terms of the locale.

9.2.2 Policy as authoritative voice

As an accountability structure within the education-labour relationship of the teachers' work, the Statement demanded compliance, and the teachers all began by adopting an "ideal reader" position as they went through its description of learners in Band B (episodes 5.4). In their compliance, they attempted to make meaning from the text in the ways intended by its authors; they accepted its own view of itself as the authoritative word on science education. However, once confronted by the "unitary language" of the curriculum policy (see Chapter 5.3 and below) and its underpinning ideology of centralisation (Bakhtin, 1981), they quickly relinquished the ideal reader position and began to act against it, mocking the descriptors of learner behaviours and giving counter instances (episodes 5.4 and 5.6 to 5.8). Policy-compliant readers would have allowed "their perspectives on their own experience [to be] transposed and subdued by the magisterial forms of objectifying discourse" (Smith, 1990, p. 4). These teachers did not. They rejected the monologic stance (Bakhtin, 1981) of the document and engaged with it dialogically, thereby for that moment rejecting its authority over them.

Following these episodes, Carmen questioned (episode 5.9) the consultation process undertaken by the authors of the document, intimating that they may have "got feedback from mostly, Topmarket College" and not thought about Countrytown and similar schools. This in turn brought a comment from the Literacy coordinator to the effect that the social justice feedback from schools was thought to have rarely been incorporated into changes. The Statement's authorial credibility was shaken during the meeting, and the teachers no longer took its knowledge representations as fully authoritative. Over time the teachers' work constructed policy as potentially fallible, and, as with other policy, requiring "a high level of discretion and interpretation" (Elmore & Sykes, 1992, p. 186).

To this end, the teachers engaged in what Levinson and Sutton (2001) call *appropriation* of policy, whereby policy as a discursive mode of governance, "is constantly *negotiated* and reorganised in the ongoing flow of institutional life" (Levinson & Sutton, 2001, p. 2). In order to make meaningful local sense of policy, their appropriations breached the borders of authoritative discourse. On the whole they made only "secondary adjustments" (Riseborough, 1992), "contained" in that they did not require radical change. However, reconstructing Band B to include Year 8 students, with Band C restricted to Years 9 and 10 (episode 5.6), was rather more than a secondary adjustment, justified by the teachers in terms of local conditions, which they saw as rendering the official norms invalid.

There are no instances in the data of the teachers making any adjustments to the content categories or topics within the Band accounts of what learners might engage with in science. The adjustments all concerned the representations of students as learners and resistance to

the universalising, normalising policy discourse. Their position parallels the position taken by Garbutcheon Singh (1994) from a much wider perspective.

The policy framing of students is a form of cultural imperialism involving the universalisation of a dominant group's experience and culture, and its establishment as the norm. The dominant group, often unwittingly, projects its own experiences, perspectives and interests as representative of all social groups (Garbutcheon Singh, 1994, p. 3).

The teachers understood the Statement to be projecting a middle or upper class view of students as representative of all students, and countered that view. They also understood it to be projecting the experiences of the dominant western scientific community as representative of all science, but they were less ready to critique that projection, being themselves members of the community and employed to inculcate its positions. Nevertheless, they did demonstrate what I have called a "discourse of cultural reflection" (Chapter 7.3.2), which allowed them to begin considering predetermined curriculum content from the standpoint of Indigenous knowledges and ways of knowing – developing an intercultural "radar."

Various such policy-brokering discourses developed in relation to the policy discourses, mediating policy and practice. They included a discourse of whole-school commitment to some state policy priorities over others; a discourse of teacher concerns regarding the implementation of state curriculum policy; a discourse of content addition for Aboriginal perspectives, combined with an emergent discourse of cultural reflection, and a discourse of literacy as process and text type. Such policy-brokering discourses were directly responsive to policy as textual representation, and the teachers' experience of policy fallibility as representation.

9.2.3 Policy as authoritative text production

The monologic composition and stance, the wording and the visual presentation of the documents were all consequential in terms of how policy was constructed in the teachers' work and how it was translated into curriculum plans. As the teachers began to familiarise themselves with the two new curriculum documents for science, their function as representation was consistently referred to. For example, in regard to the naming of the documents and their function, the Literacy coordinator affirmed to Carmen that the Statement was "a generally agreed statement about what Science is about," and again shortly after, when confirming that it did not incorporate specific objectives, "It IS just a statement" (episode 5.1). In clarifying the relationship between the Strands of science and the Bands of schooling, he referred to how they were represented on the page, "So the Strands go vertically and the Bands go horizontally" (episode 5.2). Thus what was to count as content in science education at Countrytown High was delineated through the lattice-work of vertical

Strands and horizontal Bands, whereby categories of content were constructed. What was taught needed to be made to “fit” those categories (episodes 5.5, 6.1-2, 6.8).

In addition to categories of content, the policy also constructed categories of student, and presented them as universal reality. This was achieved through the use of generalising or universalising grammar. Examples include “the learner,” “learners,” “students,” “Students in Band B,” implying *all* such students (indicated through the generalising “the” + singular noun or the generalising plural noun form without “the”), and students “are attracted to,” “like,” “learn,” “are aware of,” “take part in” implying *consistently* or even *always* (indicated through the use of the generalising present simple tense). This kind of grammar functioned to idealise descriptions of student behaviours as if they were natural, which was further supported by lexical choices such as “typically” (Statement, p. 1). Through such textual devices, “[a]uthority bleeds from the institutional relations of ruling to the relations of authority at the surface of media” (Smith, 1990, p. 101).

However, there were students at Countrytown High who could not be made to “fit” the descriptions of anticipated learning behaviours. Through their commentary (episodes 5.4, 5.6-9) the teachers rejected this marginalisation of their students, and the authority of the textual representation, acting dialogically against the compositional and ideological monologue, which closed “down the represented world and represented persons” (Bakhtin, 1984, p. 293), and did not invite a response. Whereas earlier the teachers had obeyed “the ground rules which govern the production of appropriate utterances” (Wegerif & Mercer, 1996, p. 60), for example by “ventriloquating” (Bakhtin, 1981) policy, this now ceased. By flouting the institutionalised ground rules, including mocking the representations, they not only “profaned” the authoritative discourse (Bakhtin, 1981), but made new ground rules to support further transformations (Huberman, 1993, p. 24) to state policy. Through their work, policy was constructed as fallible in its representation, and open to the exercise of dialogic practice in ways not anticipated in the monologic policy discourse.

9.2.4 Policy from a dialogic perspective

While Ball (1994) constructed policy only as text and discourse, the teachers’ work in this study provides strong evidence for constructing it also as dialogue. Teachers began by engaging with policy as text – glossy newly-printed multi-coloured tightly structured, often tabulated text. In dialogue with this text, they gave it meanings, meanings that sometimes conformed to the position of ideal reader and sometimes did not, that sometimes privileged the discourses embedded in the text and sometimes discourses of the locale. Policy as discourse was uncovered through the teachers’ dialogic engagement with policy as text; but

without that dialogue no discursive meanings could surface. Dialogue, as Bakhtin suggests below, was central to the generation of local truths for policy meanings.

Truth is not born nor is it to be found inside the head of an individual person, it is born *between people* collectively searching for truth, in the process of their dialogic interaction (Bakhtin, 1984, p. 110).

Policy remains mere text without the participation of other “speaking consciousnesses” in dialogic interaction with it. Only in situated dialogue, in particular contingent conditions, can claims to authorised truth be interrogated, confirmed, contested or rejected.

Central to the notion of policy as dialogue is the notion of curriculum definition by state education authorities as a key means of externally regulating teachers’ work (Reid, 1997). The dialogue is undertaken on the understanding that this is indeed a cultural function of policy as text and as discourse.

[W]here gaps and disjunctures appear between the actualities of people’s lives and the categories and concepts laid down for the bureaucratic and professional textual realities that make the world bureaucratically and professionally actionable, those in direct contact with those actualities work hard to reproduce the sense of the enforced and enforceable categories in which they are to be made accountable (Smith, 1990, p. 104).

In a number of episodes we saw the teachers most definitely working hard to reproduce the sense of curriculum categories such as Bands (e.g., episodes 5.6), outcome statements (6.1-2), Aboriginal perspectives (episodes 7.1-6) and literacy focus (episodes 8.1-9). The dialogue thus started from a position of acceptance of authoritative discourse, and then moved to articulate the categories through the interplay of contextual factors. As Habermasian theories of legitimacy, communicative action and communicative ethics suggest, the dialogue changes the dimensions of authority, legitimating the authority of the local collective through the processes of discursive democracy (Warren, 1995).

Policy as a dialogic construct takes account of the fact that documents and their readers are “already positioned in an interdiscursive space, at the intersection of other texts, institutions, discourse formations and ideological structures” (Threadgold, 1986, p. 27). In this study, the interdiscursive space was shaped significantly by diverse contextual factors, including the previous curriculum documents for science, the view of science education current in the school, each teacher’s individual views of what science education should be, and the recognition by all parties that the documents were authoritative in the state education-labour relationship. It was also shaped by the wider social discourses of affirmative action and reconciliation that were sweeping across Aboriginal and White communities at the time. The tension between representations of western scientific and Aboriginal knowledges in the Statement and Profile for science reflects conflicts among political interests (Elmore & Sykes, 1992, p. 186) and associated political compromises (Taylor, Rizvi, Lingard & Henry,

1997, p. 15). The teachers encountered the residue of those conflicts and were obliged to make their own decisions in the vacuum left by the compromises.

By attempting to address the vacuum and come to common understandings, the teachers saw how policy positioning might be adopted, rejected or adapted. They appropriated policy by taking in certain elements, “thereby incorporating these discursive and institutional resources into their own schemes of interest, motivation, and action (Levinson & Sutton, 2001, pp. 3-4), and by rejecting or adapting other elements. This demonstrates dialogism functioning in a subversive relation towards authoritative discourse (Emerson, 1996, p. 114).

9.3 A dialogic perspective on teacher agency

Neither the Statement nor the Profile for Science explicitly acknowledges teachers and their agency as factors in school-based curriculum development. Rather, agency is located with an abstraction – the school. Choices for organising content and learning activities, for example, “belong with the school” (Statement, p. 15). Teachers are seldom mentioned in the Statement and not at all in the Profile, although the term “curriculum developers” is used occasionally. Nevertheless the Statement asserts that it merely defines the area and outlines its essential elements and a sequence for developing knowledge and skills (Statement, p. 1), and this implicitly assumes teacher agency in developing more precise frameworks and teaching programs. The policy construction of such agency, however, requires it to function precisely within the bounds of the view of science education put forward in the two curriculum documents.

While the project brief was not materially present during the teacher meetings, it was in itself a construction of anticipated teacher agency. Two features of the brief that profoundly shaped the bounds of that agency were that (a) it called for *referencing to* policy, rather than *working from* policy, and (b) it specified *explicit reference in the format of the curriculum outline* only for literacy, not for Aboriginal perspectives. Had these two features not been present in the brief, constructions of teacher agency might have been different. For example, the teachers might have developed their curriculum using the Statement and Profile as a starting point, and they might have avoided the dilemma of how to represent Aboriginal perspectives within the curriculum outline. Nevertheless, I believe the teachers’ work would have constructed teacher agency in much the same way, in terms of professionalism: professional discourse, voice and text production.

9.3.1 Teacher agency as professional discourse

State policy expected school-based curriculum development to “reflect advances in our knowledge – both of the learning area [...] and how students learn” (Statement, p. iii), which

implies an education-labour responsibility laid upon teachers to be alert to such advances and able to critique and apply them with discrimination in local contexts. At the same time, the Statement and Profile were provided as authoritative versions of such advances, and an obligation laid upon teachers to conform to them. Through the invisibility of teachers in these documents, teacher agency and professionalism were constructed in terms of policy compliance.

Instructions from the Department stipulated that the Statement was to guide teachers' planning, and constructed teacher agency in school-based curriculum development as the generation of intended outcomes according to the five-strand construction of science presented across the Bands of schooling in the Statement. Specific content, learning activities and assessment procedures were then to be developed, drawing on locally relevant aspects of science education. Having done that, teachers were to locate their units of work against outcome statements in the Profile. Teacher agency was thus constructed in terms of content elaboration and pedagogical practice. Teachers were to use the Profile primarily for referencing their own prior choices of content, which were to be based on the descriptions of content given in the Statement. This process, and its associated construction of teacher agency as policy implementation or brokering, assumes close compatibility between the Statement and Profile. However this is not entirely the case; there is a certain disjuncture.

While the Statement invites the flexible exercise of professional judgement, the Profile, presented as a set of "shoulds," invites a more mechanistic exercise of standardised procedures (cf Helsby, 1999, p. 172). The former creates spaces whereby professional discretion can exert positive learning effects on a local basis, whereas the latter closes them down (cf Hargreaves, 2001, p. 175). A further difference is the Statement prioritises constructivist learning, while the Profile prioritises behaviourist outcomes. Both authoritative policy discourses required teacher compliance, and yet the two were not always readily compatible. The tension between these competing discourses implicitly called for a more politicised interpretation of the education-labour relationship, and a more active construction of teacher agency in terms of "curriculum making" (Clandinin & Connelly, 1992).

The teachers' curriculum making practices in this study reflect what Elmore and Sykes (1992, p. 190) refer to as organic policy making, taking account of interest group agendas, and engaging with the problematic relationships among different interests and pathways. We saw this particularly in the attempts to include Aboriginal perspectives and a literacy focus within a traditional compartmentalised construction of western science; and we saw it also in the attempts to negotiate relationships among discourses of outcome-based education, constructivist learning, educational accountability and contextual relevance. Teacher agency was centred in the work itself, and in the locale rather than within individual teachers,

growing out of the dialogic spaces in the education-labour relationship. Notably, it grew out of dialogic spaces among the education-labour requirements to make education relevant to students, to generate written school-based curriculum outlines, to engage with curriculum policy and make decisions about its local interpretation, all of which involved making sense out of the competing discourses of science education.

9.3.2 Teacher agency as professional voice

Competing discourses generated local concerns and dilemmas, which required teachers to engage their own professional voice in problem investigation and problem solution. The most vivid dilemmas encountered by the teachers related to the inclusion of Aboriginal perspectives in the science curriculum, requiring “an assessment of conflicting values” (Billig et al, 1988, p. 163). Addressing these dilemmas involved reflection, negotiation and compromise, forcing the teachers to think critically and creatively, to persist in trying to get meanings across to each other, and as Greene (1986, p. 72) puts it “to make increasing sense of their actually lived worlds.” Such teacher agency in localising curriculum works against what Gruenewald (2003) calls the “placeless” curriculum put forward in discourses of educational standardisation, which Gruenewald suggests offers only a generalised view of the world and risks regimenting learning experiences.

Western constructions of science were deeply embedded in the teachers’ consciousnesses as part of their schooling and again in their teacher education. Such constructions showed themselves in professional judgements of other views of reality, of what was to count as content in science education. In particular, by using their own professional voice regarding the inclusion of Aboriginal perspectives, the teachers made themselves professionally vulnerable, putting their ideas at risk of rejection, as when Oscar implied that it was not appropriate to raise the cultural baggage of science (episode 7.5) or when Carmen proposed making up a Dreaming Story as a classroom task. This also involved active risk taking, as when Oscar brought to the dialogue his own developing professional voice on how to relate scientific “fact” to Aboriginal “fact.” Through such dialogue, a person “not only shows himself outwardly, but he becomes for the first time that which he is – [...] not only for others but for himself as well” (Bakhtin, 1984, p. 252). According to Bakhtin, “human agency and constructive change in this society come about through an accretion of tiny personalised responses” (Emerson, 1996, p. 114) taking place in dialogue such as this, where individuals accept their own “answerability” or “respons-ability” (*otvetstvenost’*) as part of their personhood. In this case, Oscar was able to clarify both his dilemma and his answerability in relation to it.

The data provide many other instances of tiny personalised responses involving teachers' own professional voice and bringing about a series of small and perhaps not so small changes in the curriculum process and sometimes in its eventual product. For example, every time the teachers brought up their concerns and managed to gain a hearing for them, some small change eventuated. One example of a not so small change came out of the dilemma about whether or not Aboriginal perspectives should be "outcomed" (i.e., incorporated into a core learning outcome for a unit of work) or merely mentioned as an aside (episode 7.7). Given that the project brief did not specify explicit reference in the format of the curriculum outline, and given the difficulty the teachers encountered in wording an outcome inclusively, the transformative options for assessable content to be inclusive of Aboriginal science were lost. Through the dialogue, they were articulated out of "what counts as science" and into "what might make science more interesting." Skill in wording unit outcomes appropriately, as well as in wording curriculum assumptions such as what counts as "fact," is thus significant not only in curriculum development processes, but in potential curriculum products.

9.3.3 Teacher agency as professional text production

There are many instances of choices at the level of text being consequential in the conduct of the teachers' work. Examples in teacher talk include the use of "made up" and "mythical" in regard to Aboriginal Dreaming; describing an outcome statement as "boring" (episode 6.7) or "racist" (episode 7.7); and the adoption or rejection of epistemic responsibility as described in section 1.1 above. In addition, there are instances of choices in written text being potentially consequential in terms of how classroom curriculum might be enacted following upon the curriculum development process and its written product. This is the focus I want to take up here, specifically in regard to the wording of unit outcome statements, notably the process items, such as *describe* and *identify* (the two most frequently used across the Profile). I do this because the teachers' work constructed it as significant, and because dialogic theory constructs it as significant in terms of its potential educational effects.

While most policy researchers in the education field have been concerned with "the translation of the crude, abstract simplicities of policy texts into interactive and sustainable practices" (Ball, 1994, p. 19), the teachers in this study were frequently concerned with the translation of interactive practices from the classroom to the "crude, abstract simplicities" of the Profile outcome statements. What the data analysis shows is that this latter process, like the former, involves "productive thought, invention and adaptation" (Ball, 1994, p. 19). This was noticeable in Chapter 6, where the more the teachers talked about the Profile outcome statements, the more they became aware of the need to formulate outcome statements in ways that represented preferred practice at Countrytown High.

The teachers spent some time generating outcome statements for their unit of work (e.g., episodes 6.2-7, 6.9) and the wording frequently became a focus of the interaction. This was most commonly in regard to choice of process item, e.g., not “understand” but “generate” the law of reflection of light (episode 6.4), not “describe” but “generalise” about images in a plane mirror (episode 6.5). “Isn’t the key to using light that they should be able to extrapolate” (episode 6.9: 8-11). From time to time, wording the perspective and/or scope also took their attention. For example, Oscar oscillated for a moment between “characteristics” and “fundamental properties” in regard to *perspective*, and expressed a need in regard to *scope* to specify the characteristics in question, wondering whether to include or exclude duality for Year 10 (episode 6.3). By contrast, Oscar removed the *scope* component almost entirely in the statement “describe the effects of the refraction of white light” omitting all mention of using prisms, which Carmen had used primarily as a tool for students to investigate refraction rather than merely as a basis for description, i.e., a tool to support students in constructing their own knowledge (episode 6.7). This sort of mis-representation is perhaps what led Carmen to reiterate so emphatically: “We don’t word our outcomes like this, we word our outcomes for OURSELVES.” (episode 6.8: 30-31).

In response to this, Lytton expressed concern that their choice of wording should “transmit the degree of hardness” intended in an outcome statement so that other staff could understand the reasoning through the wording (episode 6.8, 25-28). He saw the wording in the outcome statements as a means of showing the graduation of Levels (episode 6.8).

As mentioned, the teachers paid particular attention to the process items in the outcome statements, noticing the frequency of verbal processes such as *describe* and *identify*, and critically evaluating the limited range of verbal processes available in the Profile. Specifically they found the Profile outcome statements did not include the kinds of processes they expected from students in their constructivist classrooms, e.g., *generate* (episodes 6.4 and 5), *generalise* (episode 6.5), when Carmen comments about the Profile “Not much in here about that” and Oscar confirms, “And none of those are in there.” Similarly, when they looked for *differentiate* (episode 6.6), it was absent, even among the indicators. Having students differentiate, generalise and generate ideas, and encouraging them to speculate, take risks and clarify their thinking is very much a part of working scientifically in constructivist approaches to science education. While this is a feature of the Working Scientifically Strand in the curriculum documents, the teachers had chosen to ignore that Strand until after conceptual content had been established, so they did not have access to its textual options. Nor did they refer back to the Statement and notice the disjuncture between the predominantly constructivist process items in that document, and the predominantly behaviourist process items in the Profile outcome statements, particularly across the

conceptual Strands. To this extent the teachers limited the information base upon which to make choices at the level of text, but this did not hold them back from making their own selection of verbal processes.

I believe the teachers' concern over the process words in their outcome statements suggests an awareness of the importance of language in scientific thinking and in students' apprenticeship into the scientific discourse community. This reflects a whole body of work on verbal thinking processes, including Whorf's notion of linguistic thinking, as "a complex of mental processes intimately associated with conceptual activity of a distinctively human and shareable kind" (Lee, 1997, p. 4). This does not mean there is no thinking without language, but that the distinctively human style of thinking is linguistic thinking, where thought and language are integrated and not influencing one another as separate processes. Whorf stressed that metalinguistic awareness, and the finer calibration of agreement which it makes possible, is also crucial to the advance of science.

Such words as "analyse, compare, deduce, reason, infer, postulate, theorise, test, demonstrate" mean that, whenever [scientists do something they] talk about this thing that [they do]. As Leonard Bloomfield [1887-1949] has shown, scientific research begins with a set of sentences which point the way to certain observations and experiments, the results of which do not become fully scientific until they have been turned back into language, yielding again a set of sentences which then become the basis of further exploration into the unknown (Whorf, cited in Lee, 1997, p. 20).

The decision taken by the teachers to delay looking at the process Strand outcomes in the Profile seems to me to risk limiting the range of linguistic thinking required of students, certainly in terms of assessable outcomes and possibly in terms of classroom activity. The process and orientation items restricted to the process Strand (see Appendix 2) were not represented in the initial structuring of the program. For example, when looking for appropriate outcome statements, none came before them that were to do with care/responsibility, conclusions, factors/influences, limitations, observations, procedures or questions, all central in the process Strand and in a number of the goals for science education given in the Statement.

9.3.4 Teacher agency from a dialogic perspective

By participating in curriculum development processes, the teachers gained a greater understanding of the nature of those processes. This frequently occurs for junior participants in an activity, "as a 'by-product' of communicating in it" (Wertsch, 1985, p. 216). For example, by collaboratively reflecting on policy meanings, the teachers were both expanding their epistemological options for thinking about curriculum development and facilitating subsequent decision making. This is paralleled in a study referred to by Grundy and Bonser (2000) of teachers starting to plan from a new outcome-based curriculum framework who

found that coming together with others to collaboratively reflect on what the outcomes might mean was highly valuable both as learning and as decision making.

Grundy's (1994a, p. 34) view that "judgement rather than prescription will inform action" in curriculum development is borne out by the ways the teachers' work dialogically constructed teacher agency as a politicised stance within the education-labour relationship, and more active than the policy implementation stationing ascribed to them through the state curriculum documents. Even though possibilities for the transformation of policy were "strongly regulated" (Bernstein, 1996) through the policy discourse, we saw the teachers exercising agency in dialogue with policy and demonstrating the distinctive organisation cooperation imparts in workplace activity (Smith, 1990, p. 70). Throughout the data, teacher agency was dialogically constructed in terms of expertise allowing individual teachers to take an authoritative stance and adopt epistemic responsibility within the curriculum development process. To do this, they needed to be able to articulate knowledge and demonstrate skills in the moment, showing themselves as "active and rational interpreters" (Hargreaves, 1988, pp. 211).

9.4 The case for a dialogic perspective on school-based curriculum development

Building on the previous discussion, and on associated literature, I argue here for a broader application of a dialogic perspective on school-based curriculum development. I do this first (section 4.1) by identifying features of the currently dominant task, policy and teacher agency perspectives reviewed in Chapter 2.2, and reading them against features identified in sections 1 to 3 above. I then go on to take a dialogic perspective on language consequentiality in school-based curriculum development, in regard both to its processes and the products they potentially generate. I argue that this suggests the value of constructing teachers' work as language work.

9.4.1 Contrasting a dialogic perspective with task, policy and teacher agency perspectives

On the basis of the foregoing analysis, I take the position that a dialogic perspective on school-based curriculum development is more representative of the teachers' work than any of the three perspectives currently dominant in the literature, namely task, policy and teacher agency perspectives (see Chapter 2.2). While each of these perspectives was evident from time to time in the teachers' work portrayed in Chapters 5 to 8, none of them on their own accurately represents what was going on in the data. For example, the teachers sometimes positioned themselves as subordinate to the Statement and Profile for science (a policy perspective), yet sometimes they flouted it (a teacher agency perspective); they worked at

producing a curriculum outline according to their brief (a task perspective), yet they consistently took power in flexibly managing that brief whilst functioning within the education-labour relationship of their work (teacher agency).

These three perspectives are monologic in that they single out and emphasise one curriculum development element over others, whereas a dialogic perspective places all such elements in dynamic relationship. A dialogic perspective does not privilege any one of task, policy or teacher agency, nor does it set them up against one another. On the contrary, a dialogic perspective takes as its very ground the intersection of conflicting power relations, competing discourses, and the centrifugal and centripetal forces of heteroglossia. By taking this multi-voiced condition as the ground of school-based curriculum development, a dialogic perspective is readily able to make visible and acknowledge the contradictions internal to it, and the associated array of tensions, concerns, dilemmas and compromises, as well as strategies used to address them. In addition, a dialogic perspective acknowledges the consequentiality of language, which is not the case with task, policy or teacher agency perspectives.

In policy and task perspectives, state education policy is positioned as a privileged participant in school-based curriculum development, and treated not only as having authority in the education-labour relationship of teachers' work, but as having legitimate "imperialising power" (Fiske, 1993). In a teacher agency perspective, state policy is positioned as powerful and authoritative, but its imperialising power is not privileged over teachers' own localising power. In a dialogic perspective, imperialising and localising power relations are constructed in articulation, at all times with a space available for indeterminacy, for the potential to shift given a change in contingent conditions. A dialogic perspective on policy in school-based curriculum development takes account of the monologic composition of policy as text and also the dialogic process of making meaning from text in workplace settings, uncovering policy as discourse. A dialogic perspective requires an appreciation of policy-in-context, as a situated set of cultural-historical "truths."

From a task perspective, the goal of teachers' curriculum development is constructed as the development of a comprehensive, balanced and challenging program, simultaneously responsive to learner needs, mandated policy and the monitoring of enacted programs. However, from policy and teacher agency perspectives such a goal is unacceptably unproblematised, since it fails to acknowledge the multiple interests and social forces involved. A dialogic perspective on goals similarly adopts this latter position, but takes it further to acknowledge not only substantive and process goals, but the intersections among them, emphasising the relational nature of school-based curriculum development. Task and policy perspectives position control as coming from above through mandatory requirements,

while the teacher agency perspective emphasises situated decision making, often compliant with policy but sometimes oppositional or unrelated to it. A dialogic perspective also emphasises situated decision making, and specifically acknowledges the inevitability of competing discourses and conflicting interests, as well as the relational processes engendered by situated goals that emerge from the curriculum development activity itself.

A task perspective constructs the teacher as technician and the task as something pre-determined and routine, which is merely carried out by the teacher in accordance with certain listed principles (as in the *Teachers' Work* document reviewed in Chapter 2.3.1). Task fulfilment from this perspective is simply the achievement of identified outcomes, such as a written program, in a way that can be measured against identified criteria. A policy perspective similarly constructs the task as pre-determined, with the additional feature that criteria for task fulfilment prioritise policy implementation and the teacher is not only technician, but specifically stationed as compliant technician. A teacher agency perspective constructs the curriculum development task with more fluidity, as only partially determined and hence open to re-partialising and re-shaping in light of the context of practice including the concerns and dilemmas it presents. This is similar to the construction we have seen in the data, but whereas a teacher agency perspective puts the teacher at the centre of the curriculum development task, in the data the dialogue itself is at the centre. In other words it is the teachers' interactive work that shapes the task rather than teacher agency as such.

A dialogic perspective puts the spotlight on teachers' work, not as a set of unproblematised, routinised operations (as in a task perspective), nor as a matter of compliance and policy implementation (as in a policy perspective), but rather as a complex play of factors and forces that engage professional judgement (as in a teacher agency perspective). A dialogic perspective is thus closer to a teacher agency perspective than to either a policy or a task perspective, but it differs from that perspective in foregrounding the activity engaged in by the teachers rather than the teachers themselves. It thereby highlights dialogue and interactive meaning making over and above individual power and action, and simultaneously allows space for other agencies such as those of learners, school cultures, and state policies.

A dialogic perspective on school-based curriculum development assumes a "dialogic field of vision" (Bakhtin, 1984) constituted through diverse discourses and social forces, through situated voices and "zones for hearing," and through particular representational practices. Within such a field of vision, new and unforeseen possibilities for meaning making are recognised, and a space is available for either opening out the dialogue or closing it off. A dialogic perspective highlights such spaces, valuing "dialogicality as a special form of interaction among autonomous and equally signifying consciousnesses" (Bakhtin, 1984, p. 284). It acknowledges curriculum meaning making as articulation requiring "active and

intentional political work [...] within determining conditions” (Fiske, 1996, p. 213), and thus as an active site of a broader social struggle for meaning (Hall, 1996).

Establishing a dialogic perspective allows for a systematic and multi-dimensional understanding of the place of language in teachers’ work, and the significance of that place. On the one hand, it affirms that, as Olson (1992) asserts, the “[d]ialogue itself is one way to begin to examine the nature of the social system which underlies practice” (p. 80). On the other hand, it endorses Hall’s view that meanings “are full of the same contradictory and contesting forces as the society which produces, circulates and consumes them” (Fiske, 1996, p. 218). The contradictory and contesting heteroglossic forces produced, circulated and consumed by educators constitute the underlying ground for school-based curriculum development, while the relational work done by teachers in making local meaning constitutes the active foreground. A dialogic perspective brings this alive by constructing teachers’ work as language work.

9.4.2 A dialogic perspective on language consequentiality: Teachers’ work as language work

Through a search for places where language can be seen as consequential in teachers’ work, this study has made visible the power of language to make a difference both in the processes of school-based curriculum development and potentially through its products. Adopting a dialogic perspective highlights the language work inherent both in processes and products.

In regard to the processes of school-based curriculum development, what has been shown across the data is that language as a resource for enacting school-based curriculum development materially incorporated and represented the power relations inherent within that activity. Consequently language was a force to be reckoned with, as became apparent to the teachers themselves at moments of interactive trouble. Such moments occurred most frequently when there was tension among competing curriculum discourses, whether policy or practitioner discourses; among different understandings of science; different degrees of pedagogical and/or scientific knowledge among the teachers; and other such differences. In other words language functioned smoothly as long as there were no contrasting rationalities (Freebody, 1996) coming into play, but when they did, clarifying participants’ use of language was central to their negotiation.

It is important to reiterate that language was consequential in the teachers’ curriculum development not so much as a factor of individual participants, but as a factor of the activity itself, which directly and indirectly acted upon participants’ use of language. It was the curriculum development activity itself that brought into play particular societal discourses and situated voices, and that required teachers to engage with particular produced texts.

Individuals accessed and engaged with these texts, voices and discourses, re-produced, ignored and contested them, but always within the frame of the activity.

This suggests that the more teachers are aware of the nature of the activity and how language functions within it, the more they can bring this awareness into the conduct of the activity, taking account of it as an integral part of their intellectual, emotional and organisational work (Groundwater-Smith, Brennan, McFadden & Mitchell, 2001). To this end, teachers need a meta-language that allows them to bring their awarenesses into dialogue.

[T]he ability to discuss the processes of language use enables us to ascertain the limits and boundaries of our social practices as they are reflected in how we make sense of our world through these processes. To neglect the development of that capacity is extremely perilous: what we do not know we do, we cannot criticise, or work to change (Lemke, 1985, p. 31).

Lemke's point suggests direct implications regarding a place for language in accounts of teacher knowledge, a concern taken up in section 2.1 below. It is also supported by Whorf's (1937) position that metalinguistic awareness should be integrated into all human sciences.

Apart from the actual processes of curriculum development, the data and analysis together demonstrate the power of language in opening up or closing off options for imagining curriculum as a product. This typically occurred as teachers interpreted and critiqued policy constructs, priorities and representations, and also in response to each other's curriculum ideas and proposals.

Sometimes competing discourses were in question, and one or other was pushed aside, closing off its options as an influence on curriculum. This occurred most notably in regard to discourses of outcome-based education and constructivist learning theory. The Profile outcome statements favoured students' use of verbal processes that could readily be measured, processes such as *describe*, *identify* and *explain*. The teachers' commitment to constructivist learning theory favoured students' use of verbal processes that involved problem solving, creative thinking, analysis and transfer, but that were less readily measurable, or less readily measurable in traditional styles of assessment. When the teachers' work was bathed in the Profile's authoritative policy discourse of outcome-based education (Chapter 6), alternative discourses risked being drowned out. One powerful example of this was when the zone for hearing any inadequacy in the verbal process *describe* as a student learning outcome was curtailed and debate closed off (episodes 6.7-8). In this instance, it is possible that the domination of the discourse of outcome-based education reduced the likelihood of outcome statements being framed in constructivist terms. If this is so, it privileged the systematicity of scientific method as opposed to the "creative leaps of the imagination, inspired hunches and guesses" also valued in the Statement for science (p. 3). Other instances of competing discourses were very evident in regard to the inclusion of

Aboriginal perspectives in the curriculum. The exclusively traditional discourses of western science put up barriers to the possibility of integrating Aboriginal knowledges, and permitted Aboriginal perspectives to be constructed only as illustrative content, irrelevant to the core business of the science curriculum (Chapter 7). In contrast, the long-standing Australian educational discourses of literacy across the curriculum supported the imagining of a science curriculum inclusive of literacy development. This was further supported by a textual location for literacy on the program outline. Adopting a dialogic perspective in data analysis highlights the consequentiality of language in all of these curriculum decisions.

More generally, the data repeatedly demonstrated (a) the power of the authoritative official discourse in universalising and normalising required learner behaviours, and (b) the power of both the compliant and the contesting teacher voice in carrying this discourse through into planned units of work, with potential effects in classrooms. A key site of this power lay in the wording of student outcome statements. Clearly from this study alone it is impossible to draw firm conclusions about the lines of effectivity between process items in outcome statements, the planning of instructional activities and actual student activity in classroom environments. However the data certainly invite questions about what might be the effects on student learning when teachers decide on one process item over another in formulating unit outcomes. If it is true to say that “when the focus changes to outcome rather than input, teachers and students can see immediately what is expected to occur” (Spady, 1993, p. 44), then it follows that the choice of process item in the outcome statement is extremely important. The predominance of *identify* and *describe* in the Profile, suggesting a particular set of beliefs about science education and desirable ways of working scientifically, may well privilege a transmission view of education over a constructivist view, with associated effects on classroom practice. This would be an instance of communicative institutions, practices and relations acting as a barrier to the re-articulation of cultural practices (Hall, 1996, 1997), and strongly suggests that the relationship between pedagogy and the language processes prescribed in outcome statements might warrant further study.

9.5 Chapter review

This chapter has built on the data and analysis in Chapters 5 to 8 to argue for a dialogic perspective on school-based curriculum development. The argument was based on the evidence of the consequentiality of language in the teachers’ work, and developed through an analysis of how the teachers’ work dialogically constructed itself, specifically in terms of task, policy and teacher agency. This analysis showed task to be characterised by goal-oriented discourses, voices and text production; policy by authoritative discourses, voices and text production; and teacher agency by professional discourses, voices and text

production. Section 4 then proposed a dialogic perspective on school-based curriculum development as a more representative view than a perspective privileging any one of task, policy or teacher agency. This suggests the value of understanding teachers' work as language work.

Chapter 10

Teachers' work as language work: Some implications

This study has tried to bring alive the place of language in the curriculum development work of one small group of teachers, and to put forward ways of thinking about that place that could be generative for a broader understanding of teachers' work as language work. Starting from a theorisation of language-in-context developed in Chapter 3, the data analysis focused on the articulation of tensions and compromises among multiple and sometimes competing discourses, voices and text.

As expected, the study has shown that language is consequential as a process in teachers' work, but it has additionally shown it to be consequential both as environment and consciousness in such work. Language-as-environment in the teachers' curriculum development emerged as consequential particularly in regard to curriculum policy documents, students' language proficiencies and preferences, and the teachers' own ongoing use of language within their meetings. Language-as-consciousness emerged as consequential in several areas: in how science education was constructed (Chapters 5 to 8), in how cultural and social inclusivity was constructed, specifically in regard to the inclusion of Aboriginal perspectives and literacy development in science classes (Chapters 7 and 8); and also in how teacher agency, state policy and the curriculum development task were constructed (Chapter 9).

Identification of these three parameters of language activity in teachers' work – language as environment, consciousness and process – suggests direct implications for accounts of teacher knowledge, as outlined in section 2 below. Implications for research and practical application also arise from the analysis, related to both the processes and potential products of school-based curriculum development, as briefly outlined in section 1.

10.1 Some implications for research and practical application

In regard to future research avenues, a logical extension of this study would be to systematically investigate the consequentiality of language in other aspects of teachers' work, including classroom interaction. For example, a three-level dialogic approach approach has already been used in investigating how the choice and presentation of classroom activities may support or constrain students' opportunities to engage in different types of language use (Feehan, 2005). It has also been used in investigating interaction in second language learning activities (Barnett & Daroon, 2002). Another interesting

application would be to investigate the language-related understandings, dispositions and skills that are involved in creating and resolving interactive trouble, when language itself becomes a problem space. This could be linked to the study of professional learning in team-based program development, where the group generates new ways of doing things, by taking account of individual input. The analysis in this study suggests considerable scope for such an investigation, with direct links to my next topic, which is the construction of places for language in accounts of teacher knowledge.

In regard to practical applications, a range of professional development and teacher education options can be imagined. For example, teacher education programs include courses on educational contexts in which language-as-environment would comfortably fit; they include methodology courses in which language-as-means would be an important factor; and they include curriculum content courses for each discipline, in which language-as-consciousness should find a place. To illustrate the potential for teacher education more broadly, I have included as Appendix 5 an outline of one potential professional development application aiming to clarify the place of language in required learning outcomes for students, chosen because of the importance accorded this in the teachers' work in this study. Other professional development applications could be directly related to places for language in accounts of teacher knowledge.

10.2 Places for language in accounts of teacher knowledge

In Chapter 2.2, I argued that accounts of teacher knowledge do not adequately acknowledge the part that language plays in teachers' work, and I suggested that phenomenological studies were needed to provide some insights into the language-related understandings, dispositions and capabilities involved. I believe the data analysis and the adoption of a dialogic perspective in this study together provide such insights, suggesting what teachers need to know in regard to language in curriculum development, what questions they might need to ask, and why the answers might be important. Building on the three-level dialogic perspective developed in Chapter 9, I outline below the salient dialogic knowledges involved in the teachers' work reviewed. It must be pointed out that since these are drawn out by inference from a very small data base, further research would be needed to confirm or disconfirm them. However, it may well be that these dispositions, understandings and skills may have wider application not only to school-based curriculum development but to other aspects of teachers' work.

10.2.1 Dialogic dispositions

The teachers evidenced several dominant dialogic dispositions in regard to how they constructed themselves within the competing discourses of the education-labour relationship.

As a background disposition, they were ready to see themselves as members of three professional discourse communities – as educators, science specialists and state employees. This they saw as their professional framework. Within this framework, the teachers showed themselves ready to engage with the interplay between the school and policy environments, between traditional western science and traditional Aboriginal ways of knowing, and between the different science specialisations among them. They were also alert to the language of science and the language of students as part of the environment of science education, and were well disposed to address this through their curriculum development. Literacy in fact became one of the objects of curriculum development activity, though it was never specifically constructed as content.

In terms of voice, the teachers constructed themselves as a dialogical locale, ready to generate and reflect on ideas and make curriculum decisions; ready also to take up a station as directed by authoritative discourse, as well as to resist such stationing in terms of their own internally persuasive discourse. In other words, they evidenced dispositions to comply with authoritative discourses and also to critique them and re-construct them. This could be seen as their professional way of being in the workplace situation. They were ready to acknowledge the authority of policy and their own local authority, and to pit the two against each other. In Bakhtinian terms, they showed a disposition to independence and internal freedom, but within a realistic sense of the limits of their autonomy and equality within the education-labour relationship.

The operational dispositions that surfaced most frequently in the data related to materialising this professional way of being through the use of language. The teachers were very willing to ask for information and for clarification, very willing to negotiate meanings and try to achieve a common position, and very willing to seek out the right word to express a required student behaviour for an outcome statement. Some were more expert than others in finding the right word to express a personal view and in gaining a hearing for their views. In regard to language as a means of curriculum development, they were diligent in searching for the most representative way to formulate unit outcome statements, acknowledging the close relationship between language and consciousness, and ready to use their own words to express the constructivist learning they valued, where the words in the Profile were not what they wanted. To do this they needed to be alert to language and how it functions in different approaches to learning and teaching.

10.2.2 Dialogic understandings

To bring such dispositions to bear across the dimensions of their work, the teachers could be said to have drawn on the following core dialogic understandings. As a framework, they

drew on their knowledge of key discourse communities, such as the educational bureaucracy, including state curriculum policy makers; the western scientific community, science teachers as a professional community; and the local school discourse community. They were familiar with the discourses of each community and familiar with how the discourses combined, specifically in curriculum policy and in the school management practices governing their work. The teachers understood the nature of the contexts relevant to their curriculum development project, and what connections needed to be made. They knew both the preferred discourses and the preferred language practices of the stakeholder communities, and had some understanding of the functional differences among them. While they had relatively little understanding of how to connect with Aboriginal contexts of science education, they had a stronger idea of how to connect with literacy contexts. The degree of understanding shaped the nature of the dialogic interactions, and the epistemic responsibilities taken on by the various participants.

In their own locale, the teachers drew on situated understandings of how the authoritative discourse of policy positioned them as teachers in a socio-economically disadvantaged rural school with a 19% Aboriginal population, and also how it positioned their discipline and their students. They also understood the relationship between their own internally persuasive discourse and that of the authoritative discourse, and what their options were in regard to engaging the power relations inherent in curriculum policy. The teachers had a locally constructed understanding of the power relations within the education-labour relationship and the scope for dialogic play within them, specifically in regard to prioritising local curriculum interests and interpreting policy from the creative space of their own locale. They needed to know how to use language for such purposes, how to unravel competing discourses, making sense of policy discourses in terms of their own practice, and perhaps also engaging in their negotiation, contestation, variation and re-construction.

The operational understandings that were most noticeable in the teachers' work, although unspoken as such, concerned the use of language to (a) universalise and normalise student behaviours, and (b) construct learning behaviours within an assessment paradigm that privileged students' capacity to identify and describe over and above their capacity to reflect, analyse and generate ideas. The Countrytown High teachers understood the dialogic means in such processes in terms of the interactive purposes and language moves needed to conduct a reflective conversation, for example, to manage topic shift and perspective shift, and to put the words together. This is not to say that they could have made this knowledge explicit, but it was vitally present and functional as tacit knowledge, and demonstrated through their skillful actions.

10.2.3 Dialogic skills

The teachers needed particular dialogic skills for tapping into their key discourse communities and their values, and for using and interpreting the social language that marks community membership. These they had. The dialogic skills related to developing a science curriculum at this time and in this place were very much shaped by the monologic forms used to represent the principles of outcome-based education and western science, and the tension between these and the dialogic forms used to represent constructivist classroom practice, non-determinism, and cultural inclusivity.

In order to function professionally as curriculum developers in their own situation, the teachers additionally needed to be able to critically interrogate and manipulate different discourses, and to respond dialogically to tensions between them, e.g., tensions between the discourses of outcome-based education and constructivism, of constructivist learning and scientific knowing, of western science as totalitarian knowledge and non-western scientific knowledges as devalued “Other.” To engage with this, teachers needed skills in deconstructing the ideologies represented through the forms, while to enact their agency they needed skills in developing their own voice and the voice of the locale, and in making verbal compromises.

As a means to achieve this, the teachers needed skills to pick up on how the language functioned as representation, and skills in choosing and switching among different codes. These are what is commonly known now as critical literacy skills (e.g., Comber, 2001; 2003; Janks, 2000; Luke, 2000). Operationally, the teachers needed to use language as a tool in their work, and to manage it skillfully. This they did with some variation, mostly using language in socially appropriate ways and with precision, but occasionally not. Lytton consistently demonstrated advanced skills in the wording of ideas, manipulation of topics and topic shifts, and control over the floor, the latter undoubtedly being related to his seniority, and all very probably to his years of experience. A dialogic perspective on school-based curriculum development acknowledges the importance of skill at the level of text in regard to fulfilling the task with maximum efficiency and professionalism. Strategies relating directly to task accomplishment included: focusing the group on the task, sharing information on previous teaching, distilling conversation to confirm understanding, formulating decisions, and scribing ideas. Strategies relating more directly to knowledge building included: allocating and taking on the role of resource person or the one with epistemological responsibility, raising and responding to concerns and dilemmas, arguing for and countering arguments for an idea.

10.2.4 A dialogic perspective on teacher knowledge

The above account of dialogic knowledges in school-based curriculum development is not, as mentioned earlier, intended as anything more than an impressionistic account, since the focus of the study has been the place of language in the teachers' work, not on the knowledges involved. In addition, a dialogic perspective on school-based curriculum development is an outcome of the study, not an object of the study. Nevertheless, it seems to me that the notion of dialogic knowledges deserves further research, and perhaps a wider application of the construct in teachers' work more generally. Teachers needed understandings, dispositions and skills for a range of curriculum decision making and knowledge-building roles, and when these were lacking there were negative effects. For example, information was lost, outcome statements were inadequately formulated, and time needed to be spent repairing the interaction. Such consequentiality strongly supports the inclusion of places for language in accounts of teacher knowledge, and the necessity of viewing those places from multiple perspectives in teacher education.

10.3 Chapter review

In canvassing some implications of understanding teachers' work as language work, this chapter has suggested potential research avenues and practical applications, and proposed places for language in accounts of teacher knowledge. Based on a dialogic perspective on school-based curriculum development and an understanding of how language functions as text, voice and discourse within such work, the study provides a strong warrant to recognise language more explicitly in accounts of teacher professionalism and in teacher education. By adopting the idea of teachers' work as language work, dialogic practices become more readily apparent in the day-to-day practices of teachers, suggesting the importance of incorporating dialogic knowledges into teacher education programs.

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Appendices

Appendix 1

Transcript episodes in Chapters 5 to 8 and Appendices 3 and 4

Chapter 5: Connecting with new curriculum policy: How is language consequential?	
5.1	Defining the Statement and Profile
5.2	Defining Strands and Bands
5.3	Relating student Year Level to policy Profile Level
5.4	Interpreting a policy description of students in science
5.5	Relating Band B to the existing Countrytown curriculum
5.6	Relating Bands to Year Levels
5.7	Interpreting descriptions of learning behaviours (1)
5.8	Interpreting descriptions of learning behaviours (2)
5.9	Questioning the validity of the Bands
Chapter 6: Developing a unit of instruction: How is language consequential?	
6.1	Referencing to the Profile
6.2	Formulating a unit outcome from classroom activity (1)
6.3	Formulating a unit outcome from classroom activity (2)
6.4	Formulating a unit outcome from classroom activity (3)
6.5	Formulating a unit outcome from classroom activity (4)
6.6	Formulating a unit outcome from classroom activity (5)
6.7	Formulating a unit outcome from classroom activity (6)
6.8	Investigating principles for wording unit outcomes
6.9	Negotiating content selection and concerns

Chapter 7: Including Aboriginal perspectives: How is language consequential?	
7.1	Seeking Aboriginal perspectives (1)
7.2	Seeking Aboriginal perspectives (2)
7.3	Seeking Aboriginal perspectives (3)
7.4	Seeking Aboriginal perspectives (4)
7.5	Negotiating uncertainty about discussing racism in class
7.6	Including Aboriginal perspectives in the curriculum outline
7.7	Inscribing Aboriginal perspectives in an outcome? (1)
7.8	Inscribing Aboriginal perspectives in an outcome? (2)
7.9	Sharing concerns about introducing Aboriginal perspectives
7.10	Clarifying “classify” cross-culturally (1)
Chapter 8: Incorporating a literacy focus: How is language consequential?	
8.1	Constructing what counts as literacy (1)
8.2	Including text types in the curriculum outline (1)
8.3	Including text types in the curriculum outline (2)
8.4	Including text types in the curriculum outline (3)
8.5	Constructing a verbal process in terms of text types
8.6	Clarifying “describe”
8.7	Constructing what counts as literacy (2)
8.8	Including text types in the curriculum outline (4)
8.9	Justifying a focus on verbal processes

Appendix 3: Storying a description of the digestive system	
A3.1	Setting up a “describing” task
A3.2	Requiring technical terms in a “describing” task
A3.3	Literacy support for an Aboriginal student
Appendix 4: Process items: From a “Literacy in the National Profiles” meeting	
A4.1	Clarifying “identify” (1)
A4.2	Clarifying “identify” (2)
A4.3	Looking for clarification in the Statement
A4.4	Clarifying “describe”
A4.5	Clarifying “explain”

Appendix 2

Process and perspective items in the Profile outcome statements

No information is provided in the Profile as to how and why particular process items were selected by curriculum writers, why some recur more frequently than others and why some occur at lower or higher Profile Levels. Nor is there any kind of mapping of the distribution of the process and perspective items. The tables on the following pages provide such mapping.

Process items

After grouping the items with almost identical meanings, there are 37 specific processes that the Profile expects of students (see next pages, table A2.1 in alphabetical order and table A2.2 in order of frequency). The majority of these are exclusively verbal processes, e.g. *describe*, *explain*, *report on*, a few could be undertaken non-verbally as well as verbally, e.g. *identify*, *compare*, *locate/map*, *collaborate*, and one or two could be almost entirely non-verbal, e.g. *collect/gather*, *carry out/conduct*.

Table A2.1 Process items occurring in Profile Levels 1-8 (in alphabetical order)

Process items	n=196	Instances at each Profile Level																	
		PROFILE LEVELS		1		2		3		4		5		6		7		8	
		CONCEPTUAL/PROCESS STRANDS		C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Analyses	11									1		1	1	4	1	2	1		
Applies	2											1	1						
Argues	1					1													
Assesses/evaluates	8					1		1	1			1	1		1	2			
Carries out/conducts	2	1		1															
Collaborates	1	1																	
Collects/gathers	3					1		1				1							
Comments on	2									1				1					
Compares	6		1			1	1		1	1				1					
Considers/takes account of	5					1					1				1		2		
Contrasts	1		1																
Defines	1									1									
Demonstrates	3					1								1			1		
Describes	20	3		5	1	1		2	1	1		3		1		2			
Designs/selects	4					1					2		1						
Discusses/talks about	4	1												1		2			
Distinguishes/recognises	3	1		1				1											
Draws	2				1				1										
Examines	4							1		1				1		1			
Explains	16			1	1	1		6		3		3				1			
Formulates	1				1														
Gives/prepares/takes	5					1				1		1		1			1		
Identifies	35	8	1	1	1	2		6	1	2	2	2		2	2	3	2		
Illustrates/exemplifies	3					3													
Investigates	2			2															
Lists	3	1	1	1															
Maps/locates	2					1		1											
Organises	1							1											
Plans	1												1						
Predicts	3										1		1		1				
Presents	2							1									1		
Records	2			1						1									
Relates/links/connects	7		1	1		2				1			2						
Reports on	7					1								1		1	3	1	
Reviews	1									1									
Suggests/proposes	5		2		1		1					1							
Supports	5					1		1		1		1		1					
Uses x to do y /makes	12							1	1		3	2	1		1		3		

Table A2.2 Process verbs occurring in Profile Levels 1-8 (ranked according to frequency)

Process verbs	n = 196		Instances at each Profile Level															
			1		2		3		4		5		6		7		8	
PROFILE LEVELS			1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
CONCEPTUAL/PROCESS STRANDS	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Identifies	35	8	1	1	1	2	6	1	2	2	2	2	2	2	3	2		
Describes	20	3		5	1	1	2	1	1		3		1		2			
Explains	16			1	1	1	6		3		3				1			
Analyses	11								1		1	1	4	1	2	1		
Uses x to do y/makes	12						1	1		3	2	1		1	3			
Assesses/evaluates	8						1		1	1			1	1		1	2	
Relates/links/connects	7		1	1		2			1			2						
Reports on	7					1							1		1	3	1	
Compares	6			1			1	1		1	1			1				
Suggests/proposes	5		2		1		1				1							
Supports	5					1		1		1		1		1				
Considers/takes account of	5						1				1				1		2	
Designs/selects	4					1					2		1					
Discusses/talks about	4		1											1	2			
Examines	4							1		1				1		1		
Gives/prepares/takes	5					1				1		1		1				1
Collects/gathers	3						1		1				1					
Demonstrates	3					1								1				1
Distinguishes/recognises	3	1		1				1										
Illustrates/exemplifies	3					3												
Lists	3	1	1	1														
Predicts	3									1		1		1				
Applies	2											1	1					
Carries out	2		1		1													
Comments on	2									1					1			
Draws	2				1				1									
Maps/locates	2					1		1										
Investigates	2			2														
Presents	2						1										1	
Records	2			1					1									
Argues	1						1											
Collaborates	1		1															
Contrasts	1			1														
Defines	1									1								
Formulates	1				1													
Organises	1						1											
Plans	1											1						
Reviews	1								1									

The 16 process items occurring four times and above in the Profile outcome statements make up three quarters of the total instances, as shown in table A2.3.

Table A2.3 Process items occurring in the outcome statements four times and above

Process items	Instances
Identifies	35
Describes	20
Explains	16
Analyses	11
Uses x to do y/makes	11
Assesses/evaluates	8
Relates/links/connects	7
Reports on	7
Compares	6
Suggests/proposes	5
Supports	5
Considers	4
Designs/selects	4
Discusses/talks about	4
Examines	4
Gives/prepares	4
TOTAL	151

The high occurrence of *identify* is notable, particularly considering that there are also three instances each of *list* and *distinguish/recognise*, as well as two each of *draw* and *map/locate*. When we consider that *contrast*, *define* and *argue* occur only once each in the whole corpus, this emphasis on *identify* takes on even more significance. It is also notable that the two most frequently used process items – *identify* and *describe* – are passive and reproductive in orientation, with a heavy weighting on skills of observation and differentiation. This is in contrast to the more active, generative processes referred to in the Statement goals, such as *investigate*, *explore*, *reflect*, *appreciate* and *apply*. *Investigate* and *apply* occur twice each in the Profile outcome statements, and the others not at all, although reflection is implicit in *explain*, *analyse*, *assess/evaluate*, *relate/link/connect*, *consider* and some others. The contrast between processes valued in the Profile and in the Statement suggests a possible disjunction among dominant ideologies– outcome based education in the Profile and social constructivism in the Statement.

Table A2.4 Distribution of the six most frequent process items across the Profile Levels

Process verbs	Instances	Instances at each Profile Level							
		1	2	3	4	5	6	7	8
Identifies	35	9	2	2	7	4	2	4	5
Describes	20	3	6	1	3	1	3	1	2
Explains	16		2	1	6	3	3		1
Analyses	11					1	2	5	3
Uses x to do y/makes	11			1	1	5	1	1	2
Assesses/evaluates	8			1	1	1	1	1	3

Identify and *describe* occur at every Profile Level, with the highest number for *identify* at Levels 1 and 4, and for *describe* at Levels 2 and 6. *Explain* occurs at all Levels except 1 and 7, *analyse* occurs only from Level 5, and *use x to do y* and *assess/evaluate* occur only from Level 3. This patterning raises some questions about the principles applied by the Profiles writers in allocating processes. For example, what is the basis for the comparatively low occurrence of *identify* at Levels 2, 3 and 6? And for the absence of *explain* at Levels 1 and 7? What is the reason for deferring *analyse* until Level 5? And for including *evaluate* only from Level 3? Is there or is there not a relation with Bloom's taxonomy, or any other taxonomy? Such questions suggest potential issues for teachers in interpreting the use of process items in Profile outcome statements.

However, looking at process items in isolation does not give the full complexity of the required learning behaviours. In every outcome statement, the process item makes more sense when connected with a perspective item, and suggests differences in cognitive and discursive competencies. For example, assessing dangers involves different competencies from assessing evidence or fairness, but similar ones to assessing impact and implications. Similarly, of the 23 different perspective items associated with the 35 instances of *identify*, some, such as needs and patterns, can be carried out through less complex competencies than others, such as controls and scientific responses. On that basis, it is worth looking more closely at the perspective items.

Perspective items in outcome statements

There are 205 instances of perspective items in the 144 Profile outcome statements, but a number of the items are repeated, and a number can readily be grouped together, bringing the total down to 34 (see next page, table A1.7). A number of perspective items highlight ways things work or can be made to work. These include: *ways how* (37), *changes* (8),

effects/implications (7), factors/influences (7), limitations (6), properties (5), techniques (5), conditions (3), relationships (3), role (3), advantages/benefits (2), applications/uses (2), procedures (2).

Thirteen of the perspective items occur four or more times across the Profile Levels and Strands, amounting to half of the total.

Table A2.5 Perspective items occurring in the outcome statements four times and above

Perspective items	Instances
ways how	37
features	11
changes	10
effects/implications	7
factors/influences	7
information	6
limitations	6
conceptions/ideas	5
interactions/ events	5
properties	5
techniques	5
evidence	4
patterns	4
TOTAL	112

Table A2.6 Perspective items in Profile outcome statements, ranked according to frequency

PERSPECTIVE ITEM	n=186 ¹
ways how	37
features	11
changes	10
effects/implications	7
factors/influences	7
information	6
limitations	6
conceptions/ideas	5
interactions/ events	5
properties	5
techniques	5
evidence	4
patterns	4
care/responsibility/rigour	3
conclusions	3
conditions	3
fairness	3
groupings/groups/ classes	3
instruments/equipment	3
interventions	3
observations	3
options/alternatives	3
relationships	3
role	3
significance/importance	3
stages/milestones/landmarks	3
advantages/benefits	2
applications'/uses	2
knowledge/concepts	3
models	2
procedures	2
questions	2
sequence/chain	2
source(s)	2

Each perspective item makes different cognitive and linguistic demands on learners. For example, *change* requires skills of observation, differentiation and causal relationship, and is syntactically expressed by shifts of verb tense across past, present and future, as well as comparative wordings, and also particular visual representations. These may be related to, but

¹ The following 19 focus elements each occurred once only and have no parallels among the other focus elements: arguments, controls, data, effectiveness, forces, improvements, instructions, materials, mathematic(s), motion, needs, principles, receiver, recommendations solution, systems, tests, validity, why. They are omitted in the table.

not the same as, the skills needed when focusing on *effects/implications* and *factors/influences*, which call not only on causal relationship, but prediction, network awareness, and so on, with different lexico-grammatical and visual realisations.

Table A2.7 Predominant locations of the 21 most frequently used perspective items

PERSPECTIVE	PROFILE LEVELS							
	1	2	3	4	5	6	7	8
advantages/benefits								
changes								
conclusions								
conditions								
evidence								
factors/influences								
features								
interventions								
limitations								
models								
observations								
options/alternatives								
questions								
relationships								
role								
sequence/chain								
significance/importance								
source(s)								
stages/milestones/landmarks								
techniques								
ways how								

Certain perspective items are restricted to particular Levels: upper, middle and lower. For example, of the eleven instances of a *features* perspective, nine are in Levels 1 to 4; of the three instances each of *observations*, *questions* and *relationships*, all are in Levels 1 and 2; and the two instances of *sequences* are in Levels 1 and 3. More to the middle of the spectrum, we find *techniques* (5 instances) referred to only in Levels 4 to 6; *conclusions* (3) in Levels 3 to 6; *conditions* (3) and *models* (2) in Levels 4 and 5. Next we have *evidence* (4) in Levels 5 to 7, and *factors/influences* (7) and *options/alternatives* (4) in Levels 4 to 7. At the top end of the spectrum, the eight instances of *limitations* and *advantages/benefits* occur only in Levels 6 to 8; instances referring to *scientific interventions* (3) occur in Levels 7 and 8; *significance* (3) and *role* (3) in Levels 5 to 8; and *stages* (3) in Levels 6 and 7. A few have a broader spread: *change* ranges from Levels 1 to 6, and *ways how* from Levels 1 to 8.

The patterning in the occurrence of these perspective items suggests an implicit developmental sequence assumed by the policy writers. Some of the patterns make intuitive sense pedagogically – emphasising *features* and *sequences/chains* only at the lower Levels, for example, and *milestones* only at the higher Levels, with *ways how* having a place across the whole spectrum. However, some of the weightings seem counter-intuitive and raise questions about the validity of the pattern both as a developmental sequence and a pedagogical guide. For example, *evidence* is left until Level 5, *questions* occurs only at Levels 1 and 2, and there is no mention at the lower Levels of items such as *roles*, *advantages/benefits*, *significance/importance* and *limitations*. The weighting and allocation of the perspective items once again suggests a disjunction between Statement and Profile.

Many of the perspective items in the outcome statements are restricted to either the concept Strands or the process Strand – they do not span both types of Strand (see table A2.8). This confirms the importance of integrating the process Strand with the conceptual Strands in curriculum planning.

Table A2.8 Perspective items consistently located in either concept or process Strands

PERSPECTIVE ITEM	CONCEPT STRANDS	PROCESS STRAND
advantages/benefits		
applications/uses		
care/responsibility		
changes		
conclusions		
conditions		
evidence		
factors/influences		
features		
limitations		
models		
observations		
procedures		
properties		
questions		
relationships		
role		
sequence/chain		
significance/importance		
source(s)		
stages/milestones/landmarks		

Combinations of process and perspective items in outcome statements

While some of the process and perspective items have considerable inherent meaning even in isolation, most have considerably more meaning when combined. Without going into any great detail on this, the following table gives a few selected combinations to illustrate the point.

Table A2.9 Frequency of selected process-perspective combinations

Process items with recurrent perspective items	n = 193
Analyses approaches, cause and effect, effects, estimations, experiments, influences, interactions, transfers	11
Assesses/evaluates dangers, effectiveness, evidence, fairness, impact, implications, validity	8
Compares (and contrasts) conditions, experiments, features, options, processes	6
Considers/takes account of fairness/ethical questions, factors, limitations	5
Describes alternatives, approaches, changes, conditions, features, influences, interactions, interventions, observations, processes, properties, relationships, roles, structures, systems, techniques, uses	20
Explains how/ways/functioning, why	15
Identifies advantages, chains, changes, conditions, controls, events, factors, features, forms, ideas, implications, limitations, materials and their uses, measurements, needed information, needs, patterns, processes, properties, roles/functions, scientific responses, sources, stages	35
Relates/links/connects observations to other situations, interpretations to other situations, changes to processes, features to functions, structures and properties	7
Reports on applications, factors, information needed, patterns, processes, scientific approaches	7
Suggests/proposes how, interpretations, questions	5
Uses data, equipment, mathematic(s), models, concepts, knowledge, equipment	11

Appendix 3

Storying a description of the digestive system

NARRATOR: The student has produced a story of 12 paragraphs and 436 words, written out neatly from a rough draft. The characters are: the author (“I”) as a tomato pip; Tracey and Shelly, her more worldly wise friends and likewise tomato pips; an old man picking tomatoes; an old lady preparing food; and some thieving children. The narrative sequence can be summarised paragraph by paragraph as shown in figure A3.1.

Paragraph	Number of words	Narrative sequence
1.	(49 words)	from the tomato bush to the picking bucket
2.	(35 words)	to the kitchen
3.	(55 words)	to the sink and the first joyous experience of a bath, having previously only had showers
4.	(33 words)	to the table and a child’s hand
5.	(22 words)	to the mouth and down to the stomach
6. & 7.	(61 words)	through the terror of a tummy rumble, reassured by her friend Shelly
8.	(45 words)	through the small intestine, the large intestine and into the rectum (none of these technical words are used in the story)
9.	(42 words)	into the toilet, parted from friends, and flushed away
10.	(41 words)	through sewage pipes into a holding pool
11.	(29 words)	watered out onto the ground
12.	(24 words)	then delightedly growing again.

Figure A3.1 Summary of student story (Intended outcome – describe the digestive system)

The student uses everyday descriptive vocabulary such as *compartment*, *long tube*, *maze*. Very little technical vocabulary is used. The story is sequentially constructed and easy to follow, despite a shift between the three chief characters acting first as tomatoes and subsequently as pips. The characters are developed through their words and actions, and the writing is studded with realistic and imaginative touches such as the old man giving “me a

bruise on my stalk” as he “chucked us into the bucket;” the excitement of a bath; thieving children; the slippery-dip ride into the stomach; the thunderous rumble when the person “let some air out.” The story leads up gradually to the digestive system, the narrative preliminaries taking up the first four paragraphs (172 of the 436 words).

One of the teachers specifically comments on the flow, logical sequence and interest Level in the story, acknowledging those features as part of the literacy requirement implicit in the task. We join the meeting at the point where Oscar is explaining the nature of the task.

Episode A3.1 Setting up a “describing” task

OSCAR	The task was to write a short story titled “Life as a Tomato Pip.” It was a task given to the kids about a week into the unit after we’d looked at the digestive system. What we did was we went through what happens to the tomato pip.	1 2 3
	And we’d talked the week before about what happens in the digestive system and that it fails to break down some materials .. that it’s very hard for it to break down seeds and pips. We talked about what would happen to a pip after we’d swallowed it. Then I let it go. I just said it was an imaginary story, it was up to them.	4 5 6 7 8
LYTTON	So you didn’t have preconceived ideas about them mentioning the names of the parts or ..	9 10
OSCAR	I did, but I didn’t SAY it. So it was something I SHOULD have said. But I didn’t mention ..	11 12

NARRATOR: Contrary to his view, other teachers go on to suggest that requiring the naming of parts would change the nature of the assessment goal. A Metropolitan High teacher points out that the task as set means “I also want to know what you know about the digestive system and waste processing.” So requiring naming of parts might mean something like “I want to know what technical vocabulary you can use meaningfully in relation to the digestive system and waste processing.”

INTERPRETER: The task as set suggests a constructivist discourse where the understanding of systems is prioritised over reproduction of terminology. The naming task suggests a transmission discourse where it is technical reproduction that is prioritised. The task Oscar perhaps wanted to set (6-8, 11) could have combined the two discourses, while still somewhat privileging constructivism.

NARRATOR: The discussion next turns to the question of whether or not the verbal process *describe* should be constructed in Year 9 science classes as requiring the use of technical vocabulary.

Episode A3.2 Requiring technical terms in a “describing” task

LYTTON	I notice that Deborah’s got down the bottom of her draft on page 2 “down this very small tube.” Would you have expected her to have used other technical terms in there?	1 2 3
OSCAR	Such as oesophagus?	4
LYTTON	Or ..	5
OSCAR	Oh, you mean the small intestine .. she’s past the stomach. I would expect certain kids to say that, but I didn’t expect HER to.	6 7
MARY	And given the task of illustrating what they know about what happens in the digestive system, it didn’t matter much. If you haven’t actually specified, and she can tell you the process, well, that’s fine.	8 9 10
OSCAR	Yeah, well for that particular girl, that was good. That was something. I thought, well, she’s taken in something about what actually happens, and she’s MENTIONED all the different bits even though she hasn’t said what they are. I mean I can read into it. Ah, this is a THIN tube.” And then suddenly she’d go off into the small intestine and the large intestine. And I KNOW what she’s talking about, even through just looking at the picture.	11 12 13 14 15 16

INTERPRETER: We know from the staff member who supported Deborah in this task that Deborah recognises the technical terms but does not use them herself in conversation. We also know from this staff member that Deborah understood the digestive system and waste disposal pathways very well and only needed help with the writing task. That suggests a student who can *do* the science but cannot yet *report* the science.

Oscar’s expectations of “this particular girl” (11) reflect the fact that she is one of a group of identified “girls at risk” in the junior classes at Countrytown High, meaning that she is at risk of failure in the school system. She is an Aboriginal girl, an irregular attender who in the middle of term two has not previously completed a written assignment for Year 9 science. When teachers at Countrytown High work with students at risk, they usually place a priority

on motivating them to feel confident and interested enough to begin, continue and complete the set task. This has been a strong focus in school based staff development.

NARRATOR: Oscar goes on now to indicate something of this student’s relationship to the task and his own response to that.

Episode A3.3 Literacy support for an Aboriginal student

OSCAR	I didn’t actually go through this. This was the Girls at Risk coordinator and SHE actually went through it with her. She wouldn’t come to me and go through it. So I had nothing to do with the first draft, she just handed this up.	1 2 3
MARY	Between the teaching you do and the counselling or the support she got, to keep the two pieces of work gives you heaps of information.	4 5
OSCAR	Well, this particular girl was so rapt that she’d actually finished it, and was able to hand it up. And “Have you looked at it yet?” just every day. It was about four weeks after everyone else had finished. It took her quite a long time.	6 7 8 9
MARY	Good to show the student her own progress. “Here’s the work I didn’t get. Here’s the work you handed up. You’ve come a long way.”	10 11
OSCAR	I would have marked that differently than say a piece of work done by a different girl, like Miranda. She would have had to have mentioned the names.	12 13
MARY	I suppose another way of finding out if she really understood the concepts would be to have had a talk to her, not using print form.	14 15
OSCAR	Yes, a different person if they’d handed this up wouldn’t have got .. I don’t know if that’s alright or not. But if you’re not going to count it for anything ..	16 17

INTERPRETER: Miranda is a top student and would have had no difficulty reading the implicit requirements in the task and designing her story so that scientific language was not out of place. Deborah, on the other hand, has had very little experience in reading implicit requirements in tasks and in designing a story to meet such requirements. Her use of everyday vocabulary is stylistically appropriate to the story and its characters, but not to a scientific description. Oscar clearly recognises the tension here in regard to normative standards and supporting student effort.

In Deborah's work, the literacy demands of *story* are met, but the literacy demands of *technical description* are not. The question is the extent to which the demands of the required outcome are met. As Oscar apparently recognises (16-17), in outcome based education there is a tension between maintaining standards and supporting effort. Maintaining standards suggests an accountability discourse, supporting student effort suggests an affirmation discourse.

NARRATOR: Oscar suggests that for the student to use her own words in a story format is not only valuable for learning, but for motivating her participation in class. He says the details of science must wait "until I get her motivated and on side." Then one of the other teachers suggests that the task responds well to the student's preferred ways of learning, and Oscar agrees. However, while members of the group acknowledge the motivating value of story writing, they are concerned that the student should also be helped to make the next step into using the discourse and text types of science, and that expectations of the student should be extended progressively. The project leader also suggests that to mix story writing with the demonstration of science knowledge calls for additional writing skills, which may be more complex than for an overtly academic task.

Appendix 4

Process items: From a “Literacy in the national Profiles” meeting

NARRATOR: Here, the team from Countrytown High is participating in the Department’s

Literacy in the Profiles project, in collaboration with science teachers from a metropolitan secondary school (Mary, Mark and Mike). They have chosen to participate because they see the process as directly relating to the development of their new junior secondary science program. This sequence of episodes focuses on the meaning of the verbal processes in the Profile outcome statements and pointers, in terms of participants’ own classroom practice. It chiefly explores four verbal processes: *identify*, *describe*, *explain* and *classify*.

At this meeting, the eight teachers start by trying to work out what meanings the verb *identify* might have in the Profile outcome statements referred to in figure A4.1, presented in table form to distinguish the process, perspective and scope items.

PROCESS	PERSPECTIVE	SCOPE
Identifies ->	materials and (their) uses (1.10)	
Identifies ->	the chain ->	of sources and receivers of energy within systems (3.6)
Identifies ->	events ->	that affect balance in an ecosystem (4.7)
Identifies ->	science ideas ->	that we use in the development of our physical environment (5.1)
Identifies ->	landmarks ->	in the identification of components and patterns in their structure and properties (7.11)
Identifies ->	the role ->	of scientific disciplines in an interdisciplinary approach to understanding and managing ecosystems (8.7)

Figure A4.1 Outcome statements referred to in Episodes 1 and 2

The following episodes are provided without analysis, to add further information on how the teachers constructed process items in outcome statements.

Episode A4.1 Clarifying “identify” (1)

LYTTON	I’m thinking about the specific specimen, the green frog versus .. frogs and toads or something. There’s some degree of recognition. Key elements .. a student needs to know what the key elements .. what they’re identifying .. what makes the specimen they pointed out different from the other ones they haven’t pointed out .. what are the characteristics that make it important for them to identify ..	1 2 3 4 5 6
OSCAR	So, perhaps we need to do an example. Like 4.7: “Identifies events that affect balance in an ecosystem.” So, in order for a student ..	7 8
LYTTON	What do the pointers say?	9
OSCAR	“Describe how populations are naturally controlled within an ecosystem. Investigate the effects of seasonal changes in a habitat within the school grounds. Investigate ways humans affect the stability of ecosystems through the use of chemicals, land clearing and other farming methods. Describe the work of quarantine and customs officers in controlling the movement of plants and animals in and out of Australia. Use a computer simulation to explore the effect on various populations of introducing new species into an ecosystem.”	10 11 12 13 14 15 16
LYTTON	That’s interesting, because they don’t actually match with any of the key things that we wrote up.	17 18
MIKE	No, they don’t.	19
MARK	Because that’s just it. Unless you know what it is that the word <i>identify</i> .. what is the context in which the word is actually used, it means a lot of things.	20 21

NARRATOR: Carmen later makes the point:

After you’ve actually done that, “describe how populations are naturally controlled,” you could then go back and identify an event that affects the balance of an ecosystem. By describing it, you could then identify it.

Similarly, Mary from Metropolitan High suggests that having done some investigation, students should then be able to *identify* as required:

I’ve just set [my Year 9s] to write a newspaper article where they have to look at the effect of fishing of krill, how that affects the food web in the Antarctic. So that, I think, is covering it .. If they can identify the events within that, when they write their article.

In this next episode, Lytton selects one of the pointers and starts analysing it to see whether or not it meets the requirements of *identify* as used in the overarching outcome statement.

Episode A4.2 Clarifying “identify” (2)

LYTTON	What I was thinking about is .. Let’s take “investigate the effects of seasonal change on a habitat within the school grounds.” How would I teach that?	1
	Some sort of observational record stuff. What I’m getting at is .. could a student go through the process of recording that stuff, but if you then went to get them to identify .. What I’m trying to grapple with is .. Is there not a stage where you do the teaching and, in fact, the identification actually is an extra task? That a student could sort of rote learn in some regard and not be able to IDENTIFY.	2 3 4 5 6 7 8
MIKE	Yes, so if they can only do what you just described, which is probably just another process of recording, they are probably doing these things, which are in Level 3. They’re “mapping relationships between living things in a habitat.”	9 10 11 12
OTHERS	Mm.	13

NARRATOR: Another teacher then takes up the notion of hierarchy by suggesting that some verbal processes, such as *name, list, record, observe*, would occur at a fairly low Profile Level while items such as *investigate, make conclusions, compare, contrast, analyse*, would occur at higher Levels. The group checks the outcomes and finds that while there are some items that occur only at the lower Levels, such as *record*, and some that occur only at the higher Levels, such as *presents a critical case*, the majority occur across all the Levels. The teachers then turn to the Statement to see if any hierarchy is apparent among these required behaviours.

Episode A4.3 Looking for clarification in the Statement

LYTTON	But they avoid using the terms that they themselves have used in the Profile.	1
	The closest they get, on that page 39, second paragraph, “Students investigate	2
	and quantify.” Now, they are almost telling us now something more about the	3
	investigation, aren’t they? They are saying, “You must put numbers to it.”	4
	And then they go on, “Determine the quality of local water, do tests on	5
	perfume.” So, we get some more information about what the investigation	6
	might look like.	7
OSCAR	<i>Whispers to Lytton and points to the document.</i>	8
LYTTON	Yeah, here’s another one. So, page 38, third paragraph, <i>explore and compare.</i>	9
	“Students explore and compare the particle and wave models for explaining	10
	light as a phenomenon.” Then they’re introduced to ideas about quanta.	11
OSCAR	That’s Band D.	12
OTHER	Yeah, so it should be.	13
LYTTON	<i>Continues reading from page 38 of the Profile.</i> “The ideas that energy and	14
	matter are conserved are developed quantitatively.”	15
OSCAR	So, do those words pop up in Bands B and C? Or do we have “to investigate?”	16
LYTTON	Yeah, look at 34, third paragraph. “Students investigate major life sustaining	17
	processes” blah blah blah, “they might explore the ideas in the context of	18
	general understanding, or in contexts of health.” So, Band D, they were saying	19
	we’ve got to quantify them; here they “explore in the context of general	20
	understanding.” So, all they’ve done is, allude to the fact they’ve gone from ..	21
	yeah, the concrete to the conceptual, with some sort of qualifying words onto	22
	their own verbs.	23

Episode A4.4 Clarifying “describe”

LYTTON	What about <i>describe</i> ? What are the elements of that?	1
LUCIO	Would that be “identify the features.”	2
OSCAR	<i>Identify</i> , we did <i>identify</i> , that was easy, “point out the features, characteristics.”	3 4
LYTTON	Is a “trend” an interpretation or an analysis?	5
MARK	No, it can be a description..	6
OSCAR	So, they are not just identifying it though, are they, because if they were just identifying it, then it would be <i>identify</i> and not <i>describe</i> . So, what else do they do if they identify it, what do they do, they have to..	7 8 9
MIKE	Explain it as well, but then it’s getting into..	10
LYTTON	Is <i>explain</i> the next one down, the next most developmental, difficult thing? Is that what you want to do next?	11 12
OSCAR	Can we .. ? I don’t think we’ve finished that one though. I’d just like to .. Right. Let’s say that the task is for them to describe the features of a rabbit. And they’ve identified the features ..	13 14 15
LUCIO	So, it’s got long ears, it’s got long hairy ..	16
LYTTON	So, its physical attributes.	17
OSCAR	What’s that word? Is it a verb? Is it a noun?	18
CARMEN	It’s not narrative.	19
OSCAR	What’s a describing word? It’s a verb isn’t it?	20
LUCIO	Nup, adjective.	21
OSCAR	Adjectives, so they’d be adjectives, wouldn’t they?	22
LUCIO	USING adjectives!	23
OSCAR	Using adJECti.. Adjectives.	24
CARMEN	<i>Mocking</i> . AdJECTives.	25

OSCAR	<i>Ignores Carmen.</i> That's the important bit. I mean that forms the BASIS of a description.	26 27
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Episode A4.5 Clarifying "explain"

LUCIO	<i>Explain.</i> That's an easy one, isn't it?	1
MIKE	"Explain why some living things have become extinct" (Profile outcome 3.9).	2
LUCIO	Give reasons for.	3
MIKE	Yeah. "Explain the functioning of systems within living things" (Profile outcome 4.8).	4
OSCAR	Does that give reasons?	5
LYTTON	Don't you then have to name the function? So there's a degree of .. Name it first, then give reasons.	6 7
MARK	So, you're going to do your description first followed by your explanation?	8
	Structure and function	9
OSCAR	You mean, like "explain why hot air rises?" So, you're giving reasons for why, why rising ai r.. "Explain the functioning of the heart." In your body, not giving reasons why the heart ..	10 11 12
LYTTON	But you have to name what the function is first before you give reasons, you've got to describe it before you can give reasons for it.	13 14
MARY	Would the word <i>explain</i> sort of imply that you need to <i>describe</i> , but you go one step further and you also state why a thing happened?	15 16
OTHERS	Mm.	17
LUCIO	Let's actually do that. Let's explain how .. plants .. take up water through their root system.	18 19
LYTTON	Still <i>describing</i> . You're asking them to describe and then go further.	20
LUCIO	And then WHY plants take it up through their root system?	21
OSCAR	Once they put <i>how</i> on the back of <i>explain</i> ..	22

MARY	If you take the verb <i>describe</i> , with uptake of water by plants, then you could..	23
	I imagine that a student could say “Water travels from the roots, it’s taken up	24
	by the roots and travels from the roots through to the stems, through to the	25
	leaves.” And, if you have a good student, then they might actually talk about	26
	vascular tissue. If you asked them to <i>explain</i> , then I would expect a process.	27
	Why does? How is? What is the mechanism by which the water moves up the	28
	plant?	29
OTHERS	Mm.	30
MARK	Process .. we are assuming a <i>how</i> .. capillarity, etc. etc. etc. That’s the	31
	explanation. I agree, I think a description is just giving a pathway.	32

Appendix 5

Outline of a professional development application using a dialogic perspective

The data in this study highlighted the teachers' commitment to clarity in regard to the statement of learning outcomes, notably clarity in regard to verbal processes such as *explain*, *identify* and *describe*, which have particular significance in the scientific community and consequently in science education.

It is my belief that an approach using a dialogic activity system can facilitate professional development on this issue. For example, I have already found that science teachers appreciate the analysis of student outcome statements in terms of process, perspective and scope, since this provides them with specific categories of knowledge production. However, I now believe that to articulate the dialogic expectations in different outcome statements and assessment requirements, teachers need a broader analysis that can directly shape their dispositions, understandings and skills towards dialogic practice, and that can be readily translated into instructional strategies and learning activities for students.

Using a dialogic activity system for understanding required verbal processes in science

A professional development approach using a dialogic activity system could achieve this by interweaving the three dimensions and the three parameters. Teachers would first consider the operational language features of fulfilling a requirement to *identify*, *explain*, etc., linked with different perspective items, e.g. *identify properties/changes/effects*, *explain functioning/observations/effects* in particular classroom activities. This would involve analysis of examples of successful and unsuccessful attempts, as well as analysis of the guidance provided for the activity; in other words analysis not only of wording, but of textual circumstances and positioning. Language-as-means perspectives on verbal processes would include attention to the various text types through which they could be carried out, e.g. poster, essay, advertisement, travel brochure, practical report, sentence responses to questions. The conventions of these text types would need to be matched against the requirements of the learning objective, as the teachers in this study attempted in their vision of a Countrytown High literacy dictionary. Teachers would then go on to consider language-as-consciousness and action in fulfilling process requirements, referring to the types of thinking involved, e.g. differentiation for

identifying, comparing, contrasting and defining; evaluation for *assessing and commenting on*. This would involve making links back to the operational level where particular words come into play. For example, *contrast* anticipates oppositional thinking and the use of terms such as “but,” “whereas,” and “on the one/other hand,” while *compare* includes parallel thinking and the use of terms such as “in the same way,” “like,” “in both cases.” Identifying types of thinking would also involve rehearsing and analysing classroom scenarios. Teachers might find that, in investigating ways humans affect the stability of ecosystems, students need awareness of (a) the likely differentiating features of events in an ecosystem, eg location, duration, human involvement, intensity, and (b) the features of events that characteristically affect balance, e.g. human greed, error, oversight. This would lead to the development of learning activities that could encourage a dialogic rather than an oppositional stance, recognising the complexity of decision making in multi-faceted socio-scientific situations.

Teachers would also need to consider the kinds of school and out-of-school situations in which students carry out the required processes, and the purposes to be achieved, e.g. arguing a case through evidence, raising a problem, or simply providing sufficient and relevant information. And they would need to consider how these articulate with the construction options open to the students in responding to set tasks, depending on such factors as cognitive and language development in different Year Levels, library and computer resources, task instructions, and group or individual work.

Last, but importantly, throughout the two previous processes teachers would consider the environmental features underpinning such processes in science education – the discourse communities involved, their discourse practices and their ideological discourses – and how and why these shape operational language processes both in general and specifically in science. Discourses of working scientifically would come to the fore here, raising issues about how these articulate with assessment practices, which require displays of learning conforming to conventions. Tensions between the requirements of constructivist learning theory and outcome based education would be considered in regard to the different kinds of processes each highlights. The fact that the one expects students to *generate* knowledge, while the other expects them to *demonstrate* knowledge, would be dialogically addressed. Teachers would also need to consider discourses of equity and access, and how these articulate with factors such as multiple literacies and Aboriginal perspectives across the curriculum.

While the above provides only a sketch, it does show how an approach using a dialogic activity system could apply a theoretical framing to dialogic tensions in curriculum development,

opening up opportunities for multi-dimensional analysis and problem-solving, and providing a resource for developing teaching strategies. Other professional development outcomes could be expected to include heightened capacity in setting clear guidelines for assessment tasks, in assessing and giving feedback to students, and in constructing learning objectives. Taking a dialogic activity system approach in such professional development also addresses one of the recurrent tensions between different stakeholders, some wanting only what can be used in the classroom immediately and others wanting a deeper grasp of issues and pathways to resolution. Each of the dimensions and parameters of the activity system can be incorporated to some degree, thereby providing a principled base for professional development, which can be built on at different times and through different channels.