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INTERACTION WITH TEXT :

**A STUDY OF TEACHERS' MEDIATION OF
MATERIALS IN MAINSTREAM AND ESOL
SECONDARY SCHOOL CLASSROOMS**

A thesis presented in
fulfilment of the requirements
for the degree of Master of Arts
in Second Language Teaching
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Sarah Elizabeth Davey

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Abstract

The increasingly multi-cultural nature of New Zealand society is accompanied by burgeoning school enrolments of students whose first language is not English (called ESOL students in this study). Immigration, refugee movements, and the recruitment of international students for largely economic purposes, all contribute to this. Whilst many of these students are competent English speakers when they enrol at our schools, large numbers are not. In secondary schools, regardless of English language competence, most ESOL students are placed in mainstream classes for the majority of their timetable, with the addition of a relatively small amount of specialist English language tuition. How do both these mainstream and ESOL teachers address the language learning needs of these students? Because texts remain central to classroom teaching and learning, this study considers how teachers mediate texts with students. It has a particular focus on how this mediation contributes to the language learning environment for ESOL students in both mainstream and ESOL classes, using classroom observation as its primary source of data.

This study reveals both predictable and unexpected results. It is not surprising that it finds extensive use of questioning by teachers in their mediation of texts. However, the value of copious recall or display questions for senior secondary school students is challenged by this study, and the importance is asserted of referential questioning to develop critical thinking skills in relation to text. The preponderance of teacher-dominated classrooms and classroom language is a disappointing finding of this study, especially because the study reveals that students say very little in such an environment. More collaborative and interactive teaching methods would help ESOL students use, and therefore learn, English more effectively. Thus the study finds a lot of class time invested in the use of texts, but comparatively little effective mediation to help both native-speaking and ESOL students comprehend the language of the texts. The study reveals the need for

teachers to acknowledge their role as teachers of language, and especially to mediate texts with students by teaching reading strategies.

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Chapter 1 Introduction and Background

1.1 Introduction

Texts, whether spoken, or visual, or written, have been the cornerstone of classrooms since formal education began thousands of years ago. The teacher's role in selecting these texts and in ensuring that students understand them has always been significant. Considering how long this has been the practice, it might be considered surprising that even today teachers find one of their most difficult pedagogical tasks is the effective mediation of texts.

This study of interaction with text aims to examine how teachers mediate materials in mainstream and ESOL secondary school classrooms in New Zealand. Peacock (1995, p. 389) supports this intent: "Research should also focus on meta-textual factors, such as how text is mediated by teachers in the classroom."

As a secondary school teacher, I wanted to conduct this research in the real life environment of authentic lessons, and to produce findings that could be readily understood and applied by other classroom teachers. Nunan supports this approach: "Methodologically, there is a need for research which is carried out in genuine language classrooms, that is classrooms which have been constituted for the specific purpose of teaching and learning, not for providing cannon fodder for research" (1993, p. 10).

Further endorsement and development of this approach is provided by Love (1996, p.4). She believes that classroom research of the 1970s, 80s, and 90s was "a substantial body of ethnomethodological and socio-linguistic study into classroom discourse", but that its findings were rather too simplistic, with its conclusions that "students were quiescent and powerless in the educational process". She supports the more recent approach, of "work within a tightly sociolinguistic perspective" that "sees school in less... pejorative terms" as a place where students and teachers work together to construct and negotiate meaning. She emphasises the dynamic and unfolding nature of the culture of the classroom, and argues that students succeed best

when they understand, and to some extent control, this culture. For ESOL students in particular, this classroom culture must be acquired along with the English language they are learning. From my perspective as a secondary school teacher, I believed that I could conduct this study within the frame of my insight into classroom dynamics.

The terminology I have chosen for second language learners in New Zealand secondary school classrooms is *ESOL* students. This acronym refers to *English to speakers of other languages*, and is the term most commonly accepted in New Zealand educational circles today. It is favoured for its positive emphasis on students' existing language competencies. However, it must be noted here that internationally this term is not used. Outside of this country, the most common usage is *ESL*, which is *English as a second language*. I have only used *ESL* when directly quoting international writing using this term. *NESB* (Non-English-speaking background) has some currency also, but I have not used it here. Other terminology relating to these students includes *L1* and *L2*, representing first and second languages acquired. This distinction is also described as *native* and *non-native* speakers.

I have distinguished mainstream subjects from ESOL in this study. By mainstream, I infer all subjects that are available for study by all, or at least the majority, of students. Criteria for acceptance into these classes relate to the ability of the student to study at this level. Mainstream subjects have a prescribed curriculum, and assessment is based on this. ESOL, on the other hand, may be considered to be a subject offered in response to the special needs of particular students, and is not available to the general student population. There is no national ESOL curriculum in New Zealand: Teachers tailor courses closely to the specific English language learning needs of the particular students in the class.

This chapter now considers some major issues for ESOL students. Do they learn best in separate English classes or are their needs best met by integration into the mainstream? How can schools, and the classroom environment in particular, facilitate this learning?

1.2 Separation or integration?

For every ESOL student who enrolls at a secondary school, the decision must be made about how much specific ESOL tuition is necessary, and which of the mainstream classes will provide a suitable course. Often teachers are fearful that students who are not fluent in English will not be able to learn in a mainstream class, and the tendency can be to want to separate these students, or at least severely restrict the subjects offered. Teachers of mainstream classes are sometimes concerned that the student is not “up to” taking their subject, because their English is not sufficiently developed. Such a concern is generally also accompanied by teachers feeling that they are inadequately trained to know how to bridge the language gap. Insufficient time to spend individually with an ESOL student in a large class also contributes to teachers sometimes actively discouraging the placement of an ESOL student in their mainstream class.

However, learning a language is inextricably bound with learning a culture. As Stubbs (1983, p. 3) reminds us, “there is no use of language which is not embedded in the culture.... There are no large-scale relationships between language and society which are not realized, at least partly, through verbal interaction”. This is an argument for mainstreaming ESOL students, so that they can be as much a part of the culture of the language they are learning as possible, rather than taught separately, to some extent prevented from full immersion in the target culture.

Clegg (1996) lists four academic arguments for mainstreaming ESOL students for at least the majority of their school programme. The first is the belief that language cannot be separated from learning. Therefore, he argues, “the mainstream teacher with a language-impoverished teaching style is as pedagogically limited as the ESOL teacher cut off from the mainstream curriculum” (1996, p.8). ESOL students in separate English language classes can be prepared for mainstream study, but eventually the only way they can “meet the cognitive and linguistic demands” of a subject is in the mainstream curriculum classroom. The second argument presented by Clegg develops from this. Whilst it may be easier or more convenient for teachers and administrators to provide separate ESOL instruction, second language learners

will inevitably need the greater intellectual challenge of mainstream curriculum subjects. Another argument presented by Clegg for mainstreaming is the need to recognise ESOL students' prior curriculum learning. The danger of sidelining such students into separate classes is that previous learning is not utilised, and in fact is gradually lost through lack of use or development. Clegg's fourth argument considers the long-term needs of ESOL students. He believes that "even if we argue for delaying a child's entry to mainstream education in the short-term ... much of her ESL development will take place in integrated contexts" (1996, p. 8). In other words, because it will take a very long time (Clegg suggests five to seven years) for ESOL students to catch up to native-speaking peers, the sooner they start working alongside these peers, with support, the better. Bruner supports Clegg's arguments, concluding that "we learn language by using language in the company of experienced language users to receive or to give messages" (in Corson, 1987, p. 5).

However, not all mainstream subjects are equal in the way they constitute knowledge building, and for this reason some are more suitable for second language learners than others. As Clegg (1996, p. 21) explains, "Some subjects provide a lot of contextual support: they involve visuals and artefacts, require learners to engage in manipulative or physical tasks, or lend themselves naturally to small group task-focused activity.... Subjects may be graded for ease of accessibility by teaching first the subjects with high contextual support, such as geography or science, and later those which tend to be more language-dependent, such as history or social studies". It is noteworthy, then, that in this study none of the ESOL students observed are enrolled in any Science classes. Only one takes Geography. On the other hand, all are enrolled in at least one very language dependent Social Science subject, such as Social Studies or Economics. Clegg concludes his point by stating that "ESOL learners share with English-fluent learners the need to develop cognitively and academically, and the need to deploy a special cognitive/academic variety of language to do so. Learning curricular contents and learning the language which is the vehicle for this, are, it is claimed, best done concurrently and in the mainstream classroom" (1996, p. 7). Corson (1987, p. 13) confirms this view. He advocates the role of language across the curriculum, which is "the responsibility of every teacher at every level... its focus is on language as an instrument for learning".

What is vital, then, is for better professional development of teachers so that they can accommodate ESOL students effectively in their mainstream lessons. The responsibility for every student's language development must be seen as belonging to every teacher of that student. "Language is learned best at the point of communicative need and in the service of other learning", Clegg insists (1996, p. 10). The results will benefit all the students in the class, because "the language-rich diet of an ESOL group can turn out to be nourishing for the whole mainstream class" (Clegg, 1996, p. 12). Nevertheless, Clegg does also present a case for separate English language tuition for ESOL students. The proportion of the programme allocated for ESOL classes clearly must relate to the stage of second language acquisition of the individual student. For example, Clegg (1996, p. 9) outlines some reasons why temporary withdrawal, or separate provision for part of a student's programme, may be desirable. Such classes can provide ESOL students with a "haven: the place in the school which acts as a buffer to culture-shock, refuge from racist abuse, and comprehensible language environment". The ESOL teacher may be seen as "preserver of cultural and linguistic identities, support for self-esteem, and source of high expectations". The danger, however, is that this view may allow mainstream teachers to feel that they can opt out of responsibility for these vital areas of a student's well-being.

A related aspect of the separate/mainstream debate is the issue of class size. We know that individuals' active participation in oral communication is a significant contributor to language acquisition. The size of the class will inevitably impact on the opportunities for this to occur, especially in a teacher-directed classroom. Small group work can mitigate the effects of a large (numbers above the low twenties) class, but cannot overcome the limitations of a teacher's access to each group in a large class during a lesson. Furthermore, a large class tends to become quite noisy in small group work, and space in the classroom can be very crowded. These environmental effects provide poor conditions for language learning, rendering many students' voices inaudible, and making listening difficult.

The obvious conclusion is that ESOL teachers and mainstream teachers need to work in complementary ways to provide optimum learning for ESOL students in a school. Effective and regular communication between these teachers is important for the

sharing of information and strategies which will benefit ESOL students. Wherever possible, also, ESOL students will benefit from being in small (less than 10) to medium-sized (numbers in the teens) classes.

1.3 The facilitating school

In the past decade in particular in New Zealand, there has been strong interest from most teachers in developing a wider range of teaching strategies than traditional methods have used. The need for students to develop their thinking skills is widely recognised, and reflected in all New Zealand curriculum documents, which list problem-solving as one of the eight essential skills. For example, the *English in the New Zealand curriculum* (1994, p.19) document presents three processes that “underpin language functions and are crucial for students’ language development”. These are exploring language, thinking critically, and processing information. Most teachers accept that active involvement of students in constructing their own learning is a vital component, and this inevitably requires a shift from teacher-dominated classrooms. In social constructivist classrooms, meaning is constructed in a social context.

Clegg (1996, p. 9) counts, as a key learning need of ESOL students, a school environment that “enables them to develop communicative... competence... interactively”. Chimombo and Roseberry (1998, p. 230) claim that more collaborative classrooms produce discourse that shows “many more of the features of ordinary conversation than the familiar classroom discourse”. This approach makes a major contribution to developing the functional competence of a second language learner, providing the environment necessary to develop communication skills. It inevitably demands less dominance by the teacher and greater use of language by the student. In such a model, the teacher has a major role as a listener, a “valuer of talk” (Corson, 1987, p. 70), and a motivator.

Parkin and Sidnell (1992) present some very simple and practical strategies for teachers of second language learners in mainstream classes, in *ESOL is everybody's business*. They understand the difficulties for teachers “who may have little or no

background in ESOL... (who are) faced with the task of teaching Science, Mathematics, Geography or History to a diverse group of students, some of whom are still learning to communicate in English" (1992, p. 7). However, they urge teachers to recognise that ESOL students "bring a wealth of experience that can be shared with their teachers and classmates. As teachers draw on this, seeking out and including in the curriculum materials from other cultures which may be familiar to them, the study of a subject is enriched for all students" (1992, p. 7). The simplest and most obvious strategy suggested by Parkin and Sidnell, is to "summarize important information on the board so that students whose English is limited have the opportunity to absorb key information visually as well as aurally" (1992, p. 39). Of course, this advice applies equally to all students, who individually use a wide variety of learning styles.

Clegg (1996, p. 17) also stresses the need for visual representation of knowledge, in what he terms the notion of "contextual embeddedness". "Early L2 learners rely on retrieving meaning from other sources than solely the utterance: the more the meaning is distributed across visual and other contextual sources, the more mental processing capacity is available to focus on the unfamiliar target language." He lists some features of a "facilitating environment" for ESOL students, including the use of known objects, present time, visual support, manipulative activity, body and facial gesture, and culturally familiar content.

A key suggestion from Parkin and Sidnell (1992, p. 42), designed to promote greater oral participation of ESOL students in mainstream classes, is to "give students time to prepare oral answers whenever possible.... Be patient and wait for a response," they suggest, and "concentrate on what they are trying to say, rather than on grammatical correctness". These strategies are an important part of creating a supportive learning environment for second language learners in the mainstream.

The importance of "speaking to understand" is emphasised by Appel and Lantolf (1994), who refer to Vygotsky's proposal that speech can have an intrapersonal function of "communicating with the self for the purpose of mediating mental behaviour" (1994, p. 437). They also note O'Connell's (1988) belief that speaking "is not the process of giving linguistic form to the message nor translating thoughts

into sentences..., it is a process of finding the message by speaking” (in Appel and Lantolf, 1994, p. 440).

Appel and Lantolf (1994, p.440) themselves take this point further: “We contend that not only can planning occur simultaneously with speech, but that the very activity of speaking can, in fact, be planning, or more precisely, thinking, externalized as self-directed private speech, the goal of which is planning what to say about a particular topic.” Later in the same paper, Appel and Lantolf continue to explore this: “People can, and do, rely on each other through linguistic interaction when attempting to make sense of, or to comprehend, the world.... People can construct meaning from a text after the reading process itself has ended. They do this by conversing with others... or... with the self” (1994, p. 449).

Underpinning all of Parkin and Sidnell’s suggestions is the essential understanding that “the most effective learning takes place when students are actively participating in their own learning” (1992, p. 55). They warn that the “tyranny of curriculum content comes at the expense of opportunities students would otherwise be given to acquire concepts, skills, attitudes, and problem-solving strategies – the mark of true learning” (1992, p. 56). They challenge teachers to “achieve a balance between what must be taught and a varied repertoire of methodologies that develop language and enhance thinking skills” (1992, p. 57).

One of the most helpful ways teachers can encourage ESOL students to use oral language in the classroom, is by requiring students to work in small groups for parts of the lesson. Clegg (1996, p. 16) emphasises the importance of this: “Facilitative teacher-talk needs to be balanced by facilitative small-group talk.” As Long (1983) shows, the ability to make interactional modifications to discourse, as students negotiate meaning, is very useful in developing second language competence. Clegg (1996, p. 16) reminds us that this is more likely to occur in small groups than in “the canonical discourse patterns of the teacher-controlled classroom”. He also cites the research of language-in-education theorists Barnes (1975) and Wells and Chang-Wells (1992), which shows that “exploratory small-group talk can be particularly valuable to the development of concepts and curricular knowledge”. However, Corson warns that “there is a balance required... between a teacher domination that

discourages pupils from active learning and at the other extreme abandoning pupils to their own devices” (1987, p. 107).

It is also important to recognise cultural factors that affect the participation of second language learners, in particular, in small group discussion. Easton (1998, p.19), summarising a number of studies on this, surmises:

L2 speakers tend to participate less actively in tutorials (which) could be both a consequence of less verbal confidence along with a different cultural view on the role of talk/silence and learning. For students used to a certain degree of social and power distance... a spontaneous informal discussion reflecting minimal social distance can be a difficult situation. In addition, incomplete communicative competence exhibited through unfamiliar turn-taking and listenership skills means such students may miss cue-taking opportunities through reduced eye contact.

Additionally, Easton (1998, p. 10) explains, “meaning is retrieved and reconstructed from the listener’s previously acquired knowledge,” but “what the hearer understands may not be the intended meaning (Di Vesta, 1974). This can particularly be a problem when speaker and hearer share different cultural experiences because inferences that are made are also based on cultural knowledge.”

Thus, interactive opportunities for students are essential for effective learning. Teachers need to ensure that such opportunities are a part of every lesson, and are appropriate for second language learners as well as for native-speaking students.

1.4 The facilitating classroom

Students’ success at school to a large extent depends on their ability to learn to comprehend and use the language of learning. Corson (1987, p. 3) claims, “It is clear that achievement in schools is highly dependent on the child’s ability to ‘display’ knowledge. This display almost always takes the form of spoken or written language.” To describe the limited and predictable language generally used to display this knowledge, (Edwards and Westgate, 1994, p. 29) write of “the deep

grooves along which most classroom talk seems to run". Using language in this way requires a "communicative competence", as described by Hymes (1972). This differs from two other kinds of competence: "linguistic competence", identified by Chomsky (1979) to describe an innate predisposition to language acquisition; and "analytic competence", by which Bruner (1975) named the ability to use language to engage in complex reasoning. ESOL students therefore must have particular opportunities to develop their production of English for academic purposes. Moffett (1968) believes that "our ability to think depends on the many previous dialogues that we have taken part in..." (in Corson, 1987, p. 12). He argues that teachers have a vital role in developing students' oral language by incorporating plentiful opportunities for them to talk about their learning.

Furthermore, Lynch (1996) emphasises the important point that, as every experienced teacher realises, what occurs in the classroom is not necessarily what students learn:

A number of research studies have shown that what learners actually notice in the classroom – either because of, or in spite of, the teacher's actions – is highly idiosyncratic. When Assia Slimani asked a group of Algerian EFL learners what they had learnt from a sequence of lessons, she found that only 3 per cent of the items they mentioned in their reports were noticed by most of the class (i.e. by three-quarters of the students). Nearly 40 per cent of the items noticed were reported by only one person. More striking still, some 11 per cent of the items that the students said they had learnt in the lessons had not actually occurred in the interaction at all (Slimani, 1992).

(Lynch, 1996, p. 35)

After a detailed discussion of some unproductive aspects of real classrooms, Clegg (1996, p. 18) describes the "main ingredients" of his ideal "facilitating classroom" for second language learners. These are to be found in schools which:

- Pursue language, multi-cultural and anti-racist policies;
- Strengthen their community ties;
- Foster L1-medium learning;
- Link language with the curriculum;
- Value linguistic and cultural diversity;

- Pay attention to teacher talk;
- Encourage small group interaction;
- Provide contextual support for learning;
- Be careful in the choice of tasks;
- Consciously foster language skills.

The Ontario Ministry of Education in Canada has built these concepts into its Language Across the Curriculum Policy. It is worth including here in full, because it succinctly but explicitly spells out the practical implications for teachers of implementing language theory:

Language plays a central role in learning. No matter what the subject area, students assimilate new concepts largely through language, that is, when they listen to and talk, read, and write about what they are learning and relate this to what they already know. Through speaking and writing, language is linked to the thinking process and is a manifestation of the thinking that is taking place. Thus, by explaining and expressing personal interpretations of new learnings in the various subject fields, students clarify and increase both their knowledge of the concepts in those fields and their understanding of the ways in which language is used in each.

It follows, then, that school should provide an environment in which students are encouraged to use language to explore concepts, solve problems, organize information, share discoveries, formulate hypotheses, and explain personal ideas. Students need frequent opportunities to interact in small group discussions that focus on the exploration of new concepts. In addition, they should be encouraged to keep journals in which they write thoughts, questions and speculations that reflect on their learning.

Principals should provide leadership by encouraging all teachers to participate in developing and practising a school language policy, which is, in effect, a school learning policy. By allowing students to discuss and write in the language they already control, teachers can gain new insights into the difficulties that students are encountering in particular subject areas. In this

way teachers can help students to avoid rote learning and to gain clear understandings.

(Corson, 1987, p. 12)

Essential in the facilitating classroom is recognition of the language demands that each class presents. Students have to learn the different forms and genres of the different “discourse communities” (Spivey, 1997) of their different curriculum areas. Spivey (1997, p.22) explains that “becoming a member of a discourse community entails learning its discourse as well as its knowledge, a process that is often viewed as enculturation”. For ESOL students, in particular, the language of the classroom can be another hurdle to overcome in the acquisition of both English and curriculum knowledge. The facilitating classroom, then, will address all of these issues to provide an optimum environment for learning, including learning English as a second language.

1.5 Preview of chapters

This study is based on the observations of mainstream and ESOL lessons in New Zealand secondary schools, with a clear focus on textual interactions as teachers mediate the texts used in those lessons.

Chapters 2 and 3 investigate the two key aspects in the textual interaction dynamic: firstly the texts, and secondly the mediation. Within chapter 2, discussion focuses on various types of texts, the use of multiple texts on a topic, the language of texts, and the place of students’ prior knowledge in their reading of text. This chapter also discusses potential barriers to students’ comprehension of text, and what effect teachers’ mediation of text can have on this comprehension.

Titled *Input, intake and output*, Chapter 3 considers the other side of the dynamic; the language generated in interactions with text. It encompasses the complex issues of what constitutes comprehensible language input, and how students process that into intake to produce language output in response to text. This chapter then discusses a major component in textual interaction, oracy, and particularly teacher talk. Some

particular attention is given to teachers' use of questioning, simplification and explanation.

Chapter 4 details the research methodology employed in this study. Following the research questions, the main tool of this study is explained: the observation schedule. The data-gathering process is described fully. Finally this chapter presents the raw data and explains how it is treated for analysis.

The data gathered in this study is analysed in Chapters 5 and 6. Chapter 5 considers the data on the general classroom environment. This includes how students are organised, what the content is and who controls this, what students do, and what materials are used, in the lessons observed in this study.

Chapter 6, though, reports on the specific language features of textual interaction recorded in the observations of classes in this study. The major divisions of this chapter are those of the observation schedule: Phatic communion, explanation and summary, and enquiry. These are the main functions of teacher language in the classroom. Within these categories, discussion covers the more significant elements of the language used by teachers in their mediation of texts in the lessons observed. These include predictable and unpredictable speech, minimal and sustained speech, eight language techniques frequently used for explanation and summary, and five techniques frequently used in enquiry.

Whereas chapters 5 and 6 analyse the data in a statistical way, and discuss textual interactions using this analysis, chapter 7 considers three individual lessons observed in the study. These are not necessarily intended as typical representations of the lessons observed. Rather they are analysed because they reveal actual contexts and practices of textual interaction. The language used in the mediation of text is therefore examined closely within context, in a way that is insightful for classroom teachers in particular. Furthermore, language usages are found in these lessons that are not prominent in the collated data and discussion of chapters 5 and 6. The lessons analysed represent an interesting slice of the secondary school curriculum: Year 13 Mathematics with Calculus, Year 10 English, and Year 13 ESOL.

Finally, chapter 8 presents the conclusions of the study. These include specific implications about educational practices, as well as implications for future research in this field.

Chapter 2 Text

2.1 Introduction

Texts or materials are the “bread” for classroom consumption. Virtually every lesson in a secondary school revolves around a text, generally provided by the teacher, which is the pivot for learning. Texts may be oral, such as a recorded interview, a song, a speech, or a radio news item. Texts may be visual, such as a map, diagram, chart, photo, or graph. They may be audio-visual, such as a recorded television documentary or a film. However, in New Zealand secondary school classrooms, the majority of texts used are written. In the observations conducted for this present study, 74 per cent of texts used are written, of which 75 per cent have no visual component, and only a surprisingly low 25 per cent have any significant visual support of the written text.

Of course, text is not necessarily a single item. In reality, students in classrooms are often exposed to a number of texts at one time. Increasingly in senior secondary school classrooms, lessons involve the use of multiple texts on a topic, from which students are expected to elicit information and from this construct a coherent view. Franken and White (1999, p. 59), believe that “the implications of such text complexity and diversity are immense in terms of the learning burden for students”. In their discussion of how students comprehend multiple texts, they quote Goldman (1997), who explains: “Increasingly, successful information search and retrieval involves coordinating multiple sources of information that often have pointers to other texts and graphics. Navigation through such multiply-linked texts and graphics can be quite complex”.

There are two particular difficulties identified by Franken and White (1999, p. 59) inherent in this usage of multiple texts. The first is the difficulty of making “connections with other material, such as previous personal and domain (or topic-related) knowledge”. The other difficulty is “the need to focus on main points”. Franken and White believe that multiple texts “may in fact obscure the focus of the text and make it more difficult to retrieve information”.

The postmodern theory of intertextuality is defined by Cairney (in Gambrell and Almasi, 1996, p. 170) as “the process of interpreting and constructing one text by means of a previously composed text”. It refers to the context in which any one text is both constructed and interpreted. That is, both the writer and the reader bring contexts to the text that contribute to the meaning of the text. Franken and White (1999, p. 58) explain that “the process of understanding a text is modified by, and merged with, all previous texts”.

Spivey (1997, p. 27) presents a constructivist perspective that supports this view:

I focus on individuals as constructive agents in social activity, building meaning for texts, and producing texts intended to signal those meanings.... The individual agent is a member of social groups, has a social identity, and employs socially acquired knowledge, including knowledge of social phenomena. He or she has experienced numerous texts written by other authors, and much of the knowledge used in literate practices has come from those kinds of social experiences. The individual works in a social context, both the large sociocultural and historical context and the more immediate situational context. And he or she is in social relationships with others... Sometimes these relationships are with other people, whom I call co-constructors, who can influence the nature of the meaning being built.

Describing the “complex intertext surrounding any one lesson”, Chimombo and Roseberry (1998, p. 212) note the influence of “the sources of information teachers may refer to in their preparation of lessons”, students’ “previous school experiences”, and even “the students’ findings on the task”. Edwards and Furlong (1978, p. 41) remind us of Schegloff’s (1972) concept of “conditional relevance: The meaning of an utterance arises partly from something else which has been (or will be) said, perhaps some distance away in the interaction, in relation to which it is understood”.

Hartman (1992, p. 296) explains this in the Latin phrase: *E Pluribus Plures* (i.e. many from many). He writes, “From this perspective, the text is never an *ex-nihilo* (i.e. out of nothing) creation; it presupposes other texts and has a multiplicity of sources. It is polyphonic and double-voiced; it is a multivocal field of play where texts are

superimposed upon texts, upon still other texts.” Continuing the Latin connection, Hartman reminds us that “even the Latin derivation of the word ‘text’ (n. *textus*) – which means *woven*, as in a fabric or structure – further suggests that the composition of any text is interwoven with previous resources that give a particular texture, pile, and grain... And although the text itself is a woven network of codified threads in progress that fill a particular time and space, the threads are all anchored elsewhere” (1992, p. 297).

It is where else they are anchored that gives ESOL students the most difficulty with texts. Second language learners are also learners of the culture of that language. They therefore are likely to have gaps, not only in their language acquisition, but also in their knowledge of the social, cultural, historical, and ideological aspects of the context of a text. That is, intertextuality is likely to provide a barrier to ESOL students’ full comprehension of a text. Their comprehension will not depend merely on their acquisition of the vocabulary and syntax used in a text, but on their degree of acculturation.

For the purposes of this present study, *text* is defined as prepared materials¹. That is, in my observations of teacher interactions with texts, I restricted my recording of data to those in which teachers were dealing with materials that were brought to the lesson. These therefore included obvious texts such as books, photocopied notes, and videotaped resources. Whiteboard notes were included only if these had been prepared before the lesson. Thus, whiteboard notes constructed during the lesson, and arising from learning as it occurred during the lesson, were not included in this specific definition of *text*.

An example of one of the more unusual texts used by teachers in this present study is found in a sequence of Art lessons, which used an installation as a text. It was a large

¹ This does not, therefore, follow the technical usage of *text*, which describes equally oral, written, and visual language products, as defined by Brown and Yule (1983, p. 6) as “the verbal record of a communicative act”. It also does not use the term in its most global sense, as used by Kristeva (1989), and explained by Easton (1998, p. 22): “Kristeva held a wide view of text beyond the written or oral message, incorporating the notion of text into what she termed *signifying systems*...gestures, paintings, photography, cinema, dreams even, were all cited as...forms of communication or text.” Nor does it encompass some common linguistic uses of *text* as discussed by Stubbs (1983, p. 9), either to differentiate written text versus spoken discourse, or interactive discourse versus text as non-interactive monologue.

sculptural form, made of a number of large industrial objects, assembled in the middle of the Art room. This visual text was the focus of three lessons, requiring substantial teacher mediation, as the Art teacher explained, described, and analysed it and the learning activities that derived from this text.

2.2 Text in the essential learning areas

The New Zealand Curriculum identifies seven essential learning areas, which are “broad, recognisable categories of knowledge and understanding” (Ministry of Education, 1993, p. 8). The seven areas are Language and Languages, Mathematics, Science, Technology, Social Sciences, The Arts, and Health and Physical Well-being. In secondary education, which is the focus of this present study, “schools are required to ensure that students in years 11, 12 and 13 maintain a balanced curriculum...to continue studies in each of the learning areas” (Ministry of Education, 1993, p. 9). Consequently it is expected that students would be engaged with a wide variety of text types, reflecting the broad range of essential learning areas of the curriculum.

In relation to this variety of subject specific texts, five aspects are significant, particularly for second language learners, and will be discussed here. These are the use of different text types and the need for schema; the use of multiple texts in the construction of knowledge; the linguistic demands of texts; the support of written text by visual text; and the impact of prior knowledge or context on reading comprehension and learning.

2.2.1 Text types

Peacock (1995) differentiates the language of various text types. Text types, or genres, found in secondary school classrooms include narrative text, as in the short stories and novels studied in English lessons; and expository text, as in Science or History textbooks, for example.

Young second language learners frequently encounter narrative texts in the early stages of acquisition. Such texts typically use chronological structure, personal

pronouns, dialogue, and are supported by illustrations. However, at a more advanced stage, second language learners frequently encounter expository texts, such as may be used in Science teaching. These texts typically have a very different structure from narratives, use a lot of new vocabulary, and are dense with statistics and facts. Different text types, such as these, make different demands on the language proficiency of students.

Franken and White (1999, p. 58) state, "The textual material that students are exposed to across the curriculum is seldom in the form of one, discrete text. If one discrete text is the focus of learning, it is often the case that it is not consistent in genre. Many current materials, in a bid to become reader-friendly, embed information or curriculum content in other material. The result of this can be, for instance, a narrative which may have embedded within it, a description." In the case of texts commonly used in many essential learning areas, Franken and White find a variety of "mini-texts" (1999, p. 58), which use different genres to present related content. As examples of this they cite *3 Science* which is widely used in Science classes and *Population Studies* which is widely used in Social Studies classes in New Zealand schools.

It is important for students to have mental access to a relevant schema when approaching a written text, so that the text is able to be not only read, but also processed in some useful way. Smith and Elley (1994), Nunan (1993), and Barnes (1975), support this concept, as does Goldman (1997) who explains that recognition of text structure is a helpful aid to students, in their reading comprehension of text. She writes: "Readers may... need to rely on genre-specific, global organizational schemes to generate the 'hierarchical' connections. For example, causal relations play an important role in stories..., whereas claim-warrant-evidence relations are important in arguments.... Studies that have taught children to be more aware of narrative text structures have increased their narrative comprehension and composition skills.... However, awareness of expository text-structures does not play a simple predictive role in learning. Rather, learners need to know how to flexibly use the structure to enhance their learning" (1997, p. 367-368).

Research into the reading experiences of senior secondary school students of History in the United States is reported in Carretero and Voss (1994). In relation to the Social Sciences, one study finds that students may be assisted in their comprehension of History by an emphasis on familiar human experience for example. "Humans are especially skillful both in processing episodic information around human characters and preserving the temporal-causal structure of events. Several findings can be presented with respect to the central role played by characters in the reader's mental model or narratives.... Emphasising this sort of information improves the students' comprehension of the stories" (Carretero and Voss, 1994, p. 312). Thus, "historical texts must be 'good stories', taking advantage of human modeling skills. This means that historical texts should be mainly narrative, rather than expository texts.... Expository texts are more difficult to understand and learn than narrative texts" (Carretero and Voss, 1994, p. 315).

As in the area of Social Sciences with Carretero and Voss's (1994) reports of research of History texts, Chimombo and Roseberry (1998, p. 224) report Australian research by Martin (1993), that "recommends the use of narrative in writing Science". Two examples of narrative being effectively used for presenting comprehensible informative text are *Journey to the brain* and *I am Joe's heart*. Clearly then, second language learners are more likely to comprehend texts that employ this universal human approach, although an embedded genre in text always has the potential to obstruct comprehension.

In the selection of appropriate texts for use in mainstream classes that include ESOL students, the issue of simplified versions of text arises. In most cases, simplified versions are not available, but there are some commercially-produced texts that simplify common texts used in senior secondary school subjects. However, Lynch (1996) provides many examples to show that simplified versions of texts may in fact make it "more difficult for the reader to recognise the relationship between one piece of information and the next". It may not promote easier understanding. As he points out, "One of the ironies of English simplification is that the simpler and more common a word is, the more likely it is to have more than one meaning. The result is that replacing a more difficult or less frequent word with a simpler and more frequent one often increases the difficulty of a text" (Lynch, 1996, p. 29). He reaches the

conclusion that “there is bad simplification and good simplification, and that the success of simplification can only be judged by reference to a particular learner or group of learners.... A ‘simplified text’ that is not understood is not a simplified text” (Lynch, 1996, p. 29). In other words, the effect of the simplification is its measure. Teachers cannot assume that using simpler language will necessarily make the text more accessible to students.

2.2.2 Multiple texts

Increasingly multiple texts are used in senior secondary school classes to develop students’ critical thinking skills. This is a strongly recommended approach for the study of History, for example. Stahl et al cite a 1982 American survey showing that “roughly 90 per cent of all social studies teachers use a textbook in their class. Approximately half of all teachers in that survey reported relying on just one text, with that text being reported as the major determinant of the content of their curriculum” (1996, p. 430). However, they note that “currently, the single text approach to history learning and the model of learning upon which it is based are being challenged by those who espouse constructivist views of knowledge acquisition” (1996, p. 430). This contrasts with a traditional transmission view of teaching. For example, Stahl et al (1996, p. 434) state: “A number of educators have suggested that the single classroom text can be supplemented with or supplanted by multiple original source materials (eg. Perfetti et al, 1993; Spoehr and Spoehr, 1994; Wineberg, 1991).” Stahl et al (1996, p. 430) argue that “as information is learned, this information is not merely copied from one source to another but is transformed by the process of learning”.

A variety of relevant documents on a common topic represent both primary and secondary sources, from a number of vantage points. As Stahl et al (1996, p. 434) claim, “this use of original material forces students to construct links across information presented in different texts, and this information and the links connecting the different sources are remembered better if students make their own constructions rather than relying on the constructions of a textbook or teacher”. However, Carretero and Voss (1994, p. 282) warn that “there are some constraints to deal with, including

the demands that documents make on reading skill, domain knowledge, and a nondomain reasoning skill, based on something like ‘rules of evidence’ ”.

Multiple texts can lead to a firmer, more comprehensive understanding of the material. “As the number of linguistic access points increases, the cognitive representation becomes more accessible,” Carretero and Voss (1994, p. 317) explain. Stahl et al support this, because “seeing an event through different perspectives is necessary to create a rich understanding of an event or concept” (1996, p. 434). A further advantage of multiple texts is that this format “creates a learning atmosphere similar to that taking place in informal contexts of learning” (Carretero and Voss (1994, p. 318). The use of a familiar method of acquiring knowledge could be particularly suitable for second language learners, as it would be one aspect of the learning situation that is not new to them.

2.2.3 Text language

The linguistic demands of textbooks in various essential learning areas may be quite different. One major difficulty arising from the use of multiple texts in the Social Sciences is their linguistic demand, especially for second language learners. As Carretero and Voss (1994, p. 317) note, “students have to deal with multiple linguistic cues that connect to their representation, because documents present similar information, but in different ways”.

Many History textbooks do not present text content in a coherent way. Carretero and Voss (1994, p. 237) explain that “by *coherent* text we mean text in which the sequencing of ideas makes sense and the nature of the ideas and their relationships is made apparent”. Their research finds that “greater text coherence made for further comprehension enhancement” (1994, p. 241).

Mathematics textbooks tend to use less extended text than those of the Social Sciences. In Mathematics, frequent use is made of very short sentences and formulaic expressions. Algebra, in particular, is often found to be quite easily accessible to second language learners, because it uses a universal language of formulae and logic

that transcends language. However, in recent years, the Mathematics curriculum has placed an increasing emphasis on real world contexts for mathematical problems. This has resulted in greater use of extended text, using sophisticated syntax to express relativities between parts of a problem.

The readability of Science textbooks is investigated by Peacock (1995, p. 393), noting that these are “very different in structure than the narrative text in the second language which children” (in his African study) “have so far experienced”. He explains that “Science text material is expository; uses illustrations and graphics; and uses language for a complex range of functions such as giving instructions, describing phenomena, explaining ideas, hypothesising, asking questions. It is therefore potentially more ‘literate’ and thus more difficult to interpret than narrative text.” He discusses a number of studies that show this to be a particular problem for second language learners.

Peacock cites research that shows “marked disparities between the demands of the science texts and the English taught... For example..., from 38 per cent to 55 per cent of the vocabulary used was not taught... the logical connectives (e.g. conjunctions) used in the texts were not taught... and coherence conventions (headings, overviews, visual material, etc.) were used but not taught in either the science texts or the English schemes” (1995, p. 393).

Typical of informative texts, such as those used in Mathematics and Science, is the expression of causal and sequential relationships. These can present considerable difficulties for second language learners. Chimombo and Roseberry (1998) identify causal conjunctions, such as *because*, as common in Mathematics textbooks. They find that the use of marked conjunctions, such as *but*, *for instance*, and *whether*, is confined to explanations, and not used in exercises, but nevertheless it presents an obstacle to comprehension. Ellipsis is also common in Mathematics textbooks. For example, “To build a house, what measurements are needed? How accurate do these have to be? Do some have to be more accurate than others?” (1998, p. 222). Elaboration of these elliptical expressions would read: “To build a house, what measurements are needed? How accurate do these measurements have to be? Do

some measurements have to be more accurate than other measurements have to be?” (Chimombo and Roseberry, 1998, p. 222).

However, Chimombo and Roseberry (1998, p. 223) find that understanding of this language can be effected by the way “experienced teachers... maintain the cohesion of a lesson with a group of students from a similar ethnic and socioeconomic background” by encouraging and controlling classroom discussion of the information. Unfortunately, second language learners are frequently marginalised from this group, and have minimal participation in such discussion, thus not availing themselves of the opportunity to clarify their comprehension of the information.

In the essential learning area of Technology, texts are more likely to be photocopied worksheets or assignment sheets than textbooks. As such, they use didactic language to instruct about techniques and procedures. The vocabulary often features technological words, such as the technical names of tools and processes. However, a second language learner is not unduly disadvantaged in this, because native speakers too will need to learn these new vocabulary items. As Parkin and Sidnell (1992, p. 61) claim, “exploring the language, as well as the topic, is productive for the class as a whole”, for all students, not just second language learners.

2.2.4 Multimedia texts

The support of the written text by visual features is a particular aid to second language learners, and is commonly found in Technology texts. Diagrams and drawings are regularly used to illustrate the written explanation. Thus, any difficulty in the written language is usually overcome by the clarity and simplicity of the visual illustration.

The need for visual support of written texts is borne out by findings reported by Mayer et al (1996), from a series of experiments they conducted into the effectiveness of various types of Science texts. They report that many informational explanations, commonly found in Science textbooks, have a poor rate of comprehension by students. It is pertinent to quote their conclusions in some detail here:

When the goal of instruction is to help students be able to explain a scientific

system in words (retention) and to use this explanation to solve problems (transfer), a common instructional practice is to provide a lengthy verbal explanation, such as a textbook passage or a classroom lecture. Indeed, instructors may believe that providing a lengthy verbal explanation fulfills their responsibility to provide information to the learner. Unfortunately, this practice is not very efficient for many students, presumably because students do not process the information effectively.... By reducing the load on the cognitive system, summaries may enable students to carry out the cognitive processes necessary for meaningful learning.... Our research suggests that a verbal summary is not as effective as a multimedia summary that combines both visual and verbal formats and that a multimedia summary is more effective when it contains a small amount of text rather than a large amount. (Mayer et al, 1996, p. 72)

Clearly then, written scientific texts will be more effectively understood by all students, and particularly second language learners, when they are shorter and are accompanied by appropriate illustration.

2.2.5 Prior knowledge and text

The final aspect relating to texts used in the seven essential learning areas of the New Zealand curriculum, is the very important role of prior or domain knowledge and the understanding of context, on the successful reading of texts. Lebauer (1984, in Easton, 1998, p. 29) defines prior knowledge as “anything that acts as an inner resource from which knowledge is retrieved and reconstructed in the light of new input, thus contributing to the construction of meaning”. Alexander et al (1991, in Easton, 1998, p. 30), believe that “a key component of prior knowledge is sociocultural knowledge which acts as a filter through which all experiences must pass”.

The role of prior or domain knowledge as a reading strategy with History texts is discussed by Carretero and Voss (1994). Generally, “readers try to integrate their previous historical knowledge, if any, with the historical contents involved in the

narrative. In order to facilitate meaningful learning, it should be a good match between what students already know and what the text assumes" (1994, p. 313). However, unfortunately their study finds that in most texts used in the teaching of History in schools, "this condition is rarely met". They find a major problem is "the texts' assumption of an unrealistic variety and depth of prior knowledge from target-age students" (1994, p. 237). They also find that "having background knowledge did contribute to a more successful outcome" (i.e. better comprehension of a History text) (1994, p. 241).

The importance of Social Science students understanding the context of a text is stressed by Carretero and Voss (1994, p. 286). They state, "to think contextually means that words are not disembodied symbols transcending time and space". So often second language learners acquire these "disembodied symbols" through formal instruction, as discrete items of vocabulary. The connotations and nuances of the words are not fully understood; neither are the cultural and social contexts in which they are used.

Carretero and Voss (1994, p. 267) continue: "A context is not 'found' or 'located'. Words are not 'situated'. Rather, human beings create contexts in the full etymological sense of the word. *Context*, from the Latin *contexere*, means to weave together, to engage in an active process of forming strands into a pattern." They pose some pertinent questions, which have even greater import for second language learners. "How do thinkers weave historical contexts? Given the fragmented and discrete nature of the documentary evidence, how are coherent understandings realized? What kinds of knowledge are needed? How do thinkers navigate between feelings of proximity and feelings of distance with the past, points of contact, and abysses of distance? What is the role of formal study in the development of contextualized thinking? And what about the inability to create a context? What does noncontextualized, or anachronistic, thinking look like? What beliefs and processes lead to and sustain anachronistic thinking?"

This difficulty for readers of History texts is exacerbated for many second language learners in their comprehension of all kinds of texts. This is due to their social and cultural distance, frequently caused by the necessity of moving into a new culture and

language environment. As Love (1996, p. 11) asserts, regarding the use of texts in Legal Studies, "Given the fact that many of these ESL students have limited cultural knowledge of the American legal system, the teacher's role as provider of cultural knowledge is necessarily implicated in his role as provider of linguistic knowledge".

The role of prior or domain knowledge in assisting comprehension is endorsed by Peacock (1995, p. 396) in relation to Science texts: "Science learning involves acquiring and using a wide range of concepts which are often not part of children's everyday experience, and which are only encountered in school science lessons through text material." Furthermore, he explains that "many of the concepts when presented in a second language such as English are inaccessible to pupils, not only because of their difficulties of comprehension but also because vernacular languages often do not have comparable concepts or terms equivalent to the concept in English".

The importance of a range of reading strategies, in improving students' comprehension of a variety of text types, is stressed by Goldman (1997, p. 361). She cites many studies that find "the greater the variety of strategies individual readers used, the better their recall performance", particularly with narrative texts. Even with expository, informational texts, though, she finds that a higher degree of constructive reading activities brought greater comprehension of the text. She writes: "Higher levels of constructive activity involved integrating the text information with prior knowledge, thereby going beyond the text to build a representation or mental model of the referential situation."

As Goldman (1997, p. 362) elucidates, "explanation-based processing of informational text is processing that attempts to construct relationships among ideas presented in text. Sometimes these explanations are causally based. They may also reflect other types of logical relationships, such as if-then, analogical, or case-based reasoning (e.g. *That's like when I eat a lot of sugar and have so much energy I can't sit still*). Prior knowledge often enters into the process of constructing explanations."

2.3 Barriers to comprehension of texts

As far as written texts are concerned, Smith and Elley (1994) identify a number of barriers which block students' learning from text. Whilst they are considering the impact on all students, the barriers they identify are likely to become exaggerated difficulties for second language learners.

Perhaps the most significant barrier Smith and Elley (1994) describe is the lack of a relevant schema. This is a mental structure held by an individual, into which all new learning is brought. If an appropriate or related schema is not already held by a learner, then a new schema will need to be formed. This formation must be aided by some mediating interaction between the material and the learner. This is a role a teacher can fulfil. For example, "before a class is asked to read complex expository material containing unfamiliar concepts, it is important to prime the students with prior discussion, visual aids, parallel concepts or related anecdote.... Familiar analogies, concrete illustrations, and class discussion will help connect the new concept to familiar ones," suggest Smith and Elley (1994, p. 63). Nunan (1993, p. 17) describes this use of schema as an "advance organiser". He describes tasks that invite students to make predictions about a text, based on their prior knowledge, as "pedagogically... preparing students for the... task to come, and arousing their interest and involvement in the lesson". A failure to access and activate this schema disadvantages the learner, as illustrated by Love (1996). She describes an Australian Year 10 teacher, named as David, whose class contained 75 per cent ESOL students. 20 per cent were very recent immigrants. Love states that this teacher "made a conscious choice not to use the fictional texts that are so often used as a focus for social issues... choosing instead a piece of journalistic reportage". She quotes his rationale behind this selection: "Understanding fantasy is difficult for these kids, Vietnamese students especially need something they can root themselves firmly in and say yes, I've read or experienced whatever, I can relate to it. If I were to start reading something like the novel *Never Ending Story*, which is quite teachable to Australian kids, Vietnamese kids find that very hard. Their fantasies are based on folk myth or Buddhist stories and pure fantasy for fantasy's sake, individuated fantasy, is very difficult to grasp" (1996, p.6). This example highlights the

importance of selecting texts that utilise students' schemata, and the cultural factors teachers may need to consider in this selection.

Barnes (1975, p. 117) emphasises how important the use of students' schemata is for learning, when he writes that "in school, the teacher's and the pupil's views of the world are face to face". The teacher's views could be extended to include those of the texts selected by the teacher for the lesson. With this in mind, Barnes' development of this theme is rather chilling: "Children's existing knowledge is often excluded. The key to this is in the way in which many teachers control both what is discussed" (or read) "and how it is discussed."

Apart from limiting students' comprehension of the text, and consequently what is learned, such control places severe limitations on students' ability to construct meaningful knowledge from what they have learned. Barnes (1975, p. 118) continues, "If learners are always discouraged from utilizing the understanding which they do possess they will come to believe that school knowledge is esoteric and unrelated to the practical reasonableness of everyday action knowledge. They will fail to use what they do know. Moreover they are likely to undervalue their own ability to think, since they have been shown that what they know already is valueless in school."

Another barrier is clearly the level of vocabulary used in a text. Smith and Elley (1994, p. 63) refer to "considerate text (which) is user-friendly. It prefers the familiar to the unfamiliar term." An example they give is the unnecessary difficulty of the instruction, "Describe the operation of x", compared with the much greater comprehensibility of "How does x work?".

A third barrier identified by Smith and Elley is the student's unfamiliarity with common text structures. These include texts which are structured as a list, or which present a contrast, or which describe cause-and-effect. Teachers can aid students' understanding of these texts by "alerting them to these structures", for example by "a discussion of the signal words which help students recognise the structure" (1994, p. 64). These words include *first*, *second*, *to begin with*, in a list structure. Contrast is

frequently shown by *however*, *but*, *on the other hand*, or *yet*. Cause-and-effect structures commonly use cues such as *because*, *since*, *thus*, or the *if –then* pattern. Teaching students to recognise these signals assists comprehension of the text.

Smith and Elley (1994, p. 66) warn that too often teachers ignore the difficulty of the text for their students. “Some teachers, impatient to move on, simply tell and hope. But telling is not teaching.” They continue, “pupils will read better if they are reading actively – responding to questions, to predicting consequences, to summarising main points, to retelling favourite parts”. Approaching a difficult text with “active aggressive intentions rather than as a passive absorber of content is likely to be productive” (1994, p. 66).

The teacher’s role in mediating between the text and the students is clear. Yet, Smith and Elley (1994, p. 59) cite a major observational study in the United States which showed that only 0.25 per cent of classroom time was spent teaching reading comprehension. This present research in part is a study of how much this is also true of New Zealand senior secondary school classrooms.

2.4 The effect of mediation on the comprehensibility of materials

All teachers use textbooks to some extent in their classrooms. Chimombo and Roseberry (1998, p. 198) remind us that “teachers are, whether or not they like it, teachers of language.... Language is the means by which teachers (and texts) convey the content of the subject, and the means by which students relay their understanding, or otherwise, of the teacher’s material.” Teachers, then, should not underestimate the value of themselves as an oral source, providing an alternative to text and complementing textual sources. Teaching expertise is more about the ability to mediate texts, than about whatever control a teacher has over flexible learning arrangements, for example.

In his discussion of text material, Peacock (1995, p. 389) urges that “research should also focus on meta-textual factors, such as how text is mediated by teachers in the classroom”. He argues that “hopefully this might lead initially to the development of

better strategies for teachers to deal with existing texts" (1995, p. 390). He refers to work by Clarke (1994, 1995) in South Africa that shows that "effective use of text material does not simply depend on readability but is affected crucially by such matters as teacher mediation" (Peacock, 1995, p. 396).

Ur (1996, p. 11) emphasises the importance of what she describes as "presentation". She argues that "one of the teacher's jobs is to mediate... new material so that it appears in a form that is most accessible for initial learning". She considers this presentation to include "the initial encounter with comprehensible input in the form of spoken or written texts, as well as various kinds of explanations, instructions and discussion of new language items or tasks". Ur also describes the teacher's role in helping "to activate and harness learners' attention, effort, intelligence and conscious ('metacognitive') learning strategies in order to enhance learning" (1996, p.11). She concludes by stating that "the ability to mediate new material or instruct effectively is an essential teaching skill: it enables the teacher to facilitate learners' entry into and understanding of new material, and thus promotes further learning" (1996, p. 12).

Lynch (1996, p. 22) emphasises the role of the teacher in mediating texts in foreign language classrooms, but it seems likely that the same role is required in all classrooms to varying extents. He writes: "The implication of interactive processing... is that teachers can take active steps to make a message accessible by providing assistance at any or all of the three levels – language, context, or background knowledge."

In an article based on experiences in the Niue Island experiment of 1978, where the methodology of the shared book reading approach was adapted for ESOL learners, De'Ath (1980, p. 18) notes the importance of the teacher's role in mediating text. "The teacher becomes a facilitator of learning by intervening in the learning activity to expose the strategies of word decoding and meaning retrieval." Because "meaning retrieval is the essence of the reading process", its role in the acquisition of a second language is pivotal. However, De'Ath (1980, p. 21) warns against an over-emphasis on word accuracy in learning to read in any language. "Step by step programmes... restrict opportunity and leave children with an unnecessary minimum of language for communication. As children grow in ESOL through such programmes, they are

found to develop certain inaccuracies in their expression. The inaccuracies may well be the result of too little experience with language, rather than influence from the first language or from any other cause.”

One significant contribution teachers can make to enhancing students’ comprehension of text is to draw on its context. Wong and McNaughton (1980) consider how the “prior provision of context” can improve students’ oral reading proficiency. Their findings have obvious applications to ESOL students. The writers explain that “descriptions of children learning to read from meaningful texts show that early on in instruction high progress readers place high reliance on contextual cues” (1980, p. 169). They also cite Wittrock, Marks, and Doctorow (1975) in suggesting that “maintaining attention to contextual cues may support discrimination learning and retention by allowing items to be learned within a meaningful or ‘generative’ context” (1980, p. 170).

The teacher’s role here can involve “introducing and discussing texts before they are read. Such an introduction can highlight persons, places, sequences of events, unfamiliar language and experiences. By making these more familiar to the reader the teacher can attempt to increase the use of contextual cues during oral reading” (Wong and McNaughton, 1980, p. 170). ESOL students, even more than others, are likely to be assisted in their comprehension by such strategies, because their language and experiences will inevitably be somewhat different from those brought by native speakers to the reading of the text. As such, they have a greater distance to travel, metaphorically, to reach the world or context of the text.

It is not only teachers, though, who can mediate texts. Students can do this for each other. The importance of group work and cooperative learning is discussed in section 1.3. Suffice to note here that the shared construction of knowledge is proven to aid students’ comprehension of texts. Carretero and Voss (1994, p. 318), for example, argue: “People construct their knowledge in the presence of others who are also engaged in the same task. Moreover, evidence, and its respective interpretation, is not served individually, but ‘traded’ during social exchanges.... Students should be given the opportunity to discuss and contrast what they have understood during the class lessons. The use of text materials coming from different sources and presenting

different perspectives should be complimented with a naturalistic learning atmosphere. This should provide the appropriate 'milieu' in which the co-construction of knowledge as a shared activity achieved through negotiations between the students and the teacher is possible." Specifically, Carretero and Voss describe how understanding is enhanced by class discussion, "of the kind that prompts and allows students to reflect on what they have read and to raise issues and construct the connections that make the text content more meaningful" (1994, p. 254).

The notion that teachers should not be too prescriptive in their programme planning is developed by De'Ath (1980, p. 21), stating that, "Teachers are not always in control of learning – if they were then children would acquire only a fraction of the skills and knowledge they do acquire. In ESOL programmes we should not be concerned when learning gets out of control!" Rather, the motivation of the student should encourage attention to the text, and ensure comprehension. De'Ath (1980, p. 14) reminds us of Rubin's (1975) list of the qualities of a successful second language learner, which includes the "strong drive to communicate" and "practising frequently". To elaborate on these, De'Ath (1980, p. 16) explains that "motivation to use language as a functional tool must be high. The environment should foster success. There must be a wide range of language activity, where receiving and conveying meaning is more important than oral drills." This points clearly to the teacher's role as the presenter or mediator of text, to facilitate such an environment.

A positive consequence of using multiple texts is an increase in the amount of negotiation of meaning that is required among students in the classroom. Goldman (1997, p. 385) cites studies that show "that curricular and instructional designs that explicitly encourage student use of multiple texts promote classroom conversations and student responses that involve deeper and broader knowledge and meaning construction". This increase in communicative exchanges between students is particularly useful for second language learners, who need every opportunity possible to practise their developing oral language skills.

Mediation of text can be used by teachers to overcome problems associated with the complexity of multiple texts. Franken and White (1999, p. 59) note that teachers "have at their disposal a wide range of techniques for retrieving information and

learning from curriculum texts, from comprehension questions to genre frames, for example". They also suggest that teachers can draw on "embedded support devices" within the texts, which include "graphics, paragraphing, and subheadings".

Another problem created in the way texts are presented to students is in the practice of discrete lessons. Hull (1985, p. 98) states, "This starting afresh on a different subject with each new page or lesson is a way of ensuring that attributions of meaning made in reading or writing do not normally include those that have gathered over time, or those that are already in place because they are personal. Such a discreteness seems likely to cut off the pupil from his own language and its constitutive elements, and from the sense that what he uses is his own language." Thus, the failure to link texts to students' personal experience makes texts harder for students to understand.

Britton et al (1998, p. 476) report on their testing of learning from instructional text. They find that "once the learner understands the text by connecting the ideas in it to other ideas inside and outside the text, then when those connections are activated it becomes possible to demonstrate that information in the text has been learned". They describe how the student's "inference-making activity, which uses working memory and prior knowledge to make connections," causes "the learning to occur". Richards (1983, in Easton, 1998, p. 10) agrees: "Non-native speakers may lack culturally specific scripts."

The teacher's role in mediating text for ESOL students, then, inevitably includes filling in the contextual gaps. As Hartman (1992, p. 304) writes, "Any reading event is intricately bound to a larger dialogue that has preceded and will follow it. Although isolating it for close analysis may be revealing, it is also distorting... It provides only a limited frame on a larger 'reality'. Intertextuality reframes these points beyond our existential vision." The teacher must help ESOL students with their understanding of how text connects with this "larger reality".

2.5 Conclusion

Text is a central learning tool in school classrooms. Teachers' reliance upon text in their instruction of students must be accompanied by their effective mediation of the language of this text. The difficulties of text language, and the role of prior knowledge in understanding texts must be recognised. Interactions among teachers, students, and texts must enhance students' understanding, in an explicit way, of the context and cultural knowledge implied by a text.

Chapter 3 Input, intake, output

3.1 Introduction

Classroom language plays a very important role in any New Zealand secondary school second language learner's acquisition of English. Here are spent at least five hours a day, in an environment that has the potential to provide appropriate language learning conditions: opportunities to receive language input that is moderated by a prescribed context, and to use English with peers for a specific communicative purpose. If teachers of mainstream classes recognise their classrooms as a language learning environment, they can optimise the communicative opportunities of this environment.

In first language acquisition, parents will generally modify their language when talking to an infant. This "caretaker talk" (Lightbown and Spada, 1993, p.14) has a parallel in second language learning, when native or highly competent speakers use "foreigner talk" to make their input comprehensible to second language learners. However, it is not just "foreigner talk" that provides suitable input for second language learners. With self-monitoring of the appropriateness of their language for all the students in the class, including ESOL students, teachers of mainstream classes can present valuable models of English used in a particular context.

This chapter considers the importance of comprehensible input and the role of a second language learner in converting this into intake and output. The importance of oracy in learning is then discussed. The chapter concludes with an examination of the role of teacher talk as input, and aspects of teacher discourse such as questioning, simplification and explanation.

3.2 Comprehensible input

Krashen (1981), Seliger (1983), and Long (1983) have well established the importance of comprehensible input. Krashen's main argument in his input hypothesis

is that in order for input to be accessible and therefore useful to a language learner, it must be able to be comprehended by that learner. Furthermore, Krashen develops his hypothesis to include the concept that input should be just beyond the current competence of the learner, in order to be sufficiently comprehensible but with some new or additional features for the learners to acquire. He calls this $i + 1$ (1981, p. 100). This sets a direction for teachers' language in textual interactions.

Long's (1983) interaction hypothesis claims that "comprehensible input is necessary for (language) acquisition; and that modifications made to the interactional structure of conversations in the process of negotiating solutions to communication problems help make input comprehensible to the learner" (explained by Ellis et al, in Harley, 1995, p. 188). These "interactional modifications" of input in the classroom are strategies used by teachers and students to ensure that the input is comprehensible. For example, a student might use a comprehension check or a clarification request to confirm comprehensibility.

Watts (1989) has written about the learner's role in ensuring that input is comprehensible. He refers to "negotiation" (1989, p.45, but originating in Allwright, 1984b) of meaning as an important part of second language acquisition. In particular, he argues for formal language learning situations, such as classrooms, to ensure that learners are encouraged to use "negotiation". Learners should be taught useful techniques, to interact with the language input to which they are exposed, in order to maximise the intake, thus making better progress with their second language acquisition process

Ellis, Tanaka, and Yamazaki (in Harley, 1995, p. 219) find that "interactionally modified input leads to the acquisition of more word order meanings than does premodified input". This means that there must be some interaction around the use of text, which serves to modify or mediate the text and make it more comprehensible. Thus, classroom interaction can be seen to be a vital part of making the language input of text comprehensible.

Krashen's (1981) position on the $i + 1$ imperative of comprehensible input is supported by that of Vygotsky (1962). His concept of a "zone of proximal

development, defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state.... The actual developmental level characterizes mental development retrospectively, while the zone of proximal development characterizes mental development prospectively” (in Cole et al, 1978, p. 87). Teachers should use language in their mediation of text, then, that reflects their cognisance of this zone of proximal development.

The practical implication of this concept for teachers is to recognise that “learning which is oriented toward developmental levels that have already been reached is ineffective from the point of view of a child’s overall development. It does not aim for a new stage of the developmental process but rather lags behind this process. Thus, ... the only ‘good’ learning is that which is in advance of development” (in Cole et al, 1978, p. 89).

There were some controversial applications of Krashen’s (1981) input hypothesis, arising from his early claims that input was sufficient for language acquisition, and that the actual production, or output, of language was not necessary. However, many researchers challenged his early assertion of sufficiency, and in fact Krashen himself has since modified his view of this. It is generally accepted today that second language learners need ample practice in using a language to acquire it.

3.3 Intake and Output

Seliger (1983) argues that input alone does not cause language acquisition. He asserts that interaction is essential to convert input into what he calls “intake”. He differentiates the two terms, in that whilst “input” is the language the learner is exposed to, “intake” is what the learner actually internalises. Seliger believes that a learner’s interaction with the input is necessary for the language to be taken into the learner’s developing internal knowledge of the language.

Seliger’s (1983) research found that what he called “high input generators” (HIGs) acquired a second language at a much faster rate than “low input generators” (LIGs).

HIGs were learners who initiated and sustained interaction in learning situations, whereas LIGs were more passive in their role as learners, receiving the language input, but not participating much in interaction. This supports the argument for plentiful practice in language use for second language learning to be successful. An obvious example in support of Seliger's emphasis on the importance of interaction, is the fact that viewers do not acquire a second language even though they may watch many hours of television programmes in that language. Seliger would argue that interaction is the missing ingredient. Thus, the learner's role as an active participant is pivotal to their language learning success.

As well as comprehensible input, and some metacognitive processing of this to become intake, then, students need opportunities for output. It is in output, or the production of language, that students can test their learning. As language learners, ESOL students need opportunities to test new hypotheses about the rules or grammar of their target language, English. They need opportunities to recall and apply recently learned vocabulary. These opportunities for output reinforce learning through application and practice.

Reiterating the notion that second language learners need to use the target language if they are to learn it, Parkin and Sidnell (1992, p. 48) remind teachers that "setting tasks that require students to use listening, speaking, reading, and writing skills should be an objective in all classes". As Clegg (1996, p. 16) reminds us, "English-fluent peers are an equally – if not more – important source of language input. Interaction with them is a most powerful influence on ESOL students' social fluency. Within the classroom, such interaction can be encouraged by the teacher." The most valuable use of output in the classroom occurs when students are required to use language for real, communicative purposes. Thus, activities that are "relevant, interesting and purposeful" provide a suitable environment for output, as Schifini explains in Gambrell and Almasi (1996, p. 43). In these ways the classroom environment can provide a very helpful second language learning environment for ESOL students.

3.4 The importance of oracy in learning

Oracy is the dominant mode of interaction, which is so important for ensuring comprehensible input; and for second language learners in particular, competence in this is usually a major goal. However, schools do not always provide optimum conditions for developing the oracy of their students, whether native speakers or second language learners.

For example, Edwards and Westgate (1994, p. 168) find in their 1980s research, “disturbing evidence... of a persistent shortage of opportunities for pupils to engage in the kinds of dialogue through which the shared construction and negotiation of meaning might be achieved”. In the 1994 second edition of their book, whilst finding “a growing number of teachers” providing these opportunities, they are alarmed at “the re-emergent strength of the traditionalist lobby, mostly outside education, whose ignorance of research on classroom talk is only exceeded by their scorn for what they neither know nor understand”.

Edwards and Westgate (1994, p. 4 – 5) summarise the debate of the 1980s and 1990s in British educational circles about the role of oracy in schools. They quote Andrew Wilkinson (1965) who is credited with coining the term *oracy*: “Oracy is not a ‘subject’ – it is a condition of learning in all subjects; it is not a ‘frill’ but a state of being in which the whole school must operate..., where children are... placed in situations where it becomes important for them to communicate – to discuss, to negotiate, to converse – with their fellows, with the staff, with other adults.... This is basically how oracy grows: it is to be taught by the creation of many and varied circumstances to which speech and listening are the natural responses.”

The role of oracy in interaction is self-evident. Studies cited by Edwards and Westgate (1994, p. 6) provide strong support for the role of oracy as “talking to learn”. As they explain, “Talk is central to this (constructivist) view of learning and knowing, being the primary medium of interaction, and because it helps learners to make explicit to themselves and others what they know, understand and can do”. They refer to an earlier definition by Edwards, that “the development of

understanding is a communicative accomplishment embodied in classroom discourse” (1994, p. 7).

Lynch (1996, p. 44) adds to this discussion: “In a study comparing the two forms of modification in a listening comprehension task, Teresa Pica and her colleagues at the University of Pennsylvania showed that learners who were allowed to interact with the teacher to clarify a ‘difficult’ version of a listening text achieved higher scores on this comprehension task than those who heard a simplified version but could not interact with her (Pica, Young and Doherty, 1987)”. Willis (in Coulthard, 1992, p. 181) reinforces this: “As students become even more aware of the need to become fluent in English and to cope with the flow of natural speech, there is likely to be a greater demand for replication activities to allow learners to practise communicating in the classroom, not simply at utterance level, but at discourse level, taking responsibility for their own turn-taking and negotiating their own way through a complete interaction.”

Furthermore, even given the opportunity for genuine interaction, students may become adept at ensuring that it is the teacher who does most of the work. This rather cynical view is described by Edwards and Westgate (1994, p. 127): “The zeal and skill with which teachers pursue ‘right’ answers is so familiar to their pupils that it makes available to them ways of getting the teacher to do the work. For they have ways of making the teacher talk – for example, by offering token answers or wild guesses which the teacher chooses to ‘hear’ as genuine attempts to solve the problem which deserve some additional signposts which may lead towards finding a correct or more acceptable answer.”

Clearly, then, teachers have a responsibility to ensure that classroom interactions around text involve activities requiring students, not just the teacher, to use their oracy skills.

3.5 Teacher talk as input

The primary tool of a teacher is oral language. Earlier even than Plato in ancient Greece or Confucius in ancient China, teachers have used the power of the spoken word as their main mode of communication. Even with all the technological aids of the twenty-first century, from books and pictures to video and interactive computer programs, and even with a considerable increase in small group work in secondary school classrooms, lessons continue primarily to comprise teachers talking to students. The significance of teacher talk, therefore, is undiminished. It has the greatest influence on students of any aspect of their learning environment.

One cannot fail to recognise the impact (either positive or negative) of teacher talk on students, when one considers the quantity of it. Jackson (1968) in Stubbs (1983, p. 63) calculates that students spend over 1000 hours a year in school, which totals at least 11,000 hours before they leave at the age of 16. Flanders (1970) in Stubbs (1983, p. 63) estimates that for 70 per cent of a lesson someone is talking, and that for 70 per cent of that time the teacher is talking. Chimombo and Roseberry (1998, p. 211) confirm this: "In the majority of classes around the world, the teacher speaks for around 70 per cent of the time." No wonder teachers find the term long and the holiday much needed.

What do teachers do in the classroom? As Simon and Boyer (1970) cited in Chimombo and Roseberry (1998, p. 197) rather superciliously note, "Any school child playing teacher will produce most of the behaviour used by most teachers. Typical behaviours are: standing in front of a group of relatively passive onlookers... doing most of the talking... asking questions to which they already know the answers... and evaluating by passing judgements." Sinclair and Brazil (1982, p.22) outline the four main functions of teacher talk, in simple terms, as:

1. Telling things to pupils.
2. Getting pupils to do things.
3. Getting pupils to say things.
4. Evaluating the things that pupils do.

They divide the work of the teacher in the classroom into three main aspects:

1. The subject matter of lessons.
2. The organisation of lessons.
3. The disciplinary side of a large group of people working together.

It is these functions and aspects of the classroom task that form the language situation of teacher talk.

Stubbs (1983, p.43) also discusses the functions of teachers' talk. He says it "is characterized by a high percentage of utterances which perform certain speech acts including: informing, explaining, defining, questioning, correcting, prompting, ordering, requesting. It is also characterized by discourse sequences which have few, if any, parallels outside teaching, including: drills around the class, dictation to the class, group answers, and the like." Interestingly, however, whilst all of the functions Stubbs lists here can be identified in the lessons observed during this present study, none of the discourse sequences Stubbs describes here feature in any significant way in any of these lessons.

This "peculiarity of classroom talk", claim Sinclair and Brazil (1982, p. 57) results from "its overall didactic purpose". Because the teacher is so often in the role of informer, the student assumes a role of receiver. "One function of discourse in the classroom", they continue, "is the giving of information by the teacher. Since the overall purpose is a teaching/learning one, the teacher has a permanent right to speak and the pupils ... accept the basic role of a listener."

The use of teacher talk for both conveying subject knowledge and providing language input is discussed by Fillmore (in Wilkinson, 1982). She warns that this input needs to be modified, however, if it is to be an aid to second language learning. "Speech becomes usable as input for language learning only when it has been produced with the learners' linguistic needs and limitations in mind". She recognises, however, the difficulty teachers have in conveying complex content in simple language, referring to "the competing goals of helping the language learners learn the school language and of teaching them subject matter" (1982, p. 284).

This difficulty increases as the specialisation of subjects increases through the secondary school years. In particular, with reference to the situation of ESOL learners in mainstream English-speaking classes, Fillmore observes, “teachers find it considerably more difficult to tailor instructional language to the needs of language learners in classrooms where there are both language learners and fluent speakers of the target language.... The tendency for most teachers in a mixed language situation is to talk to the students who understand best rather than in a way that can be understood by everyone. Often, the easiest solution is to aim at a point somewhere in the middle of the various abilities, and hope for the best... Such language is modified somewhat, but not enough to allow children who do not know the language well to figure out what is being said” (1982, p. 293). The consequence is that the English used instructionally is not very useful to learners as input data. Nevertheless, it is likely that native-speaking students and ESOL students alike can benefit from appropriately modified input, because of its contribution to clarifying and reiterating key learning points.

In describing the “facilitating environment” necessary for second language learners in schools, as discussed in section 1.4, Clegg (1996, p. 16) explains that these students need “teacher talk which is roughly-tuned to learners’ needs and which manifests the kinds of modifications which make it comprehensible”. He cites useful features such as “repetitions, explanations, examples, and clear boundary markers”. Such input should also be, he believes, “interactive and visually supported”. Again, all students in mainstream classes can be assisted by such language, by visual material supporting text, and by interactions around the text that lead to deconstruction and reconstruction of meaning.

Fillmore (in Wilkinson, 1982, p. 291) also argues: “The importance of classroom organization is particularly obvious in cases where there is a marked imbalance between language learners and proficient English speakers in the class. Although one-on-one interaction is ideal for language learning purposes, there is only so much of it to go around in such classrooms. And with perhaps 30 children competing for this kind of interaction, the amount each receives may not be adequate to sustain language learning efforts.”

These points again raise questions about the language of textual interactions. What is the impact of class size on interaction? What is the value of mainstream classes for ESOL students? How effective are teachers' modifications to their language? How effective is teacher talk generally in mediating text?

One of the most notable features of teacher talk is the use of talk to monitor students' understanding. Stubbs (1983, p. 50–53) lists eight types of metacommunication in classroom teaching. These are:

1. attracting or showing attention
2. controlling the amount of speech
3. checking or confirming understanding
4. summarizing
5. defining
6. editing
7. correcting
8. specifying a topic

Metacommunication, then, is “communication about communication” (Stubbs, 1983, p. 48). Teachers use this so much, because of the centrality of their role as communicators. However, Stubbs (1983, p. 53) is concerned that this role maintains an “asymmetrical” relationship between teachers and their students. Because teachers see a need to monitor “the working of the communication channels, clarifying and reformulating the language used”, metacommunicative language comprises a high percentage of teacher talk and perpetuates the power status of the teacher in the classroom relationship.

The power relationship between participants is also distinctive to teacher talk. “Much classroom talk is characterized by the extent to which one speaker, the teacher, has conversational control over the topic, over the relevance or correctness of what pupils say, and even over when and how much pupils may speak,” notes Stubbs (1983, p. 44). Sinclair and Brazil (1982, p. 5-7) note that in traditional classrooms “they (pupils) have only very restricted opportunities to participate in the language of the classroom.... The teacher dominates the talk in quantity, range, and degree of control. Much of this no doubt arises from his social position and his legal responsibility.”

Continuing this theme, Sinclair and Brazil (1982, p. 57) write: "Because of social conventions, the teacher has probably more free choice of what to say than practically any other kind of person and more power to constrain what else is said." It is the view of a teacher as the holder of information that contributes to this dynamic. Sinclair and Brazil state that "the teacher's power of information control is directly related to his verbal domination of the classroom" (1982, p. 57).

However, teachers face many communication difficulties because the classroom is not an ideal communication situation. As Stubbs (1983, p. 43) explains, "Teachers have to devote a great deal of time and effort simply to keeping in touch with their pupils – not only because of the far-from-ideal communication conditions in the average school classroom, but also because of the very nature of teaching. They have to attract and hold their pupils' attention, get them to speak or be quiet, to be more precise in what they say or write, and to try and keep some check on whether at least most of the pupils follow what is going on."

So common is the monitoring aspect of teacher talk, that Stubbs (1983, p. 58) formulates a descriptive rule (following those of Labov and Fanshel (1977)) to describe it:

If A makes repeated and unmitigated statements about B's speech, or asks repeated and unmitigated questions about B's understanding of A, B will accept these statements or questions as legitimate and appropriate only if B believes that A has the right to make such statements or ask such questions; and this right is inherent in only a limited number of role relationships of which the paradigm example is teacher-pupil, where A fills the role of teacher.

This bald description unflatteringly but accurately describes a key dimension of the power inherent in teacher talk and its relationship to students.

As long as this traditional type of teacher talk dominates the classroom, students' learning will be constricted by it. A more interactive and communicative learning environment is sought by many teachers today, as is evidenced in cooperative learning classrooms. Sinclair and Brazil (1982, p. 6) optimistically point out that the

classroom is, potentially at least, a place where pupils can learn and practise skills which will increase their effectiveness as communicators". This can be facilitated, they believe, by a "changing role of the teacher in the classroom," which would accompany "a fundamental restructuring of the discourse".

Supporting this idea, Love (1996, p. 22) believes that "there are points... at which teacher directed talk is important and there are points where it is important for development of student understanding that teacher and students move towards more jointly negotiated talk". She suggests that "in modelling certain cognitive and literate abilities, and in giving students opportunities to orally rehearse their use of them, (a teacher) is providing... ESL students with access to the codes of power which may otherwise remain 'secret' to them". She continues that teachers "have a responsibility to make these codes explicit for those to whom they are unfamiliar".

Specifically, Clyne (1980, in Love, 1996, p. 23), "points to the very real disadvantage which many ESL students experience during their senior schooling if they do not have access to explicit understandings about the rules of certain kinds of talk and certain kinds of writing". It is, therefore, discourse structure, rather than content, that is the more vital aspect. Love (1996, p. 23) concludes by quoting Clyne (1980): "If culture-specific discourse structures play as important a role as is suggested by our data, they should occupy a prominent place in teaching programs for ESL students."

Changes in the nature of teacher talk, then, will occur as our classrooms increasingly reflect modern understanding of how students learn. Teacher talk will always have an important role in mediating texts, but should not be used to preclude interaction among teachers, students, and texts.

3.6 Other aspects of teacher discourse

Stubbs' (1983) identification of the functions of teacher discourse is discussed in section 3.4. Questioning, elaboration, and simplification are key functions of teacher talk that require some more detailed consideration here, because they tend to dominate classroom language.

3.6.1 Questioning

Teachers frequently use questioning as a means of interacting with students, and particularly to mediate between a text and the students. Over many decades, researchers have investigated the role and effect of questions in classroom interactions.

Hull (1985, p. 217) describes a typical lesson structure that comprises “monologues” by the teacher, which are occasionally interrupted by a pause, or a question for students. This kind of lesson is the result of the teacher’s belief that knowledge is something they possess, and which is to be imparted to students, who will receive it. In this respect, the teachers’ position of power in relationship to the students is actually strengthened by questioning. In this situation, Hull identifies the purpose of the teacher’s questions as being “to diagnose how efficiently the subject language over which they (the teachers) have custody has been distributed”. All that is required of students here is to respond by regurgitating some of the language/knowledge that has been delivered by teacher or that is in the text. Students become very skilled at this kind of response, but the extent of the student’s understanding is not well demonstrated in this “monologic” interaction.

Corson (1987, p. 104) describes teachers’ tendency to use closed or *display questions* as a “teachers’ disease: teachers become so used to their role as inquisitors that they are unable to step outside it, even when they prefer to promote learning through a conversational approach”. Other researchers, such as Nunn (1999, p. 23), have referred to *pseudo-request* or *recall questions*, as similar to display questions. These terms all identify the function of asking students to respond with language or knowledge that is already known to the teacher, and especially that which has recently been acquired, usually because the teacher has just recently taught this content.

In contrast, Hull (1985) refers to Postman and Weingartner’s *Teaching as a subversive activity*, in which the student’s role in constructing meaning is emphasised. Whilst not wholly subscribing to this view, Hull does assert that dialogue is vital to meaningful interaction in the classroom. He advocates encouraging students to ask

questions that communicate their own genuine concerns, thus encouraging meaningful, not formulaic, dialogue between students and teachers about texts. Hull explains: "In general, then, expressions of interest that are articulated as questions may be seen as revealing where a dialogic learning relation may begin, or be resumed. But when children do ask questions, they are often seen by others as merely revealing a lack of knowledge, and this social interpretation of the meaning of questions means that crucial questions may be censored and go unasked. If there is to be a dialogic relation through learning, the teacher needs to know what ideas and questions a pupil has, how provisional or developed they are, how urgent, genuinely personal, or quietly speculative, and so on" (Hull, 1985, p. 225).

Other researchers, including Nunn (1999, p.24), identify the kinds of questions that meet this dialogic function as *genuine request* or *referential questions*. In these questions, the teacher does not necessarily know how the student will respond, because they ask about less predictable aspects, perhaps drawing on the student's own domain knowledge or experience.

As a specific aid to teachers attempting to create a communicative and constructivist environment, Barnes (in Corson, 1987, p. 103) poses seven questions for teachers to ask themselves about the quality of their questioning. These are:

- 1) Are you requiring your pupils to think for themselves or mainly asking them to feed back information from a book or from an earlier lesson?
- 2) Are you eliciting the pupils' existing experience and understanding and working from that, or does the way you are planning lessons tend to make their present knowledge irrelevant?
- 3) Do your responses to pupils' contributions include replies which use and develop what they have said, or are you predominantly evaluating replies as right/wrong, or good/bad?
- 4) When you present information, or give a demonstration, or read a poem, or discuss a visit, are you requiring your pupils to explain and hypothesize, or are you telling them what it means?
- 5) Do you ask pupils to expand what they have said, to respond to one another, to ask questions, to offer evidence, or consider alternative explanations, to plan lines of action?

- 6) Are your pupils in fact contributing at some length to the lessons, or answering merely in brief phrases?
- 7) Are they raising questions of their own, offering experiences and opinions, joining in the formulating of knowledge?

The role of questioning is central to classroom dynamics, both because of its frequency and because of its ability to either reinforce the dominant position of the teacher, or to contribute to genuine interaction between teacher and students. In the mediation of texts, teachers should aim to use dialogic rather than monologic questioning. Students' own questions about text should also be encouraged in the course of these textual interactions.

3.6.2 Simplification and Explanation

So often, teachers find themselves mediating texts for students by breaking down complex language and ideas into simpler forms. However, a very interesting phenomenon concerning simplification is described by Lynch (1996, p. 27). "The relationship between simple language and accessible meaning is not straightforward. Extremely basic language can express, or hint at, highly complex messages. A vital part of being an effective listener/reader involves going beyond a text', using the clues and hints to recover the speaker's/writer's intended meaning." He later explains that "provided learners have reached a certain threshold proficiency level, unfamiliarity of topic and text structure is likely to hamper comprehension more than linguistic difficulty itself" (Lynch, 1996, p. 28).

Hull (1985) believes that attempts at simplification are not necessarily helpful. In *The language gap: How classroom dialogue fails*, he notes that teachers' talk frequently attempts to explain new ideas by simplifying vocabulary and syntax. However, in analysis of classroom interactions he found that this results in a "highly selective version" of ideas, which may in fact confuse students more than it clarifies. He asserts that "the belief that such 'simplifying' renders accessible what has proved difficult" is fallacious (1985, p. 71). Such simplification "might be seen rather as a heightened arbitrariness" (1985, p. 73) in its selection of ideas.

A similar problem to that with simplification occurs with explanation. Teachers commonly explain an idea or a word by adding extra information to the message. However, second language learners are frequently confused by this because they do not recognise the structure of the message. As Lynch (1996, p. 30) explains, "we need to give our students clear signals that what we are saying is related to what we have just said, and in what way". Pausing and stress clues may not be picked up by ESOL students. Two studies reported by Ellis et al (1995) show that excessive elaboration of input could make the input less comprehensible, by making it more difficult for learners to discern essential information.

Lynch (1996, p. 32) refers to Allwright's rather cynical summation of problems for students in understanding the teacher: "The only thing that saves learners from utter confusion in class is their relative lack of attention to the potentially confusing features of classroom interaction (Allwright, 1984a, p. 217)." It seems that neither simplification nor explanation necessarily helps students learn.

Teachers' mediation of text, then, might focus more on discussing the context of the topic or content, and the structural features of the text as they indicate the significant relationships between ideas.

3.7 Conclusion

Comprehensible input is a vital element of language learning, as is the learner's engagement to convert it into intake, and consequently output. The importance of oracy, for both teachers and language learners, is therefore apparent, as a primary mode of input. The language input of the classroom environment can play a very important role in the development of English language competence in ESOL students. Teachers' oral language in particular shapes the language learning environment to which these students are exposed for many hours daily, and the characteristics of this language is a major focus of this present study.

The following chapter moves specifically into describing the focus of the present study. It explains the methodology employed to research the language used by teachers in their interactions with text in the classroom.

Chapter 4 Methodology

4.1 Introduction

After presenting the research questions, this chapter sets out how the study was conducted. Classroom observation would be the main source of evidence to reveal what interactions occur when teachers use texts with their students. This chapter describes how the research instrument, an observation schedule, was designed. It also explains how the data was gathered. A range of secondary schools was selected, with the timetable of an ESOL student at each school determining the selection of lessons observed. In this way, data was gathered on the language environment of textual interactions, as experienced by ESOL students. Finally, this chapter explains how the data was treated.

4.2 Research questions

1. How do teachers mediate between materials and students in the classroom?
i.e. What do teachers do and say to bring texts to students and students to texts?
2. What similarities or differences are there in different curriculum areas in teachers' use of strategies in textual interactions?

4.3 Observation in classrooms

As Bellack, Kliebard, Hyman, and Smith explain in the preface to their book, *The language of the classroom*, research that describes and analyses rather than prescribes is valuable for informing practice. "Only as teachers have available knowledge about the teaching process gained through research, will they be able to exercise effective control over the process" (1966, p. v).

The present study is process-oriented research, which describes some instructional practices of teachers in secondary school classrooms in New Zealand. Because there

is comparatively little literature available on the use of these practices in relation to texts, it seems appropriate to focus on process at this stage.

One reason Bellack et al (1966, p. 251) suggest for a comparative lack of research is the “extraordinary complexity that has mitigated against research in classroom settings and has led scholars to view educational problems either from a more philosophical position relatively independent of controlled empirical investigations, or from the perspective of highly artificial laboratory conditions”. More recently, Wragg (1994, p. 109) warns that “the study of language in the classroom is so labour-intensive that it is much less common than other forms of classroom interaction research”. These comments only served to galvanise my resolve to attempt to reveal something of the reality of classroom language, as teachers present texts to students.

Edwards and Westgate (1994, p. 96) warn that there are some inevitable limitations of systematic classroom observation such as the use of an observation schedule provides. “All observation is selective,” they write, “all forms of recording partial. All researchers have to make simplifying assumptions about that part of the social world which they seek to investigate if they are to gather data at all”. This must be acknowledged, and the assumptions have been identified in the discussion of the selection of items for the observation schedule, in section 4.4.2.

Whilst audio or video-recorded teacher interactions could be useful sources of data, the volume of recording seemed beyond the means of this research. 20 hours of classroom interactions at six schools would produce 120 hours of audio or video-recording. According to Edwards and Westgate (1994, p. 2), “An hour’s recording will take 15 – 20 hours to transcribe with any thoroughness”. Stubbs (1983, p. 41) agrees, stating that researchers should “be aware that a tape-recorder, whilst providing more objective and detailed data, is indiscriminating and may well provide too much data, unless the data are collected with a specific aim in mind. Five minutes of conversation may take over an hour to transcribe if the recording is clear, and correspondingly much longer for a poor recording”. Given that this research was designed to be completed by a sole researcher within a 12 month period, 2200 hours (55 weeks) of transcription was not practicable.

However, some selected teacher interactive talk was audio or video-recorded, to provide supplementary data to that deriving from the observation schedule. Some of the participating teachers were reluctant to be recorded, though, which restricted my selection. At each school, nevertheless, I was able to record some classes. These recordings provided additional transcribed examples of interactions, which are used to exemplify and illuminate points made in discussion of the results. It was also possible to write down some significant short utterances when they occurred during the real time observation, and these are used in discussion of the results.

However, Edwards and Westgate (1994, p. 108) caution against “the mere display of linguistic anecdotes or ethnographic vignettes” and “rushing to judgement about the social or educational significance of the interaction”. They do support “insightful observations”, though, which are “recorded encounters” conveying “something of the immediacy of travellers’ tales, allowing teachers rare glimpses of fellow professionals at work”. The transcriptions, then, are intended to provide illuminating examples to accompany the data.

The observation schedule, the audio and video-recordings of lessons, the interviews with ESOL students, discussions with the teachers observed, and the researcher’s intuition of the classroom situation gained from many years in the field, all combine to meet Stubbs’ (1983) suggestion that triangulation be used, as a way of cross-checking the validity of data. By this he means that more than one perspective on a situation should be considered. For example, “survey data might be checked against ethnographic observations, and more generally quantitative data might be checked against qualitative reports, and vice versa” (1983, p. 234).

Interaction can be viewed in relation to a hierarchy of structural elements in classroom language, identified by Coulthard (1992, p. 5). A summary of this discourse structure is shown in Figure 1 below. He bases these ranks on the work of Bellack et al (1966) and Halliday (1961) in particular. Coulthard considers that classroom discourse consists of five levels, from the smallest to the largest unit, named as *act*, *move*, *exchange*, *transaction*, and *lesson*. This last he also refers to as *interaction*.

Non-linguistic organisation	Discourse	Grammar
Course		
Period	Lesson	
Topic	Transaction	
	Exchange	
	Move	Sentence
	Act	Clause
		Group
		Word
		Morpheme

**Figure 1 Hierarchy of structural elements in classroom language
(adapted from Coulthard, 1992)**

In Coulthard's (1992) system of discourse analysis, an *act* is the lowest unit, which therefore has no structure. This includes a word. Acts combine to form an utterance, which Coulthard labels a *move*, after Bellack et al (1966). A move is "everything said by one speaker before another began to speak", and *exchange* as "two or more utterances" (or moves) (1992, p. 2). An example of an exchange might be the typical pattern of teacher initiation, student response, followed by teacher feedback. Coulthard explains that "exchanges combine to form transactions and it seems there will be a number of transaction types, distinguished according to their interactive function, but we cannot isolate them as yet" (1992, p. 3). The highest unit of discourse structure he identifies in a classroom is the *lesson*. This consists of one or more transactions, and "may frequently be coextensive with the pedagogical unit *period*, but need not be" (1992, p. 4). Outside of the realm of classroom discourse, the more general term for this level is *interaction*.

Coulthard reminds us that the linguistic structure of interactions (or *lessons*) is difficult to analyse. He describes interaction as "an unordered series of transactions, bearing in mind that this does not mean that they do not display order, but that this order has not as yet been...characterized in linguistic terms" (1992, p. 141). For this reason, my analysis of classroom interactions (lessons) occurs below this widest, highest level.

In my observation schedule, I gathered data at the three middle levels of Coulthard's (1992) hierarchy of classroom discourse; *move*, *exchange*, *transaction*. Because I was dealing with neither the fine analysis of acts, nor with the global level of interactions of the classroom, I was able to record sufficient detail in real time coding. Willis (in Coulthard, 1992, p. 182) supports my decision, noting "one very real possibility ... is that of the real-time coding of interaction", and stating that "it is quite possible to record easily at the rank of exchange".

Further support for my decision to use real-time coding is provided by Stubbs (1983, p. 41-2). He describes his data collection for the spoken interaction of one type of speech event, a school lesson. He writes, "During the periods of observation I was simply concerned to write down as much as I could of what the teacher said...", and then suggests that "prospective researchers should be aware that it is often possible to write down... a great deal of useful data, even on use of language, especially when they know what sort of behaviour they are looking for".

Coulthard (1992) presents some of the factors affecting an observer's decision about whether to use single or multiple coding of the linguistic items used. He reminds us that "since human behaviour is infinitely specific and infinitely subtle, it is ridiculous to assume that one designation, especially from a small set of choices, is sufficient to describe its total effect" (1992, p. 84). Stubbs (1983, p. 47) concurs: "All utterances are multi-functional". On the other hand, though, for the sake of simplicity, Coulthard prefers "to make a general assumption that each act and move realises a single choice from a finite set" of items on an observation schedule. He qualifies this preference with the caution that "it requires sensitive interpretation in doubtful cases". Stubbs (1983, p. 63) notes that "any description at all has inherent limitations. The only solution is to make those limitations explicit."

With this in mind, I determined generally to use single coding of the language I observed, but to use multiple coding whenever interpretation necessitated. As Francis and Hunston in Coulthard (1992, p. 151) note, "an utterance may have a significance for the conversation as a whole which is not captured by the restricted nomenclature", which "may lead the analyst to see a need for double labelling". Furthermore, my

observation schedule, with many overlapping categories, was not devised especially to enable single coding. However within each category, it proved generally possible to make a single coding decision.

The sample was extensive enough to enable some generalisation from the data. For example, there are some trends in the usage of particular interactions in particular curriculum areas.

4.4 Observation Schedule Construction

4.4.1 The use of COLT as a model

Since the early 1980s, Spada and Fröhlich have developed the “Communicative Orientation of Language Teaching (COLT) Observation Scheme – an instrument used in the observation of teaching and learning in second language (L2) classrooms” (1995, p. 1). Their work has been conducted under the auspices of a number of academic bodies, including the Ontario Institute for Studies in Education; McGill University; University of Toronto; Concordia University; and the Social Sciences and Humanities Research Council of Canada.

Spada and Fröhlich claim the scheme is useful “to describe particular aspects of instructional practices and procedures in L2 classrooms, to investigate relationships between teaching and learning, to sensitise novice teachers to different aspects of the instructional process or to encourage more experienced teachers to reflect on teaching practices” (1995, p. 1). This scheme therefore seemed appropriate as a reference point for the present research.

Other observation schemes or instruments were considered in the present research, including those devised by Graddol, Barnes, Stubbs, and Hammersley, all referred to in Edwards and Westgate (1994). Sinclair and Coulthard’s (1975) model, and Sinclair and Brazil’s revised version of this (1982), are described by Willis (in Coulthard, 1992, p. 162). However, both of these require some transcription and micro-analysis,

which are beyond the means of this research. I wanted to describe the general language environment of the classroom as it is provided for ESOL students.

Cazden (1988a) has produced some profound analysis of classroom discourse, much of it based on observations of her own teaching. Flanders (1970) has devised a widely-used system, with ten categories of verbal interaction, discussed in Edwards and Westgate (1994, p. 84). Mroz, Smith and Hardman (2000) outline their coding system for interaction. Ellis, Tanaka, and Yamazaki (in Harley, 1995) describe a process-product approach to classroom interaction and its effect on the acquisition of second language word meanings. Amidon and Hough (1967) list 16 types of verbal behaviour in their *Observation system for the analysis of classroom instruction* (in Middleton, 1981, p. 37). Echevarria, Vogt, and Short (2000) provide a very full and clear account of the use of their SIOP (Sheltered Instruction Observation Protocol) model of analysing classroom interaction. Chaudron (1988, p. 18) identifies twenty-four different instruments for the analysis of interaction in the second language classroom that have been developed in recent decades.

A short and accessible summary of the main instruments available to researchers, including many of the above, is provided by Nunan (1992). Seliger and Long (1983) also outline a number of these. However, all of these were either too reliant on transcription for the practical purposes of this research, or were focused on aspects of learning that were only distantly relevant to that of my research.

The best model for my requirements was clearly Spada and Fröhlich's COLT scheme. It enables real time coding of classroom observations, which provides quantifiable data. It can lead to some generalisable conclusions about what occurs in a variety of classrooms when teachers present texts to students. With the addition of some audio or video-recording, and some immediate transcription of short utterances, I was able to produce a detailed description and analysis of classroom interactions with texts. A copy of my observation schedule is included in Appendix A.

4.4.2 Selection of the items in the observation schedule

It is important here to remember Edwards and Westgate's (1994, p. 57) admonition about subjectivity and the need for researchers "to realise the implications for every stage of their work which arise from their chosen orientation". They quote McCutcheon (1981, p. 9): "The researcher is a perceptual lens through which observations are made and interpreted, so the researcher profoundly affects what can be understood." The selection of items for my observation schedule reflects this view. Stubbs (1981) insists on a "principled" approach to this selection. He believes that researchers must "curb their random interests, and go far beyond picking and choosing as evidence 'any feature which appears to be intuitively interesting' " (in Edwards and Westgate, 1994, p, 57).

Using the COLT scheme as a model, I deleted some items and added others, in order to compile a detailed but not overwhelming list of anticipated features of interactions involving the use of texts in classrooms. As the observation schedule evolved through eight versions, the list of items grew to 136 but eventually settled at 105. COLT has two major sections, Teacher Interaction and Student Interaction. Most of the items in the Teacher Interaction section of my observation schedule were selected from either my own experience of teachers' language or linguistic publications on classroom interactions. For the latter, the most useful were Cazden (1988a), Nunn (1999), Brown (1994b), and of course Spada and Fröhlich's (1995) COLT scheme itself.

During the development process, in Mark VI, I excised the Student Interaction section of items, recognising that this was a distraction from the aim of this study. Bellack et al (1966, p. 2) believe that "the verbal activities in teaching are reciprocal affairs involving both teachers and students", and that "it follows therefore that the role played by the teacher can be adequately described only in relation to the role played by the students". However, the focus of my research was not on this verbal interplay but on the teacher's role in mediating texts, so I felt justified in making this selection. My research questions were clearly focused on teachers' mediation of texts, and thus the students' language behaviours in the interaction were not of immediate relevance.

As interesting as they would undoubtedly be, these student interactions must be set aside during this study, perhaps awaiting further research.

4.4.3 Categorisation of the items

Each of the two pages of the observation schedule has a different focus. The first page records the key components of a lesson, identifying 56 possible items under six main categories. The data encompasses how the class is organised, what the lesson is about, who chooses the lesson content, what language mode the students are using in the lesson, what texts or materials are used, and what sorts of activity the students are given to do. This section, then, produces data that can provide a general description of the lessons observed. The category and sub-category headings for the first part of the observation schedule are outlined in Figure 2.

Category	Sub-category
Participant organisation:	Class
	Group
	Individual
Content:	Management
	Language
	Other topics
Content control	
Student modality	
Materials:	Text type
	Source
Activities	

Figure 2 Key components of a lesson, categorised for the observation schedule

In what would equate to Part B of the COLT scheme, I created categories of teacher interaction. There were many possible approaches to this categorisation, including Bloom's taxonomy (in Brown, 1994b, p. 166); Stubbs' eight kinds of metacommunicative talk (1983, p. 50 - 52); Barnes' system of categorising interaction

(in Chamberlain and Llamzon, 1982, p. 4); and Mehan’s analysis of the I-R-E sequence of lesson interaction (in Cazden, 1988a, p. 31).

However, I settled on a synthesis of many of these, combined with my own classroom experience, to initially identify four simple categories: Phatic Communion (the ‘meet and greet’ stage of a lesson); Explanation; Enquiry; and Summary. After trialling these categories, though, I combined the Explanation and Summary categories, as I found they shared many of the same language features, and for the purposes of my research, it was immaterial whether these features occurred during a teacher’s explanation or summary. Thus I finally used just three categories of teacher interaction for this second section of the observation schedule: Phatic Communion; Explanation and Summary; Enquiry. Figure 3 presents these Teacher Interaction categories and their sub-categories, comprising the second page of the observation schedule.

Category	Sub-category
Phatic communion	
Explanation and Summary:	Predictable/Unpredictable speech
	Minimal/Sustained speech
	Techniques
	Macro-structure
Enquiry:	Elicitation
	Reaction to student input

Figure 3 Features of teacher interaction, categorised for the observation schedule

4.4.4 Trial and revision of the observation schedule

The observation schedule was trialled at several stages, by visiting a local secondary school and conducting observations there. The classes observed at those stages were not those to be included in the actual data-gathering observations later.

The first trial period occurred in the early stages of the observation schedule. I used Mark V of the schedule to observe classes for two days. These classes were selected solely for convenience from willing colleagues. It was immaterial whether there were any ESOL students in these classes, for the purpose of this trial. During this initial trial period, I also experimented with both audio and video-recording of lessons, to produce the most audible results possible.

The trial observations were invaluable in establishing the workability of the schedule and potential of the data gathered. The first trial showed a need for a clear definition and exemplification of the items, against which decisions about coding of data could be checked. So an expanded list was created for reference by the observing researcher. This clarification minimised ambiguity in the interpretation of the items, thus contributing to the validity of the data. This expanded observation schedule is presented in Appendix B.

Another revelation of the earliest trial was that the issue of time needed clarification. As with the COLT schedule, my observation schedule provided columns in which to record data in three minute blocks. However, a clear understanding was needed of exactly what these three minute recording periods mean. The COLT scheme suggests that observers either code the entire observation period or use a time sampling procedure. Trials of my observation schedule showed that it was possible to code the entire period, because of the nature of the items on my schedule. However, I did determine that I would record significant features of interaction only. That is, there may have been micro-level linguistic occurrences at Coulthard's (1992) level of *act* that would not be coded, but that would not impair my data because that level is not directly relevant to my enquiry.

As with the COLT scheme, I decided to differentiate between exclusive focus and primary focus in the coding of items. This meant that at times I would tick one item only, whereas at other times there may be two or three equally significant features occurring within one category. For example, in the Student Modality category, when students were reading a text and copying from it, both the reading and writing items are ticked. Similarly, in the Explanation and Summary category, there are often times

when a teacher's utterance both defines words and uses personal associations. Being equally significant, both items are ticked.

The second trial period occurred when I had believed I had finalised the observation schedule. This Mark VII trial used video-recorded lessons from the first trial observations, to refine the usage of the schedule. One important issue revealed by the second trial of the observation scheme was that my use of "text" needed a very specific definition. Some curriculum documents use text in a very wide sense, such as *English in the New Zealand Curriculum*, (1994, p. 142), that refers to: "A piece of spoken, written, or visual communication that constitutes a coherent, identifiable unit, such as a particular speech, poem, poster, play, film, conversation in the sign language of the deaf, or any other language event. A text may be considered from the point of view of its structure, context, and functions." It was clear that such a very wide interpretation of the term would not address the focus of this research. Rather, the research questions pointed specifically to materials that had been prepared in advance of the lesson, for an instructional purpose. The trials showed that the observer needed to have this narrow definition of text clearly in mind when coding interactions on the observation schedule. In addition, I expanded the list of materials from the COLT scheme, to specify audio-visual texts as well as written, audio or visual texts. Furthermore, it became evident that it was necessary for the observer to indicate which segments of the lesson involved textual interactions, so that the analysis of the data at later date could easily recognise these. As a result, I used a highlighting pen to colour the periods on the observation schedule in which prepared materials were being used in the lesson.

The third trial was of the final version of the observation schedule, Mark VIII. The purpose of this was to develop the researcher's expertise in real-time data recording. Two further days of classroom observation were undertaken to achieve this. Further practice in both audio and video-recording was also accomplished, to revise these skills to minimise the risk of production mishaps.

4.5 Data-gathering: Classroom Observation

4.5.1 Participants

The main approach of the study was a survey of teacher interactions with students in relation to texts used. The survey was conducted from the vantage point of the ESOL student in the classroom, throughout the student's regular timetabled classes.

One ESOL student in each of six secondary schools was selected. The criteria for selection of the students were:

- (a) Ideally, the student is in Year 11 or 12, but may be in Year 10 or 13.
- (b) English is the student's second or subsequent language; and the student has been learning English as a second language for less than five years.
- (c) The student receives some timetabled ESOL tuition, preferably but not necessarily in an ESOL class or small group rather than individually.
- (d) The student also attends some mainstream classes (e.g. English, Maths, Science, Geography, Accounting etc.).

4.5.2 Approach to schools

Six secondary schools in Taranaki were selected, as a representative sample. My initial approach was to the principals of each school, outlining the aim of my research, and my request to gather data through observations at their schools. I informed the principals fully of the specific focus of the study, but asked them not to divulge too much detail to the rest of the staff. This was to prevent teachers making undue modifications to the language they would use in the lessons I was to observe. The letter of request is presented in Appendix C.

Being known professionally to most of the principals approached, I believe contributed to their willingness to participate in the research. This was also found to ease the relationship with the observed teachers. It may have been more difficult to access the observations without this local advantage. An incentive to principals to

participate was my offer to provide them with a summary of my conclusions about the language of the classroom, in a wide range of curricula, and its effect on the ESOL student.

Five of the six schools I initially approached were able to accommodate my request. However, one (a private boys' school) did not have any suitable ESOL students, offering only one Year 9 student. I declined this offer, because this student would have been too far beyond my selection criteria. There are two major disadvantages of observing Year 9 lessons, compared with Years 11 and 12 lessons, for the purposes of this study. The first is that the curriculum is significantly less technical at that level, which has an obvious effect on the language used by teachers and their need to mediate materials. The second disadvantage is that Year 9 students generally attend a very wide range of subject lessons, often approximately 10, compared to the six subjects generally studied in Years 11 and 12. This wide range would dilute the quantity of data that I could gather on each subject in the four days of observation of a student's classroom language exposure. Instead of this school, then, I enlisted the resources of another school which does have a small number of ESOL students, from which a suitable candidate for observation was found.

A further problem arose at the small private girls' school when the only suitable ESOL student left school the day before my scheduled visit. As this was late in my data-gathering process, it proved impossible to replace the observation with another which could be justified in the terms of my selection criteria. Eventually, five Taranaki secondary schools provided the sources of my data. They comprised three co-educational schools, two single-sex schools; one boys' and one girls' school; three city schools, two small town schools; two boarding schools, three schools without boarding facilities; three large schools, two smaller schools; and schools with a wide range of socio-economic ratings, from decile two to decile eight. The sample is summarised in Figure 4 below.

	Community	Population profile	Roll	Proportion of students resident in school accommodation	Decile	Proportion of ESOL students
School A	Urban	Girls	1349	Boarding hostel 10%	8	4.7%
School B	Urban	Boys	1201	Boarding hostel 11%	8	1.6%
School C	Urban	Co-ed	817	0	5	2.2%
School D	Small town /rural	Co-ed	450	0	7	0.4%
School E	Small town /rural	Co-ed	420	0	2	0.2%

Figure 4 Profile of the schools in the sample

All of the schools have a relatively small proportion of second language learners, ranging from 0.2 per cent to 4.7 per cent. This suggested two possible implications for the research. Either teachers would make special accommodation of these students, because they were atypical, a noticeable minority; or teachers would not make any special accommodation of these students, because they were such a small part of the class, or because the teacher had little experience of how to meet the needs of these students.

4.5.3 Informing and gaining consent of participants

Following Massey University Code of Ethics, all relevant participants were fully informed, and their consent gained. I assured all concerned that I would be an unobtrusive observer. Once principals had given me permission to conduct classroom observations in their schools and a suitable ESOL student had been selected, I provided an information sheet to each of the teachers of the student, and to the student him/herself. This informed them in quite general terms that I was studying classroom interactions, but deliberately did not specify the teachers' use of language as they presented texts to students. A copy of this information sheet is in Appendix D.

A consent form, which is included in Appendix E, reminds participants of their rights, and asks whether they would allow any recording of their lessons. Perhaps not surprisingly, the majority (74 per cent) of teachers did not agree to the lesson being either audio or video-recorded. Fortunately this was not a major part of my data-gathering methods, but was just designed to add to the data recorded on my observation schedule. However, the teachers who did consent to recording provided sufficient material for me to select examples of language use to illuminate the quantitative data of the schedule.

4.5.4 Observation practice

As detailed in 4.4.4, before commencing the gathering of data, and as part of the development of the observation schedule, five days of observation trials were conducted. These served to train the researcher in the proficient use of the schedule, to produce full and reliable data from the outset of the data-gathering period.

4.6 Treatment of the data

Four-day visits to the five secondary schools selected in this study yielded observations of 27 subjects. Each of these was observed whenever the subject occurred, which was generally three or four lessons during the visit. Textual interactions in each lesson were recorded on the 105-item observation schedule. To record this data for each lesson, 80 observation schedules were used in total. This raw data was collated and averaged for each item on the observation schedule, to derive a mean frequency per item per subject per school. Appendix F contains sample data sheets showing how data from individual lesson observations has produced these mean frequencies.

It should be noted that Text and Information Management (TIM) was called Typing in one school. Furthermore, the Social Studies lessons at School C were eventually not included in the data because although they were extremely valuable for the students, they did not involve textual interactions and so were not relevant to this study. In the

first Social Studies lesson, students gave prepared speeches to the class. The second lesson consisted entirely of listening to a visiting speaker. In both lessons, the teacher had no interactions with the class apart from marking the roll.

As well as collating data for each of the 27 individual subjects observed in this study, these subjects were categorised into the seven essential learning areas of the New Zealand curriculum framework (Ministry of Education, 1993). These are The arts/Nga toi; Health and physical well-being/Hauora; Language and languages/Te korero me nga reo; Mathematics/Pangarau; Science/Putaiiao; Social Sciences/Tikanga-a-iwi; and Technology/Hangarau. In the event, none of the subject lessons observed in this study were from either the Health or the Science curriculum areas. I decided to subdivide the Language and languages curriculum area, in order to separate the data for mainstream English and ESOL classes. Consequently, the data has been grouped into six learning areas. Table 1 below shows the curriculum learning areas used for the analysis of data in this study, and the distribution of the lessons observed.

Because this study is particularly interested in considering the language of textual interactions in a second language learning environment, the data on the four ESOL classes has been considered separately from that of the 23 mainstream subjects, as well as including it in the total of all subjects. In addition, the means of each of the various curriculum groups are compared with the overall means of all 27 subjects in the study. Appendix G presents the mean frequency of teacher interaction data in curriculum areas. This enables consideration of any co-relationship between curriculum and the use of language around texts.

Table 1 Summary of lessons observed in curriculum areas

CURRICULUM AREA	SCHOOL A YEAR 12	SCHOOL B YEAR 11	SCHOOL C YEAR 10	SCHOOL D YEAR 13	SCHOOL E YEAR 13	TOTAL NUMBER OF LESSONS
THE ARTS: Art Printmaking Design Photography	3	2 4		3	3	15
LANGUAGE:ENGLISH: English Practical English	4 3		3		4	14
MATHEMATICS: Mathematics Applied Mathematics Maths with Calculus	3	2	3	3		11
SOCIAL SCIENCES: Geography Economics Maori Studies Self-management Social Studies	2	2	2		3 3	12
TECHNOLOGY: TIM Computing Food Technology Technology			2 2 2	3	3 4	16
LANGUAGE: ESOL: ESOL	3	3	3	3		12
TOTAL:	18	13	17	12	20	80

The observation schedule data cannot all be treated in the same way, because different parts of the schedule record different things. In the first part, for example, items 1–56 describe the general circumstances of the classroom environment. In Appendix H, a table presents the mean frequency of data on these first 56 items on the observation schedule. The data here has been analysed according to the nature of each category, and is discussed in detail in chapter 5.

In the second part of the observation schedule, however, items 57–105 record specific language techniques used by teachers when mediating text. The data here represents usage during each three-minute segment. Appendix I presents the mean frequency of this data on teacher interaction with text. This data can be ranked to highlight the most frequently used techniques. This list is presented in Appendix J. It should be noted that items 61–64 are not included in this ranking. This is because these items are for two binary systems, where all of the teacher's textual interaction has been recorded for one of each of these pairs. Thus it would be meaningless to include these in the ranking. From the ranked list, I have selected the most significant techniques, those with a mean frequency of greater than 1.00 usages per lesson, to analyse in chapter 6. Three lessons that were audio-recorded during the observations are analysed in chapter 7. They were chosen for their many effective examples of how teachers mediate text.

Finally, some of the peripheral data collected can be collated to provide an interesting description of the classroom and its effect on ESOL students. Class size, amount of textual interaction and teacher mediation, and oral output of ESOL students are key aspects of the classroom as a second language learning environment. The relationship between these aspects within curriculum areas is presented in Appendix K. It reveals particularly that ESOL students' oral output increases with a corresponding reduction in class size.

4.7 Conclusion

This chapter has outlined the development and use of the major research tool, the observation schedule, in a range of schools. Clearly, there are some limitations of the

observation schedule. As Spada and Fröhlich (1995, p. 138) caution of their own COLT schedule, “the instrument is blind to issues of quality at a more micro level”. Thus, the observation schedule cannot tell us why teachers use some linguistic techniques frequently and others rarely. Nor can it tell us whether these techniques are effective in the mediation of text.

Nevertheless, this methodology has proved capable of generating useful data on teachers’ textual interactions. Supplemented by the qualitative material gathered either anecdotally through the classroom observations, or transcribed from the lessons, the data presents a description of how teachers use language to mediate texts with their students in the classroom. Subsequent research may well find benefit in a process-product approach, in which the relative success of various interactional techniques would be measured. If so, the observation schedule I have devised, based on the COLT observation schedule, would be a useful instrument

Chapter 5

Analysis of data on the general classroom environment

5.1 Introduction

The first page of the observation schedule used in this study lists general aspects of the classroom that might have an impact on the teacher's role in interactions with text. It is important to consider these categories, therefore, because they describe the classroom environment in which the teacher's mediation of text occurs. The 56 items in this part of the observation schedule are discussed under their six category headings; participant organisation, content, content control, student modality, materials, and activities. Appendix H contains a summary of the mean frequency of occurrences for each of these 56 items. The observation schedule can be found in Appendix A.

5.2 Participant organisation

When teachers plan lessons they consider many possible arrangements of students. They decide on the most appropriate organisation of the class for the effective delivery of a lesson. The observation schedule categorises the range of possibilities into three types of organisation: whole class, groups, and individual. These types are further subdivided into items 1-7, and are discussed here.

In whole class organisation, the traditional arrangement of the teacher relating to the class is represented on the observation schedule by item 1. The major variant in this arrangement is the number of students faced by the teacher. Thus the effect on interaction of this organisation when teaching a class of thirty students will be quite different from when teaching just one or two students.

The second item in whole class organisation represents the possibility of inter-student teaching and learning. In this case, although the teacher would be involved in the initial stages of setting up this arrangement, subsequently the actual teaching activity would be from a student to the rest of the students, without significant intervention by the teacher. Of course, such an organisation might effectively exclude the teacher from the textual interactions taking place, in which case this organisation would not produce data for the present study.

Item 3 represents the use of choral work, where students work in unison to practise language skills, for example. This is also a form of whole class organisation. This participant organisation is most likely to occur in language learning classes, but might also be used by teachers of any subject wishing to use the power of the group to reinforce the rote learning of any information.

The second type of participant organisation on the observation schedule is group work. This is where the class is divided in some way into smaller units, of two or more students. Either these groups work on the same task (item 4) or else they work on different tasks (item 5). The important role of collaborative work in learning is discussed in section 1.3. Spada and Fröhlich, in their COLT scheme, are adamant about the necessity of this arrangement for ESOL students: "Group work is considered to be essential in the development of communicative competence" (1995, p. 15).

The final option of participant organisation within a lesson is to have students working individually on either the same task (item 6) or different tasks (item 7). Individual work is generally seen by teachers as necessary for students to consolidate their own understandings, and to practise the necessary skills independently, for later application either in real life situations or for assessment.

The participant organisation data from this study is presented below in Table 2 and includes the percentages of these various participant organisations within the lessons observed.

Table 2 Mean minutes (and percentage) of participant organisation types

Participant organisation	Mean minutes (and percentage) of all lessons	Mean minutes (and percentage) of mainstream lessons	Mean minutes (and percentage) of ESOL lessons
Whole class:			
1 Teacher to class	15.5 (32%)	16 (33%)	12.5 (24%)
2 Student to class	0 (0%)	0 (0%)	0 (0%)
3 Choral	0 (0%)	0 (0%)	0 (0%)
Groups:			
4 Same task	2 (4%)	2.5 (5%)	0 (0%)
5 Different tasks	0.5 (1%)	0.5 (1%)	0 (0%)
Individual:			
6 Same task	19 (39%)	19.5 (40%)	18 (35%)
7 Different tasks	12 (24%)	10 (21%)	21.5 (41%)
Total number of minutes:	49	48.5	52

The discrepancy in this table between ESOL and mainstream classes' mean length of lesson is interesting, given that they both arose from the same allocation of timetabled hours. In most schools in this study, each lesson was allocated one hour, although shorter allocations occurred in all of the schools at times, as a result of extra-curricular demands on the timetable. It would seem, though, that the discrepancy in the mean minutes per lesson of actual class time is a reflection of the different nature of these two types of class. ESOL classes are generally much smaller than mainstream classes so that less time is wasted waiting for all or most students to arrive before the lesson commences. It is also generally true that ESOL students are more cooperative and compliant than native-speaking students, and often less socially active in the peer group, and are therefore quicker to settle and prepare to start the lesson. Consequently ESOL classes tend to have slightly more teaching time per lesson than mainstream classes.

Surprisingly, none of the lessons observed organised the participants for either student teaching or choral work, as represented by items 2 and 3. With regard to item 2, although students often worked together in this study, this was co-operative small group work, recorded as items 4 or 5, not student-led instruction of the whole

class. There was also negligible occurrence recorded of individual students working on different tasks (item 5).

As Table 2 shows, the most common participant organisation of this study was individual work on the same task (item 6). This occurred in 39 per cent of all the lesson time observed. Close behind this figure was item 1, teacher to whole class organisation. This arrangement was used in 32 per cent of the total lesson time. Of particular note for his predominant usage of individual work on the same task, was the Art teacher at School B. As the data in Davey (2001) shows, in all of his Year 12 Art lessons observed during this study this teacher arranged his students to work individually on the same task. The task was to draw a self-portrait for a woodcut print. Part of the task involved researching other artists' work to find a suitable idea for a background to the self-portrait. The task was already given to the students, so any teacher to class explanation of the task had occurred before the data collection observations commenced. This participant organisation was seen to be effective for all students in the development of their Art skills, because they were able to learn from the other students working around them, who were all embarked on the same task. However, this organisation did not aid the development of the ESOL student's language development at all, because he had little need to communicate with other students. During the course of this sequence of lessons, the ESOL student spoke to either the teacher or other students for only 3 per cent of the lesson time.

There was relatively little use of group work on the same task (item 4) in the study, with this participant organisation accounting for only 4 per cent of the total lesson time observed. This is disappointing because of the value of group work for ESOL students. However, one class was particularly noteworthy for its employment of this arrangement. A Year 10 Text and Information class spent a whole lesson working in pairs on a computer layout task. This enabled students to check each other's input, and to share the learning of the computer display techniques. Nevertheless, the two ESOL students in the class, who were working together, did not use this arrangement to optimise practice of their oral English skills. They spent only 9 per cent of the lesson talking, and some of this was in their native language, Japanese. It seems that in this instance it might be the task rather than the participant arrangement that

minimised the opportunity for second language development. Furthermore, pairing each ESOL student with a native-speaking student might provide more incentive to use English. One significant difference in participant organisation between the mainstream and ESOL classes observed was the lack of group work in ESOL classes, as Table 2 shows. This is somewhat surprising, because although one ESOL class comprised only one student, another had 14 students, where small group work might be expected.

Students working individually on different tasks (item 7) is an especially appropriate arrangement where there is a wide discrepancy in levels of competency and rates of progress among the class constituents. This would account for the much greater frequency of this organisation in ESOL classes than in mainstream classes. Moreover, ESOL classes in secondary schools are often used as opportunities for students to receive individual help from the ESOL teacher with their mainstream work, which inevitably involves working on different tasks. The ESOL class at School B was typical of this arrangement. This class averaged two students per lesson, but varied between one and three. Students with special individual learning needs came to this class for one-to-one teaching. Approximately 95 per cent of this class time was spent with students working individually on different tasks. Typically this ESOL teacher began by conversing with the students as a group, before setting each of them on separate tasks, appropriate to the individual programme she had planned for them. Her time was then spent working with each student in turn as needed. The value of this participant organisation for developing the second language skills of this extremely small class is reflected in the very high amount of ESOL student oral output: a mean of 57 per cent of lesson time.

The importance of teachers tailoring their choice of participant organisation to the needs of particular classes was illustrated in the ESOL class of 14 students at a large school. Here students worked for all of their lessons in either the teacher to whole class participant organisation or in the arrangement of individual students working on different tasks. This was partly because the class was perceived to be a comparatively homogeneous group of second language learners. All were Year 12 students, studying five mainstream Year 12 subjects, and therefore with quite

advanced English competency. However, these fourteen ESOL students studied approximately fifteen different mainstream subjects, so their needs were diverse. Even in the one compulsory subject, Year 12 mainstream English, the students were spread across eleven option lines. This meant that although they had common assessments, they studied different literature. Consequently, this class often operated more as a tutorial, providing support for their mainstream studies, than as a second language class per se. Commonly, the teacher moved from student to student, helping them individually with their different curriculum tasks. This was recorded atypically on the observation schedule as both item 1 and item 7. On occasion, however, this teacher used teacher to whole class organisation, which is appropriate for a broad-brush approach to a generic topic. For example, in one lesson observed the teacher spent 35 minutes on note-taking skills.

An important aspect of participant organisation for second language learners in mainstream classes is not recorded on the observation schedule. This is the placing of the second language learner amongst the native-speaking students. Where the ESOL student is the only non-native speaker in the class, the teacher should ensure that he or she is in some way attached to a native-speaking student. This may occur naturally, where a native-speaking student approaches the second language learner and forms a nurturing or mentoring relationship with that student in the classroom. However, if this does not occur spontaneously, the teacher should ask a suitable student to assume some responsibility for helping the second language learner during the lesson. Such help usually involves ensuring that the second language learner understands enough of the instructions, for example, to have the right page open, and to be able to attempt the work set. The native-speaking student can also alert the teacher to difficulties the second language learner may be having with the work.

Where there is more than one second language learner in the mainstream class, it is generally better to separate them, at least after an initial period of acclimatisation. As suggested above, each ESOL student can then work collaboratively with a native-speaking student in the class. The Japanese students in the Year 10 Text and Information class, discussed earlier in this section, would have benefited from this. This arrangement provides many more opportunities for second language learners to

develop their communicative competence in English. An example of the effectiveness of this was found in the Technology class at School C. For one lesson, the two ESOL students in this mainstream class were assigned to different groups, to work on an electronics project. The oral output of the ESOL students in this lesson was markedly higher than most other mainstream classes of the study, with a mean of 19 per cent of the lesson time, compared to the overall mean of mainstream classes of about 5 per cent.

On the other hand, where the ESOL student is only beginning to acquire English, this separation would be premature. In a Year 12 Art class observed, two Cambodian students were deliberately seated together. One Cambodian student had been in New Zealand since early childhood, and had virtual native-speaking competence. He also had retained his native language, Khmer. The other Cambodian student was a new arrival with minimal English. He benefited from his compatriot translating the teacher's instructions into Khmer as necessary. The teacher also used the competent student's translation to check the new arrival's understanding. This situation might be valuable for an extended period, but once the new student acquired sufficient English to understand basic instructions, he would learn more in a position where he needed to communicate in English.

The study suggests that participant organisation has an important effect on students' learning, and that variations in this can create favourable or adverse learning conditions for second language learners in particular. Group work in particular is vital for developing ESOL students' communicative competence.

5.3 Content

The content of the lessons observed in this study is categorised on the observation schedule and discussed here under three broad headings: Management, language, or other topics.

5.3.1 Management

The management category includes all those elements of the lesson in which the main focus of the lesson is on classroom management; that is, on managing both the behaviour of the students and the provision of materials. The three elements of greatest frequency recorded in this category were monitoring student learning (item 14), procedure (item 8), and discipline (item 9). None of the other elements on the observation schedule were observed to have any significant incidence, which is defined in this present study as greater than one mean usage per lesson.

The most disturbing of these findings is the virtual absence of humour in the classroom. One would expect most native-speaking students to appreciate a little levity in their learning. However, consideration of some of the few humorous comments of teachers in this study reveals that teachers' oral humour could be very difficult for ESOL students to understand. One Art teacher, for example, used witticism and sarcasm to build relationships with his students. *Tomorrow I'll collect your workbooks and deliver some insults to you* was liable to amuse many students, and probably remind them of the consequences of not completing the work set. However an emergent ESOL student, such as the one in this class, was likely either not to know the word *insults*, or to misunderstand the insinuation that the teacher did not expect the students' work to be very good. Another amusing but potentially confusing example from the same teacher was the sarcastic, *Is anyone having deep psychological problems with the instructions?* Without an advanced vocabulary and a sophisticated reading of tone, an emergent ESOL student would not understand the intention of this question, which was to solicit students' requests for help if they needed it.

Imagine the bemusement of the ESOL student who observed this next exchange between his teacher and a native-speaking student in his Year 12 Design class:

Teacher: *I fancy blokes with spanners on his ears, Robbie!*

Student: *Your place at 7pm?*

Teacher: *No... Shortland Street's on! Nick handed his baby over to Rangi last night... He's not handling fatherhood very well,*

that man.

The ESOL student could see the spanner dangling on the ear of the student who was meant to be drawing it, and he could probably deduce that the teacher was attempting to make the student work on his drawing. However, the rest of the subtext would be lost to a second language student. The non sequitur of the *Shortland Street* anecdote might have puzzled even a native speaker. Nevertheless, the students in this class, both second language and native English-speaking students enjoyed the relaxed and convivial atmosphere such repartee created. The main problem with this type of language environment for an ESOL student is in sifting the important instructional language from the incidental phatic communion of the classroom. Stating the opposite of what is meant can be amusing whilst still conveying a clear message to a native speaker. But it is unlikely that an emergent second language learner would know how to interpret the example observed in a Year 12 Art class, *If you take a book out please write your name down and then I'll promptly lose the bit of paper.*

The lack of humour in classrooms generally, whilst doubtlessly disappointing for native speakers, at least does not further confuse ESOL students, with verbal and cultural nuances beyond their current comprehension.

(a) Monitoring student learning

This important feature was the highest scoring item recorded in the management category of lesson content in this study. Monitoring student learning is an important part of a teacher's job, and forms a vital part of class management. Skilled teachers constantly make informal observational assessments of their students' learning during a lesson. Through an awareness of students' progress and of their reaction to the teacher's delivery of the lesson, teachers spontaneously, within the lesson, make appropriate modifications to aspects such as pace, emphasis, selection of detail, and style. Monitoring of student learning also results in modifications to future lessons. The most objective monitoring occurs in formal assessments of student learning. In this study the overall mean of 4.76 significant occurrences per lesson indicates that student learning was monitored quite frequently, as expected. This included behaviours such as asking recall questions that invited students to display recent

learning, and moving around the room checking on students' progress when they were working individually. A Mathematics teacher marking the roll, for example, was recorded as saying, *When I call your name, let me know if you had any trouble with those linear equations you did for homework last night.* However, this was just the overt, explicit type of monitoring behaviour by teachers, which was able to be observed by the researcher. There were also likely to be other covert, unobservable strategies used by teachers to monitor student learning that could not be recorded by the observer.

ESOL teachers in this study conducted far more explicit monitoring of student learning than did mainstream teachers. During a mean of 9.23 times per ESOL lesson the teachers were observed to be actively and overtly monitoring student learning. Examples of their behaviours included listening to a pair of students talking in an information gap activity, sitting beside a student as she wrote a letter, and listening to a student read aloud. This impressively high incidence seems to emphasise the advantage of the generally small ESOL class sizes, which are conducive to providing an optimum environment for a close teacher–student relationship. It also relates to the very high oral output of ESOL students in these classes, which often gives the teacher immediate feedback on the students' learning.

(b) Procedure

The second most common management technique used by teachers in this study was procedure (item 8), occurring a mean 2.53 times per lesson. The expanded observation schedule, which is in Appendix B, defines this as procedural directives, including imperatives. Obviously this technique is used to tell students what to do in the lesson. Examples recorded in the study included:

Give the file a name, okay?

Then you transfer your circuit onto here.

This technique was used considerably more in mainstream classes, with a mean of 2.8, than in ESOL classes, with a mean of only 0.99 times per lesson. The most likely reason for this was the larger numbers of students in mainstream classes,

which meant that the teacher was further removed from individual students. Perhaps ESOL teachers are more able simply to place an activity in front of the student, or to show students what to do, without necessarily needing to express these instructions orally. In large classes more procedural explanation is needed to manage the delivery of the lesson.

The highest number of procedural directives occurred in Art and Technology classes. This would seem to derive from the practical nature of these subjects, where teachers need to give frequent instructions to students about how to do something. A typical example of this technique was from a Year 12 Art class, where the teacher was demonstrating how to stretch canvas over a frame:

Teacher: *You want to get the staple in at a 45° angle, like that... Start at the middle... I'm just going to go along here...*

This language was very accessible for second language learners, because the oral expression was accompanied by the physical demonstration. However, procedural directives spoken to the class without this support can be very difficult for such students, especially if there is too much detail and too much speed in the spoken instructions.

(c) Discipline

The expanded observation schedule defines this (item 9) as disciplinary statements or directives, and negative sanctions. The influence of the researcher's presence on the behaviour of the classes observed is beyond the scope of this study. However, generally, there was quite a low usage of disciplinary expression by teachers in the lessons observed, with a mean of 1.45 usages per lesson recorded in all 27 subjects. Not surprisingly, there were no recorded usages in ESOL classes. This could be attributed to the small class size and perhaps to the cultural differences of ESOL students from native-speaking students in their attitudes to teachers and education. However, even in mainstream classes, there was a mean rate of only 1.7 significant usages of disciplinary language per lesson. The fact that the majority of the lessons observed in this study were in senior secondary school classes, Years 12 and 13, must also be registered as a major influence on this result. Only in School C were

Year 10 classes observed, and a correspondingly higher use of disciplinary language by teachers was evident here.

5.3.2 Language: Form, function, and sociolinguistics

This category is particularly significant for its effect on second language learning. It records a teacher's specific attention to language during a lesson, whether that be the language of the teacher, the language of the student, or the language of the materials. Whichever of these is the subject of discussion, the second language learner can be assisted by explicitly acknowledging the act of language learning. Researchers such as Spada and Fröhlich (1995, p. 16) have shown, though, that ESOL classes in particular are more successful in developing communicative competence when lessons do not focus exclusively on form (or language, in the terminology of the observation schedule), but comprise a combination of form and meaning.

Form (item 15) is defined in the expanded observation schedule as reference to grammar, vocabulary, or pronunciation. Whilst these might seem to be strictly the domain of the English or ESOL teacher, they can also be usefully incorporated into other subjects. For example, it is very helpful for students to be told authoritatively how to pronounce a new scientific word. Teachers of all subjects need to teach their students how to use language in the appropriate genre or style for that subject. The topic of subject specific texts is discussed in section 2.2. Students need to know not only how to read these different genres, but also how to write them. Thus, attention to form is the domain of all teachers.

This principle seems not to be practised in the actual lessons observed in this study however. In classes other than English and ESOL, only Mathematics teachers made any reference to form at all, and this was a mean occurrence of only 0.33 per lesson. By contrast, English had a mean usage of 2.00 such references per lesson, and ESOL had a mean usage of 7.73. The ESOL incidence was high, as expected, but the English one was surprisingly low, considering the requirements of *English in the New Zealand curriculum* (1994, p.9), which states part of its general aims that students will “develop an understanding of the grammar and conventions of

English". Examples of ESOL teachers in the study drawing the students' attention to the form of the language of the lesson included a homework sheet where students selected appropriate verbs to complete sentences; an exercise on present continuous tense; discussion of silent letters in spelling words.

Reference to the functions of language or communicative acts is the scope of item 16, function, on the observation schedule. This aspect is likely to relate to the use of subject specific texts, as mentioned previously. No significant usage of this technique was recorded in mainstream classes. ESOL classes had a mean of 1.24 references to function per lesson.

Sociolinguistic content (item 18) covers reference by the teacher to the appropriateness of forms or styles for particular contexts. For example, the ESOL teacher at School A told a student, *Stuff is a bit informal... things*. ESOL classes showed a mean frequency of 1.99 of these references per lesson, which is a relatively small usage. There was almost no use of this in any of the mainstream lessons observed, except for occasional use in some English lessons. The importance of this aspect for second language learners is in developing their ability to produce language appropriate to different situations, thereby becoming a truly effective communicator in the second language. The minor attention paid to it is therefore of concern.

5.3.3 Other topics

Where the content of the lessons observed in this study is not coded as either management or language, it necessarily is recorded in the binary system of other topics: either narrow or broad.

In this study, most of this binary coding falls into the category of narrow topics (item 19). The expanded observation schedule defines this as intra-textual topics. These include those referring to the text and the teacher's and students' response to this. This is opposed to that of broad topics (item 20), which defines the content as making connections with knowledge beyond the text, using prior or domain knowledge. This latter is not to be confused with the use of prior knowledge (item

42), which refers to activities that rely on domain knowledge, not recently learned in the classroom.

Over all subjects in this study there was a mean of 9.34 occurrences per lesson where the focus was on narrow or intra-textual topics. This compares markedly with the mean incidence of only 1.3 for broad topics. Interestingly, mainstream classes showed double the incidence of narrow topics than ESOL classes. This is probably related to the much greater proportion of language content in ESOL lessons than in other subjects, as discussed in section 5.3.2, and the greater emphasis on curriculum content in mainstream classes.

In all subjects, however, there was a disappointingly minuscule use of broad content, which connects with the knowledge that students bring to the classroom. This is of particular concern for second language learners, since it ignores the contribution they can make by sharing their different cultural experiences with the class, shedding light from a new perspective on the learning. On the other hand, a focus predominantly on intra-textual learning might help second language learners, because it protects them to some extent from teachers' presumptions that all the students in their classes have the same prior or domain knowledge. Nevertheless, current learning theory places great value on the construction of knowledge using what students themselves bring to the classroom, and a greater inclusion of broad topics would encourage this.

5.4 Content control

The issue of who controls the content of a lesson may seem self-evident. Traditionally it is the teacher. However, many current theories of education argue that students learn better when they have some control over lesson content. In particular, knowledge is more effectively acquired when students are able to apply their own prior knowledge in an active way to the construction of new knowledge, as discussed in chapter 1.

In this study, approximately 70 per cent of the lesson content was controlled by teachers, meaning that the topic or task was determined by either the teacher, or the text which was selected by the teacher. This is not surprising, particularly since the data gathered was only from those parts of the lessons in which texts (or prepared materials) were used. Another reason for the high proportion of teacher-controlled content may be that 80 per cent of the classes observed were Year 12 or 13 subjects, in which students were working towards qualifications. The assessment of these subjects, whether internal or external, encourages teachers to retain control of knowledge in order to be sure of meeting course prescriptions under time constraints.

16 per cent of lesson content in this study was controlled by the joint decision of the teacher, the students, and/or the text (item 22). This was most often where the teacher chose the text but gave the student some control over the task relating to the text. In a Year 12 Art class, for instance, the teacher set the task of making a woodcut self-portrait. He also provided texts: examples of other artists' portraits on the classroom wall and in art books. The students, though, controlled the choice of photograph of themselves, from which they would work. They also controlled the style, particularly in their choice of artist whose work they would emulate in the background for their self-portrait. Their freedom was illustrated by the diverse choices they made. One boy painted Salvador Dali surrealism behind his self-portrait, while another replaced the Tuscan hills of the Mona Lisa with the Taranaki mountainscape for his background. Another example of joint control over content was in a Year 12 Design class. Here the teacher set the assignment, which was to create a logo, but the students chose the object from which they would develop a series of observational drawings, in the process of making a logo. Their choices included a screw, a tap, a spanner, and a light bulb. Similarly, in a Year 10 Technology class students also had some control over the content of the task. The teacher set an electronics assignment, stipulating a variety of circuits that students should have known, and from which they had to choose one to manufacture. Students, though, were able to choose the purpose or function of the circuit board. That is, they selected one of the circuits drawn by the teacher, according to what they wanted their circuit board to achieve.

A third type of content control was recorded in item 23, where students had complete control over the lesson content by determining the topic or task. This accounted for 14 per cent of the total content control of the lessons observed, which might be considered a positive reflection of a trend towards more active involvement of students in making decisions about their own learning. However observation showed that it did not necessarily have a positive influence. One appropriate example of this in the study was Year 13 Printmaking in a small school. The ESOL student was the only student taking this subject in the school. She knew the Bursary prescription requirements of what her portfolio had to include by the end of the year, and worked towards producing this. The teacher was actually timetabled to teach another Art class during her Printmaking time, so he could only visit her periodically to guide her. In this case, the student had virtual autonomy in her control of the content of the lesson, although the teacher did have a supervisory and advisory role over this. He provided direction towards appropriate textual resources, and technical instruction in the processes as necessary. For the ESOL student, this control was welcomed, enabling her to draw on prior knowledge from her own cultural experience.

A contrasting situation, though, occurred in a Year 12 Computing class in another school. Again the student had content control, but only by the teacher's default. Perceiving the ESOL student as unable to cope with the Year 12 Computing course, and failing to have the student moved to another more appropriate class, the teacher handed all control over to the student. The student selected both topic and task in this class, with no input from the teacher at all. She generally chose to use a typing tutor program on the computer, or to practise her use of Word, by word-processing work for some of her other subjects. In this instance, having such complete control was seen by the ESOL student to be abandonment by the teacher. Rather than having a positive effect by allowing her to be actively engaged in constructing her own learning, this situation simply left the student feeling unsupported and unmotivated. Furthermore, because she was working entirely on her own, the ESOL student had no opportunity for practising her oral English in this class. The Computing class seemed futile to her. This example presents a cautionary tale for teachers who might see student control of content as an easy option.

Interestingly, Art classes in this study showed much more student control over content than any other subject area. This reflects an inherent difference between this subject, including those in the technology learning area, and others. Art and Technology are primarily 'process' subjects, which develop students' practical skills, whereas many other subjects in the senior secondary school are primarily 'content' subjects, more concerned with the acquisition of a body of knowledge. Some inexperienced or insecure teachers in the Art and Technology curriculum areas hold tightly to content control in their classes, but this adversely affects the ability of students to develop their skills in the expression of their individuality. Experienced and confident Art and Technology teachers, however, know that the problem-solving, creative process flourishes when students think for themselves. This is encouraged by giving students considerable control of decisions about content.

A particular advantage for second language learners in these process subjects, is that by being allowed some content control, they have an opportunity to express their own cultural values or ethnic identities in their work. For example, for the Year 13 Printmaking student described earlier, the teacher helped the ESOL student make a print, using a process she had seen her Japanese grandfather use. Also witness the Year 13 ESOL lesson in School D, analysed in chapter 7, where the teacher was working alongside the student on the writing process to express her experience of racism. These examples illustrate the major difference between 'content' subjects and 'process' subjects. 'Process' subjects have the teacher working alongside the student to help with technical/practical/problem-solving aspects of the process. As such teachers are contributing at exactly the level the student needs, using more conversational language. Thus, 'process' subjects, or even problem-solving activities in any subject, contrast with 'content' subjects that use more instructional language, where the teacher is passing on information to students, according to the traditional transmission theory of learning. The language situations inherent in these different types of subjects should be recognised when considering appropriate courses for ESOL students.

5.5 Student modality

This category records the mode of operation employed by students during a lesson. The five aspects are listening, speaking, reading, writing, and other, which includes visual language modes such as drawing, acting, and creating a display. A variety of student modes is an important component of effective learning environments for two main reasons. Firstly, learning is reinforced when it occurs in more than one mode. Secondly, students have individual learning style preferences, so by planning student activities in a variety of modes a teacher can cater for the individual learning needs of all the students in a class. Spada and Fröhlich (1995, p. 18) believe that encouraging students to integrate their skills in different modes will “reflect a more authentic use of language”.

Data recorded in this category was recorded only for the main modes; the one or two dominant student modalities during each stage of a lesson. For example, students are commonly required to read a text and write their answers to questions on this. Such concurrent modality was recorded as both reading and writing. In classroom discussion, students may be both listening and speaking in relatively equal parts. In this case both modes were recorded as significant. However, if most of the speaking were the teacher's, with students only occasionally contributing a word or two in response, the modality was recorded as listening only. Table 3 presents data for this category.

Table 3 Mean frequency (and percentage) of student modality

Student modality	Mean frequency (and percentage) of all subjects	Mean frequency (and percentage) of ESOL classes	Mean frequency (and percentage) of mainstream subjects
Listening	4.84 (23%)	7.65 (29%)	4.35 (22%)
Speaking	2.43 (11.5%)	7.14 (27%)	1.61 (8%)
Reading	4.87 (23.5%)	7.16 (27%)	4.47 (22%)
Writing	4.32 (20.5%)	3.81 (14.5%)	4.41 (22%)
Other	4.45 (21.5%)	0.57 (2.5%)	5.12 (26%)
Total:	20.91 (100%)	26.33 (100%)	19.96 (100%)

As Table 3 above shows, the study found an even spread of modality across the five modal items on the observation schedule, with the exception of speaking (item 25), which is much less frequent. Over all subjects students had an opportunity to use speaking in their classroom learning approximately only half as often (11 per cent) as any other modality (over 20 per cent). This is detrimental to ESOL students who need frequent practice in producing oral English to improve their language competency. However, the data also reveals that students in ESOL classes used the spoken mode more than three times as often (27 per cent) as in mainstream classes (8 per cent). This is likely to be a result of ESOL teachers' awareness of the value of speaking, so that conscious decisions were made to structure lessons to include this mode. Class size could possibly have impacted on this mode also, with larger mainstream classes being more difficult for teachers to incorporate spoken components into the lesson. Nevertheless, whatever the difficulties, it is alarming that mainstream classes made so little use of this very important student modality.

Another significant result in this data is that the mainstream classes had a mean of 5.12 usage of other non-verbal modes, which is vastly higher than ESOL classes with a mean of only 0.57 usages per lesson. This disparity is accounted for mainly by the large number of Art and Technology subjects in the mainstream classes of the study. Art and Technology comprised 39 per cent of the mainstream lessons observed. These are mainly practical subjects, in which students spend most of the lesson manipulating visual materials, rather than the written or spoken word. Examples recorded of students using a non-verbal mode included a Year 12 Art class, where students stretched canvas onto a frame in preparation for their abstract painting. In a Year 13 Art class the student took a woodcut and used the printing press to make a print. Another example was observed in a Year 13 Catering class, where the students cooked for a staff morning tea.

ESOL teachers could also consider the opportunities such modes present for second language learners to practise their oral language skills. The inherently collaborative nature of many of these practical tasks, and the high motivational incentive of producing something of value, should encourage ESOL teachers to consider incorporating these other modes into their lessons more often.

5.6 Materials

The primacy of text use in classrooms is firmly supported by the observation data. In this study *text* refers to prepared materials that are brought to the lesson. Chapter 2 contains more detailed discussion of this definition. Students are engaged in some kind of interaction with text for 90 per cent of the time in which classes are observed. A summary of data on the materials used in classes observed in this study (Davey, 2001) is presented in Table 4. Discussion here focuses on what the data reveals to be more significant aspects of materials.

Table 4 Number (and percentage) of materials used in classes observed

Text type	Number (and percentage) of materials used in classes observed	
Minimal written text	61 (41%)	110 (74%)
Extended written text	49 (33%)	
Audio text	0 (0%)	
Visual text	32 (22%)	
Audio-visual text	6 (4%)	
Total texts:	148 (100%)	

This study found less variety of text types than might be expected in the technological environment of the twenty-first century. 74 per cent were written texts. These included traditional Mathematics textbooks and worksheets. An example of minimal written text in this subject was a worksheet of short algebraic equations. Extended written texts were most commonly found in English classrooms, where short stories and novels were widely used.

In this study only 25 per cent of written texts included a significant visual component, in support of the written text. 36 per cent of minimal written texts were supported by a significant visual component. Of particular concern was that only 10 per cent of the extended written texts used had any significant visual support of the text. Because extended text was the most likely source of comprehension difficulties

for students, this was where illustration could make a particularly valuable contribution to illuminating understanding.

A diverse range of subjects used texts that are supported by visual illustration. For example, in a Technology class students were given a worksheet on circuit construction, with diagrams accompanied by short written explanations. A written Design assignment also used sketches to illustrate the task. In a Food Technology class, students used an illustrated recipe book in their planning of a restaurant menu. A Typing Tutor computer program on layout techniques was used in a Text and Information Management class.

It is noteworthy that 35 per cent of these illustrated written texts were used in Year 10 classes, even though these comprised only 21 per cent of the classes observed in this study. This may indicate that secondary school teachers consider illustration of written text to be more appropriate in junior classes. Perhaps teachers (and maybe students too) believe that senior students do not need visual support to enhance their understanding of written text. This is a disappointing statistic, however, when one considers how helpful to second language learners such visual support can be, as an aid to the comprehension of written text. Furthermore, given the numbers of native-speaking students anecdotally reported by teachers to have difficulty reading secondary school texts, it is particularly surprising that more use of such assistance is not made.

Purely visual texts comprised nearly 30 per cent of the total text use in this study. These were observed primarily in Art classes. For example, Year 12 Design students used everyday objects such as a pen, pencil cases, and a spanner, in order to produce sketches in the development of a logo. An ESOL class used cards with drawings of objects for an information gap exercise.

Under 4 per cent of the texts used were of an audio-visual nature. An example was the interactive CD-ROM used in an ESOL class. This computer program displayed common road signs. When the student clicked on each sign, a cybervoice spoke the relevant word for the student to repeat. It is perhaps symptomatic of under-

resourcing that students generally still spend most class time working with print material rather than with software. Adequate resourcing would provide not just hardware such as computer terminals, but also the training of teachers in the use of such materials in the classroom.

Very few of the texts used in this study were authentic or those not specifically designed for classrooms. This is disappointing for ESOL students' language learning needs in particular. As Spada and Fröhlich (1995, p. 19) explain, authentic materials can help ESOL students "be better prepared to deal with 'real' language outside the classroom setting". One interesting example of authentic materials, though, was a Year 11 Text and Information Management teacher's choice of *Tearaway* magazine for part of the lesson. Students practised their keyboard skills by copying sentences out of this teenage magazine, and clearly enjoyed this access to real-life materials. English classes regularly used works of fiction, which are also authentic texts. Food Technology classes used recipe books published for a wide public audience. For ESOL students, texts like this have an important role in their acquisition of English for other than purely scholastic purposes. Second language learners also gain confidence in their own English competence when they realise they are able to comprehend the language of authentic texts.

An issue not anticipated in the preparation of the observation schedule is the actual legibility of the text, and the effect of this on second language learners. Observation of a Portuguese-speaking Brazilian student at School E revealed the extreme difficulty ESOL students may have in reading hand-written texts. One example was a Text and Information Management worksheet, hand-written by the teacher for the student to copy as word processing practice. The student was observed to copy *source* as *sowce* and *far* as *fot*. These errors were clearly not caused by minimal pair confusion, or transfer from the student's first language. They were also not simply the result of poor keyboarding skills, or inattention, as the rest of the text was carefully reproduced. When asked, the student stated that she simply could not read the teacher's handwriting. Because she did not know English vocabulary or spelling rules well enough, she was unable to guess the likely letters. A similar difficulty could be expected with elaborate, decorative fonts, as found in many word

processing programs. Teachers can help ESOL students, therefore, by providing legible text, preferably typed in a standard font; a simple matter, but one that can make a significant difference to students.

Another problem with texts is much more difficult to solve. The level of difficulty of some texts used in classes in this study presents an unnecessary obstacle to comprehension for many students, but most particularly for second language learners. A Year 10 Mathematics test provided some disturbing examples. The two Japanese ESOL students in the class scored 72 per cent and 73 per cent in the test overall, indicating that they were coping quite well with the mathematical level. However, in one section they gained no marks at all. Excerpts are reproduced here, with potentially difficult language in bold type. The students' answers indicated a lack of comprehension of the questions.

All employees at Lifestyle Sports got the same percentage increase in salary. Mike, Robyn and Amy all work at the shop.

(a) Mike's salary went up from \$30,000 to \$31,500 per year.

Calculate the percentage increase the employees got. (2 marks)

*(b) Robyn's salary used to be \$32,000. How much does she get now?
(2 marks)*

*(c) Amy's salary went up to \$26,040. What was her salary before the
raise? (2 marks)*

Percentage increase and *calculate* are vocabulary items that the students presumably had been taught in their Mathematics classes, as they are central to this topic. *Employees* and *salary* could be difficult but can intelligently be guessed from the context. *Lifestyle Sports* is a prominent shop in town, so perhaps the students could apply their prior knowledge to recognise this, although having been in this country for only two months they may not have been familiar with this shop name at all. Of most concern is the completely unnecessary complication of what ought to be simple parts of the question. *Used to be* could be more fairly replaced by the common *was*. *The raise* could be more simply expressed by a repetition of the previous phrase *it went up*.

In another part of this Year 10 Mathematics test, the teacher's expectation that students were familiar with basketball make the question impossible for the Japanese girls who were not:

*During the second half (of an important basketball match) the Home team were successful at **sinking baskets** 70% of the time. If they attempted 60 **shots**, how many did they get in? (2 marks)*

Being unfamiliar with the technical basketball terms in bold type, and with no syntactical support to enable the second language learners to make a connection between the words, the students were completely unable to answer this question. If asked *What is 70% of 60*, the Japanese ESOL students were easily able to produce a correct answer. Thus, whilst it is very helpful to relate learning to students' real worlds, teachers need to be careful at the same time that they are not excluding ESOL students by using specialised vocabulary.

5.7 Activities

Items 40-56 of the observation schedule attempt to record the main types of student activities that might be expected in a classroom. However, the list is quite arbitrary and contains some disparate items. Discussion here will cover only those items supporting significant insights into the effect of student activity on learning from texts.

Whether the teacher is requiring students to make any explicit links with previous lessons, or to reactivate previously learnt vocabulary, or to use prior knowledge, is recorded in items 40 to 42. These items are included because they are known to be a helpful way to contextualise learning. A Year 12 Economics teacher, for example, used links with previous lessons to refresh both the students' (and apparently her own) memory of the previous lesson, and establish the context for the ensuing lesson:

Teacher: *Did we get up to...? And have we done...? Are we up to Figure 215? Right, that's where we'll start.*

Another example of placing current learning in a wider context was the ESOL teacher who asked, *D'ya remember we did about swimming before?* In a Year 12

Practical English class, the teacher compared new learning with previous learning, when she said, *The next unit standard is a little bit different....*

Generally, the data shows that mainstream teachers made many more links with previous lessons, with a mean of 1.6 per lesson, than ESOL teachers, with a very low mean of only 0.64 links per lesson. This is probably because mainstream curricula require a more extended progression or development of content than ESOL classes, which in many secondary schools operate without any explicit or prescribed curriculum. These ESOL classes often tend to operate in a reactive way, responding to the language learning needs of individual students as they arise, more than working through a pre-determined curriculum structure. It would seem that both of these areas could benefit from adopting some of the approaches of the other. That is, mainstream classes would be improved by a greater responsiveness to students' learning needs, thus being less curriculum-driven; and ESOL classes would benefit from a stronger long-term course plan, to ensure an effective and methodical approach to second language learning.

On the other hand, it is not surprising that ESOL teachers revisit students' previously learned vocabulary much more often than mainstream teachers do. Data for reactivation of vocabulary (item 41), reveals an ESOL mean of 3.33 usages per lesson, compared with only 0.57 in mainstream classes. As also discussed in section 5.3.2, most mainstream teachers do not seem to pay much heed of their responsibility to teach the language of their subject.

An example of a mainstream teacher reactivating students' vocabulary was recorded in a Year 12 Practical English class:

Teacher: (reading) *Large aluminium windows. Now, when have you learnt this word aluminium before?*

Student: *In the Millennium Block?*

Teacher: *Yes, when we were talking about the Millennium Block.*

This was an effective way to apply a recently acquired vocabulary item to another context. Techniques such as these contribute to creating important opportunities for students to use new learning in a variety of contexts.

Noteworthy for its virtual absence in the recorded data was the use of predictions (item 44) in which the teacher invites students to contribute to the construction of their own learning by making informed predictions about text. This has long been considered a useful pre-reading technique, that one would expect to find in all classrooms using text. In an example from a Year 12 Practical English class, the teacher asked, *What do you think a story called Soesa might be about? What can you tell me about that name?* This invited students to consider the possible cultural implications of the main character of short story. Such pre-reading cognition helps students to tune in to text, rather than approaching it in a cold or unconditioned way, which makes reading the text much more difficult. Teachers of all subjects should consider using predictions more frequently in their mediation of texts.

Reading aloud the text (item 46) might seem a surprising inclusion in a list of activities designed for observing secondary school classes. However, using a variety of modes is extremely helpful to address individual students' learning styles, and to reinforce learning, at any age. Thus, reading aloud a text helps all students, and particularly ESOL students, to comprehend a written text. In a Year 12 Economics class, for example, the teacher had prepared some written notes to explain points in the textbook. She read these aloud to the class, added some discussion and explanation of the notes, then wrote the summarised notes on the board for students to copy. Reading aloud, here, was part of a package of mediation strategies this teacher had used to help students access and absorb this important section of the textbook.

The data reveals that mainstream classes generally, though, made little usage of this technique in mainstream classes, with a mean frequency of only 1.35 usages per lesson, compared to a mean of 2.56 in ESOL classes. Perhaps mainstream teachers feel they are demeaning their senior high school students by reading aloud to them. They certainly should not over-estimate the reading ability of their students, especially in the current climate of social promotion and the reluctance of many secondary schools to set barriers to students enrolling in subjects. Teachers should

recognise, too, the reinforcement of learning that occurs when a variety of modes are utilised.

Activities requiring students to make a visual representation of knowledge (item 56) are yet another way teachers can help to mediate text and cater for a variety of student learning styles. This item includes making a diagram of information, or a chart, a map, a graph. It thus requires students to process information from a text in some way. In a Year 12 Art class, for example, students had to stretch their own canvases, after the teacher had written brief instructions on the board, and demonstrated the procedure.

5.8 Conclusion

The data gathered in the first part of the observation schedule contributes to a description of the general classroom environment. In addition to delivering various curricula, mainstream classes provide a second language learning environment. Some types of participant organisation, lesson content and content control, student modality, materials and activities can play an important role in developing ESOL students' communicative competence. Conversely, ESOL students' acquisition of English may be adversely affected by some practices in these areas.

Following from this analysis of general classroom factors, the next chapter analyses the data on the teacher interactions with text that occurred within this environment.

Chapter 6

Analysis of teacher interaction data

6.1 Introduction

The second page of the observation schedule used in this study, and shown in Appendix A, lists specific language techniques (items 57 – 105) that might be used by teachers in their mediation of texts in the classroom. Under the heading of *Teacher interaction*, these instructional variables are divided into three categories: *Phatic communion*; *Explanation and summary*; and *Enquiry*. Discussion of the results is structured in sections 6.2, 6.3, and 6.4 of this chapter according to those categories, and focuses particularly on techniques used most frequently according to the observation data. Appendix I contains a table summarising the mean frequency of occurrences in each of the items. Appendix J presents a ranked list of this data.

6.2 Phatic communion

The communicative acts of establishing, maintaining, or modifying relationships are encompassed by this category, which covers what is commonly known as small talk. Phatic communion items 57 – 60 on the observation schedule are listed as *initiate interaction*, *keep interaction open*, *terminate interaction*, and *conversation*. Stubbs (1983, p. 41) refers to this important “function of putting the teacher in touch with the pupils”.

The observation data reveals a negligible amount of phatic communion used by teachers in this study when they are mediating text material with students. Occasionally teachers begin the mediation with small talk. Even less often teachers interrupt the textual interaction to conduct a brief conversation, designed primarily to develop their relationship with the students. With such low usage, the phatic communion section of the observation schedule, therefore, proves to be fruitless in terms of the present study.

6.3 Explanation and summary

The *Explanation and Summary* category of the teacher interaction section of the observation schedule covers items 61 - 87. The first four of these are binary systems, pairs of alternate classifications, so that throughout the teacher interaction one item of each of these pairs will be recorded. That is, the teacher's explanation and summary will use either predictable language or unpredictable language. It will use either minimal speech or sustained speech. These two pairs are discussed in sections 6.3.1 and 6.3.2 respectively.

The second sub-category of the *Explanation and summary* section of the observation schedule is *Techniques*. Items 65 - 82 list language techniques that teachers might use in explaining and summarising the text materials used in the class. The data recorded for the use of these techniques is ranked, and the eight most frequent techniques are discussed in section 6.3.3. Eight techniques are selected because this is the number recording a mean frequency of greater than 1.00 usage per lesson in this study. The ranked list in Appendix J shows this data.

The final sub-category in this section is *Macro-structure*. Teachers' references to the overall organisation of the text are recorded here. These might include explicitly drawing students' attention to embedded support devices or coherence conventions. However, in this study none of the macro-structure features (items 83 - 87) show any significant usage, with mean frequencies of 0.25 or less per lesson. This result is extremely disappointing when the usefulness of macro-structure features of text is recognised for facilitating comprehension. The following sections discuss significant usage in the explanation and summary function of teacher interactions with text.

6.3.1 Predictable and unpredictable speech

Teacher interaction in this study is coded in a binary system as either predictable or unpredictable speech. Predictable speech (item 61) is easily anticipated by the student, perhaps because the teacher is reading aloud excerpts of a written text that students have read silently themselves, or repeating an oft-stated theme or phrase.

Naturally this type of speech is much more easily understood by second language learners because it is supported by written text for example, or by following an already-known format. Its context is obvious, which also helps ESOL students' comprehension.

Unpredictable speech (item 62), on the other hand, is much less familiar. The expanded observation schedule in Appendix B refers to the use of this term as telling students something they don't know in advance, about language or content, including management or disciplinary directives. Because there is a wide range of information that can be provided, this type of speech is not easily anticipated by the student and is therefore more difficult to understand. A common example is the spontaneous speech used by teachers giving instructions at the start of lesson.

Figure 5 below presents the data for the use of predictable and unpredictable speech in this study. An analysis of the data shows that over all subjects predictable speech occurs only 13 per cent as often as unpredictable speech. In mainstream classes alone, predictable speech occurs even less frequently; only 10 per cent as often as unpredictable speech. Fortunately, ESOL teachers seem to recognise the value of predictable speech and incorporate much more of this into their lesson, using this form 23 per cent as often as unpredictable speech.

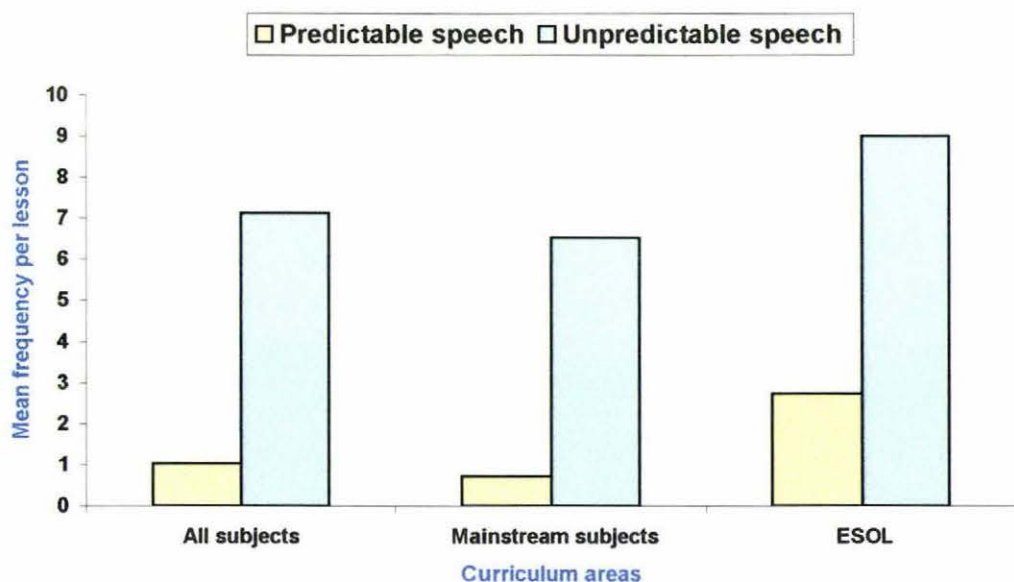


Figure 5 Teachers' use of predictable and unpredictable speech

There are some significant differences in the frequency of predictable speech in different curriculum learning areas. Figure 6 below illustrates these differences clearly. English teachers use nearly as much predictable speech as ESOL teachers do. The low frequency in Art and Technology classes is not surprising, because they make comparatively little use of written texts. However, the very low use of predictable speech by Social Science teachers is alarming, given the high dependency on written texts in this area. These teachers can greatly help their ESOL students' understanding of textual material by reading parts aloud to them, and by reiterating important points in familiar phraseology.

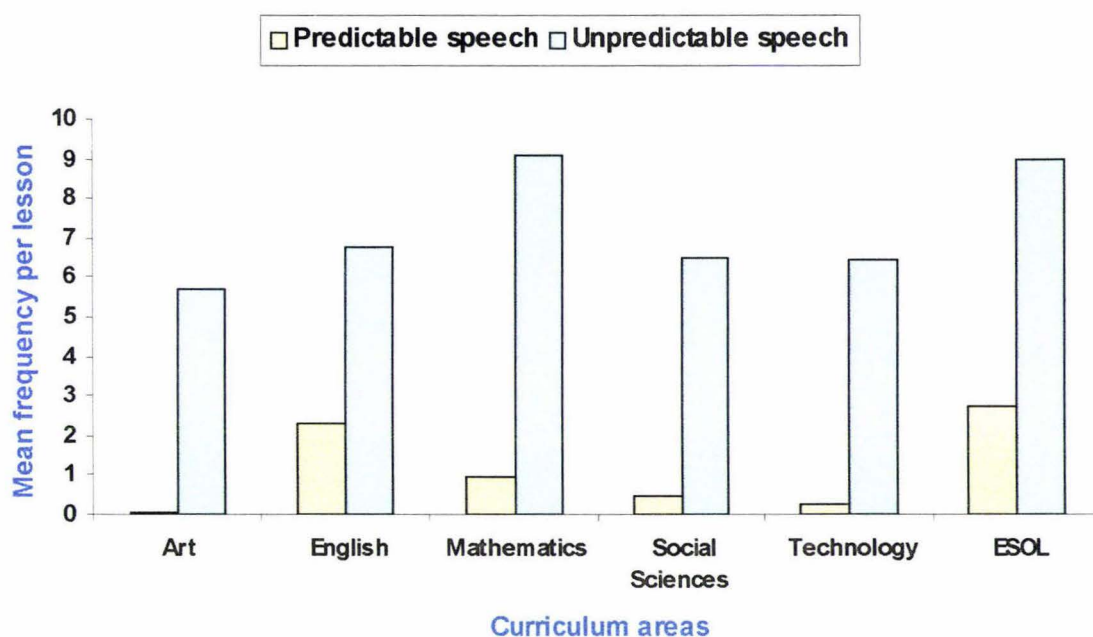


Figure 6 Teachers' use of predictable and unpredictable speech in curriculum areas

6.3.2 Minimal and sustained speech

As with the previous pair, teacher interaction is coded in a binary system as either minimal or sustained speech. Minimal speech is defined in the expanded observation schedule as an utterance that consists of only one or two word fragments, long phrases, or one or two main clauses or sentences. Sustained speech, in contrast, consists of at least three main clauses. Whilst minimal speech is typical of the early stages of second language learning, the ability to use and understand sustained speech is essential for achieving longer term competency goals. Sustained speech in ESOL

and mainstream classes presents both an additional language burden for second language learners, and also an opportunity to stretch their comprehension skills as they gain in competency.

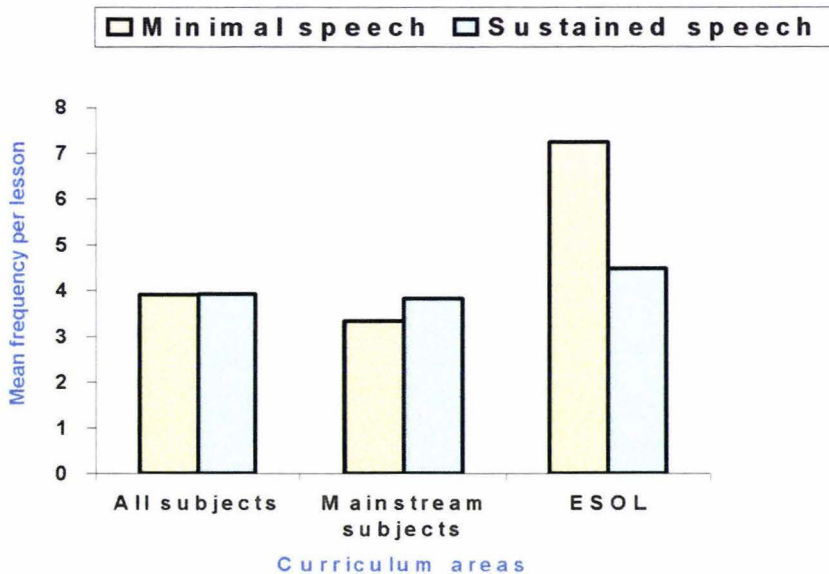


Figure 7 Teachers' use of minimal and sustained speech

Overall, teachers in the study used approximately equal amounts of minimal and sustained speech, which suggests an appropriate balance that is helpful to ESOL students. This data is presented above in Figure 7. The use of both types of speech helps ESOL students, as one complements the other. For example, a Year 12 Art teacher used sustained speech to give an extended talk to students about how they should choose an artists' model for their abstract painting assignment, but she supported this with task instructions on the board, using listed, abbreviated points to outline what to do. She used minimal speech when she read aloud this list to the students. However, as Figure 7 shows, ESOL teachers in the study used minimal speech more than twice as often as those of mainstream classes. In ESOL classes, furthermore, minimal speech was used by teachers nearly twice as often as sustained speech. These findings would seem to reflect the fact that it is predominantly the less advanced ESOL students who attend ESOL classes, and these teachers recognise that these are the students who most benefit from greater proportions of minimal speech.

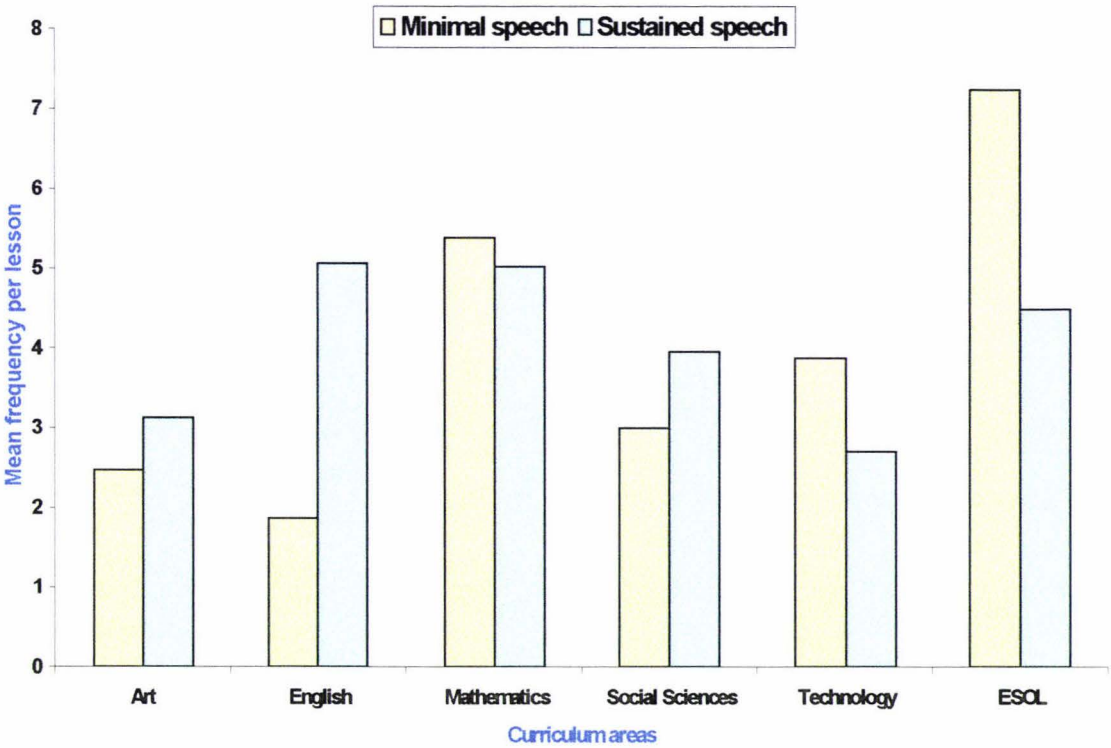


Figure 8 Teachers’ use of minimal and sustained speech in curriculum areas

Figure 8 above presents data for the use of minimal and sustained speech in the six curriculum areas in the study. Of these, English shows the greatest imbalance, with these teachers using sustained speech for 73 per cent of the English lesson time observed. English teachers in this study used minimal speech for only 27 per cent of their explanations and summaries. This might reflect the complex level of thought and the need to produce extended argument in senior secondary school English. Schools would be wise to be cautious with the placement of second language learners in these classes, which would seem to be inappropriate for emergent ESOL students.

On the other hand, a curriculum area such as Technology may offer a more appropriate environment for emergent ESOL students in their use of more minimal than sustained speech. These classes will not necessarily make a major contribution to second language learning, but may provide greater opportunities for curriculum success, which is an important contribution to the acculturation of students new to the New Zealand secondary school system. Of course, these students also need a considerable proportion of their timetable in ESOL classes to foster their emerging English language development.

6.3.3 High frequency explanation and summary techniques with text

When the 23 items in the explanation and summary section of the observation schedule (excluding the binary systems of items 61-64) are ranked in order of mean frequency in all 27 subjects, eight techniques appear as significant. None of these are macro-structure features, however, which is disappointing because of the help these offer students, particularly ESOL students, in understanding text. The eight most common techniques used by teachers in this study are discussed here, in descending order of frequency.

(a) Declarative statements

Teachers in this study used declarative statements (item 79) more often than any other technique, when they were explaining or summarising textual material. With this technique teachers generally used the first person pronoun to declare something, which was often their personal opinion. In all subjects in this study the mean frequency was 3.41 usages per lesson, with a standard deviation of 2.76. There was not a major difference in frequency between mainstream and ESOL classes, with means of 3.54 and 2.64 respectively. However, there were noticeable differences between individual teachers in the study, with much higher use of declarative statements by the teachers of Technology at School C, Mathematics and ESOL at School D, Catering and Geography at School E. Appendix L presents a figure showing the use of this technique in individual subject classes.

In many cases, teachers use declarative statements to send positive and encouraging messages to their students. A Year 12 Mathematics teacher, for example, told her class, *I'm really impressed with the way you're struggling along with these. They are not easy.* A Year 12 Mathematics Applied teacher attempted to boost his students' self-esteem and effectively rewarded them for working well by saying, *I think we don't need to do the whole thing cause we're all pretty clever.*

Teachers also use declarative statements to maintain control of the content and direction of the lesson, as a Year 12 Mathematics Applied teacher demonstrated:

Teacher: *That's something else... I won't go onto that now.*

At other times, teachers use this technique to express their opinions. For example, a Year 12 Art teacher said, *I strongly advise you to use acrylics for this... If you use oils, you'll be using about a hundred bucks worth on a painting that size.* Her recommendation was given as a declaration, but the message clearly stated what she thought the student should do.

In another common approach, teachers use declarative statements to show solidarity with students, understanding their anxieties and working collaboratively with them. One example is from a Year 12 Economics class where the teacher said, *We're writing a report on the trends, aren't we* (with the falling intonation of an assertion, not an interrogative). Another example is the Year 12 English teacher who reassured her class, *I know that not everyone is over-comfortable with syntax yet.*

In many cases, ESOL students are as likely as native-speaking students to find declarative statements comprehensible. However, it also seems likely that often teachers' declarative statements are not well understood by ESOL students, because they do not necessarily connect clearly to the logical progress of the lesson. In these cases, teachers use declarative statements to make irrelevant or divergent comments. Without a clear context, such statements become more difficult to comprehend. One example was found in a Year 12 Design class, where students were working on their own drawings. The teacher loaned an Art Department pen to one of the students, but warned him to return it because he was annoyed that so many pens had been stolen recently. He then made a declarative statement to the class in general: *I'll give a Moro bar to everyone who's got one of their own.* Because most of the class were busy with their own work, and did not necessarily notice the personal exchange between the teacher and the boy borrowing a pen, this statement seemed quite odd. The second language learners in the class looked particularly bemused by this, although presumably they realised it was not an important part of the lesson, because they did not seek clarification from either other students or the teacher.

A rather amusing use of declarative statement also came from this Year 12 Design teacher. Irritated by the lack of progress of many of his students, who were meant to

be sketching an object as preparation for designing a logo, the teacher used declarative statements to make an analogy that was intended to inspire students to persist:

Teacher: (pointing to some commercially produced logos on the wall)

Everyone who did one of these at one time was an imbecile drawer. And at some stage they sat down and learnt to draw. Sometime between the age of about two and the age of about twenty they practised until they got better... So, if you're not very good at drawing, do more... practise... I can't stand the resistance that you guys put up to drawing... The process of getting better... So don't come at me with your "I can't draw a light bulb". If you want sympathy about your lack of ability you'll have to go to your parents.

Although the context was established in this example, the volume of declarative statements, the loose structure of ideas, and the broad philosophical observations made it more difficult for second language learners to discern the teacher's message.

Generally then, declarative statements proliferate in secondary school classrooms as teachers attempt to mediate texts. They present relatively comprehensible language to ESOL students, unless they are used out of context in an eccentric way.

(b) Elaborative simplification

Elaborative simplification (item 67) is when extra information or explanation is provided by the teacher, in an attempt to simplify the textual material. This includes the oral use of vocabulary that is not in the written text. Although generally aiding comprehension, elaborative simplification is sometimes so verbose or convoluted that it confuses students, as discussed in section 3.6.2.

Elaborative simplification was the second most frequent explanatory or summarising technique used by teachers in this study. The mean frequency of this technique in all subjects was 2.94 usages per lesson, with a standard deviation of 2.63. In the mainstream classes, elaborative simplification was used by teachers a mean of 2.78 times per lesson, with a standard deviation of 2.63. The usage of this technique in

Mathematics classes, however, was generally much higher, with a mean of 6.45. However, the standard deviation of 3.74 indicates quite a wide disparity amongst Mathematics classes. This would seem to reflect teacher individuality in language style, with one Mathematics teacher using the technique an average of 10.33 times per lesson. Appendix M presents a figure depicting the use of this technique in individual subject classes.

Several examples from Mathematics classes illustrate the use of this technique to explain content arising from the text. These examples illustrate the reiterative function of elaborative simplification, with the latter part of the teacher's expression repeating the point of the former part in another way.

Teacher: *You d have to undo multiplying by pi ..becomes divide by pi.*

Teacher: *Things have to be undone ..basically in reverse order of the way you ve done them.*

Teacher: *Divide by four over three is the same as multiplying by three over four.*

An English teacher used the technique to explain the instructions of a written assignment sheet:

Teacher: *So you don t just write them down with a comment ..You must name them ..so identify which type you ve got ..and then comment on the effect on the reader.*

This example illustrates how elaborative simplification can help students by providing synonyms (*name* and *identify*). Second language learners who may not know one word may well know the synonym. Such vocabulary variety may make comprehension more accessible. This example also used the elaborative technique of adding words, so that *a comment* in the first line was expanded to *comment on the effect on the reader*. This was likely to be very helpful to the second language learner because it unpacked the density of the shorter phrase, rather than expecting students' to understand the implicit meaning of *comment* in this context.

ESOL teachers generally use this technique more than mainstream teachers, although their usage still fell within one standard deviation of the overall mean. The mean frequency in ESOL classes was 3.9, with a standard deviation of 2.78. However, the ESOL teachers at Schools B and D had very high rates of usage, with mean frequencies of 6.3 and 6.33 usages per lesson respectively. An example from an ESOL class was *The teacher is a woman. She is standing in front of the blackboard... so it's a woman teacher.* Here the teacher's apparent illogicality was in fact counteracted by the support of the visual text she was discussing with the student. They were looking at a picture, and the teacher's elaborative simplification was designed to achieve two specific language purposes. The first was to use the new vocabulary item *blackboard* in a sentence, to demonstrate its usage. The second was to model how to use *woman* as an adjective to describe an aspect of *teacher*.

Although occasional examples of confusing elaborative simplification were observed in this study, none occurred during the tape-recorded lessons, and can not therefore be transcribed. However, generally this technique was used effectively by teachers in this study to aid students' comprehension of text.

(c) Personal or emotional associations

Illustrating a lesson with examples from the students' real world is a valuable technique advocated by student-centred pedagogy. This includes exploiting real-time events to relate to teaching material, and the use of analogy in explanation. These aspects are effective in making a personal or emotional connection with students, making the learning relevant to their lives. This technique (item 75) ranked quite highly in the observation data, as the third most common explanation technique. However with a mean of only 1.93 such illustrations per lesson and a standard deviation of 1.99, it was perhaps not as strong an element in lessons as it should be.

The use of personal associations was much more common in ESOL lessons than in mainstream classes. The ESOL mean of 3.07 with a standard deviation of 3.62 per lesson compares with the mainstream classes' mean of 1.73 with a standard deviation of 1.61. This reflects the generally much stronger student-centred approach of ESOL classes, and the more personal teacher-student relationships effected by small class

sizes. Figure 9 below compares the use of this technique in all subjects, mainstream subjects, and ESOL classes in this study.

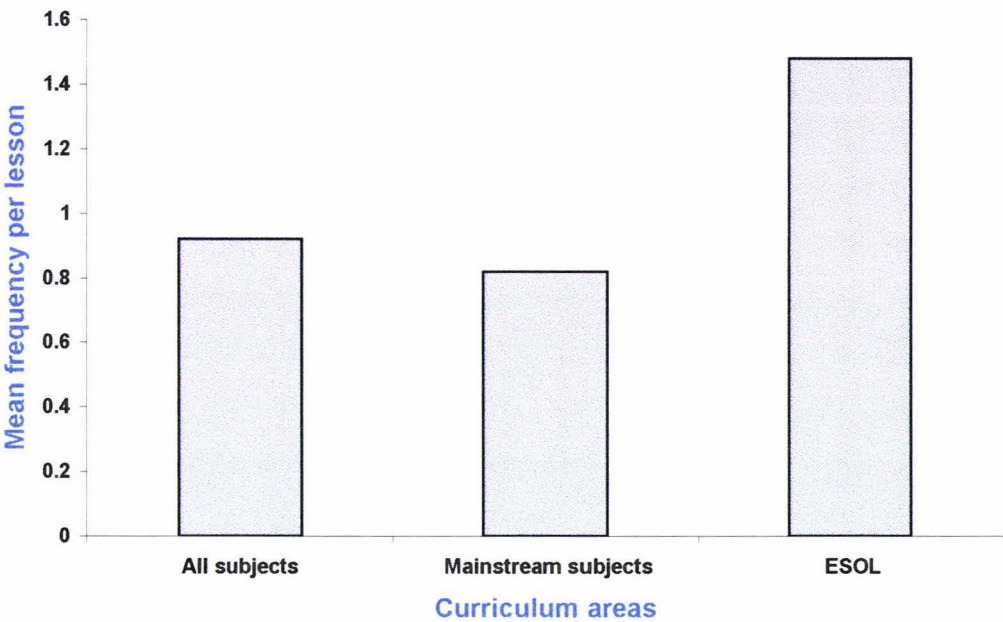


Figure 9 Teachers’ use of personal or emotional associations

The highest mean frequency of this technique was 7.66, in the ESOL class at School D. This was clearly the result of the one-to-one teaching situation of this class, and the friendly and informal relationship between the ESOL teacher and the private fee-paying Japanese student. The teacher had befriended the girl, quite frequently socialising with the student out of school, and including her in family gatherings. Consequently, the teacher was easily able to make lessons personally relevant, since she knew so much about the student’s life and interests. The student enjoyed baking New Zealand food, for example, so a muffin recipe was the source of a language exercise.

Another example from this class was letter writing. Because the teacher knew about the ESOL student’s unhappy experience of racist remarks at school recently, she suggested the student write about the incident to a friend. The strength of feelings displayed by the student, and the proximity of the event to the writing, ensured that the student had high motivation in writing this letter. A very competent and moving letter was the result. Even though it would never be sent, it achieved a worthwhile

purpose of allowing the student to express her hurt, as well as practising her English skills. Rather than the racist experience becoming a barrier to the ESOL student's learning at this school, it was overcome by the act of acknowledgement by the teacher.

So often teachers wonder why students are not engaged with the fascinating material they present to students in class. How often it is because they have not been able to show students its relevance to the burning issues of a teenager's personal world. Nevertheless, there were some exceptional mainstream classes in the data, where teachers made frequent use of personal connections with the material. These classes were not representative of their learning area: They seemed rather to arise from the particular teaching style, philosophy, and personality of the teacher. Of course, some topics will also lend themselves more readily to student relevance. The five mainstream classes in which teachers used this technique more than four times per lesson were: a Year 10 Text and Information Management class at School C; a Year 13 Catering class at School E; a Year 12 Economics class at School A; a Year 12 Geography class at School E, and a Year 12 Art class at School B.

The Year 10 Text and Information Management class at School C was a very good example of how teachers can ensure relevance to students on a personal level, even if the subject is seemingly impersonal and without any particular inherent interest to teenagers. This teacher wanted the students to practise their keyboard skills, and specifically how to make a table. It was world race relations week, so the teacher began by talking about this to the class. Then she presented them with two race relations activities that would require the use of the computer program she wished the students to practise. The first activity was a race relations quiz, that the teacher had installed onto the networked hard drive. The answers to the quiz were discussed in class later. The second activity was a race relations word find, that students had to copy as a table on computer. This lesson achieved the desired outcome of developing the students' keyboard and computer skills, whilst also addressing the students as people developing a sense of themselves in society. The lesson had additional value for the ESOL students because it gave them further practice in reading and writing English, as well as an insight into some New Zealanders' attitudes to racism.

A simple example of this technique was the Year 12 ESOL teacher, who was trying to elicit some names of vegetables from a student. She asked, *What do you put in your hamburger?* She realised that this was a food that the student eats and therefore tapped into his own personal world. Another example of this technique was observed in a Year 12 Economics class, but in this instance the teacher's explanations were not likely to be very helpful to the ESOL students who had only recently arrived in New Zealand. She explained concepts with many real-life examples. These included the Carter Holt log-loading dispute at the Port of Nelson; McDonald's Family Restaurant and the Employment Contracts Act; and an article in *The Listener*. Whilst these references may have been very helpful to students who had lived in New Zealand for some time, they had little resonance for new immigrants, and just confused the explanation for them. In this same teacher's explanation of *social effects*, which is a phrase used in the Economics textbook, she made many references to issues that are likely to impact on teenagers' lives: *...break up with your boyfriend... feel depressed... depression is well documented... with high rates of unemployment...* Elsewhere, she alluded to experiences she expected many of the teenagers to have experienced: *like filling out a withdrawal form at the bank or something like that; and Who's been to Gisborne? The road's not very good, is it? It takes a long time to get there...* With the exception of the Gisborne reference, these allusions were likely to strike a chord with ESOL students, at least to some extent, and as such may be seen as mediating techniques that would enhance students' comprehension of the text.

A Year 12 Practical English teacher referred to real life situations that were both clearly within the realm of ESOL students' experience and expressed in language they were able to comprehend:

Teacher: *I want you to think today... I've chosen this story for a reason. We live... in this school we all come from different cultures. We live in a multicultural environment.*

This type of mediation epitomises effective presentation of a written text to students and prepares students well for their encounter with the written word that will follow this explanation. Pre-reading activities generally are helpful because they rely heavily on the use of personal or emotional associations or relevance.

(d) Representation of material in a different mode

One of the most useful techniques teachers can use to enhance their explanation or summary of text is to represent it in a different mode (item 74). The means, for example, that a written text is read aloud; or an oral text is summarised in written form on the board. In all the lessons observed in this study, this technique was the fourth most common, with a mean frequency of 1.81 usages per lesson, and a standard deviation of 2.07. However, there was a marked difference between its use in different subjects. The ESOL classes' mean was 2.75, much more frequent than mainstream classes, with their mean of 1.65. Figure 10 below presents the data for all subjects, mainstream subjects, and ESOL classes' use of this technique.

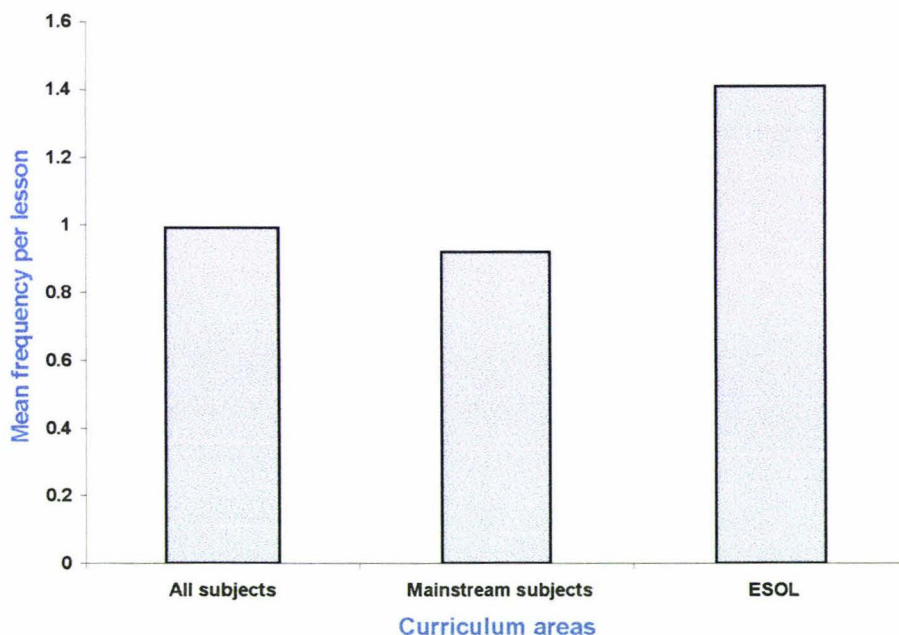


Figure 10 Teachers' representation of material in a different mode

Typical representation of material in a different mode was found in all the Mathematics classes in this study, where teachers gave an oral explanation while working an exercise from the written textbook on the board. A more unusual form of representing material in a different mode was found in a Year 12 Art class, where the teacher gave an oral explanation as she demonstrated how to stretch canvas onto a frame. This oral and visual mode of explanation supported the written instructions she had already given the students. Such a demonstration is extremely helpful to second language learners, with the physical behaviour clarifying any of the written

language that may be difficult. In an ESOL class an example of this technique was recorded when a student was reading aloud a short passage to the teacher. The teacher read out the words that the student could not say, thus representing the written word in an oral mode for the student.

An interesting and very effective use of this technique was observed in a Year 10 Technology class. To summarise a step that had been written in an assignment, the teacher put points on the board, made a numbered list, and also made a flow diagram of the process. Two of these are reproduced below in Figure 11.

Points on the board:

Printed circuit board manufacture

- 1. Circuit diagram**
- 2. Artwork – layout**
- 3. Materials**

Flow diagram:

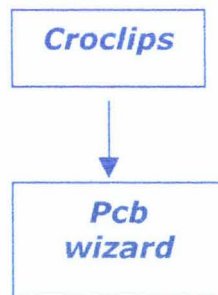


Figure 11 Year 10 Technology examples of reproducing material in a different mode

This threefold approach to summarising an activity had the advantage of appealing to a variety of student learning styles, by reiterating the important points both verbally and visually. The ESOL students in this class, who had only emergent English comprehension skills, were able to follow these instructions quite easily. This was aided, of course, by the teacher's choice of participant arrangement, placing them in small groups of native-speaking students, who were able to help the students further by demonstrating what to do.

(e) Word definition

The more advanced studies become, the more technical becomes the vocabulary. Senior secondary students, the predominant group of this study, are required to understand and use the technical words of subjects. This can present an added learning burden for ESOL students. Teachers need, therefore, not only to use this technical vocabulary appropriately in context, but also to teach it explicitly. Defining words (item 65) is the most transparent method of teaching this vocabulary. Of course, a mere definition is not sufficient to ensure learning, but it is surely an important start. It is disappointing, therefore, that in mainstream classes in this study, a mean frequency of only 1.02 word definitions per lesson were recorded, with a standard deviation of 1.41.

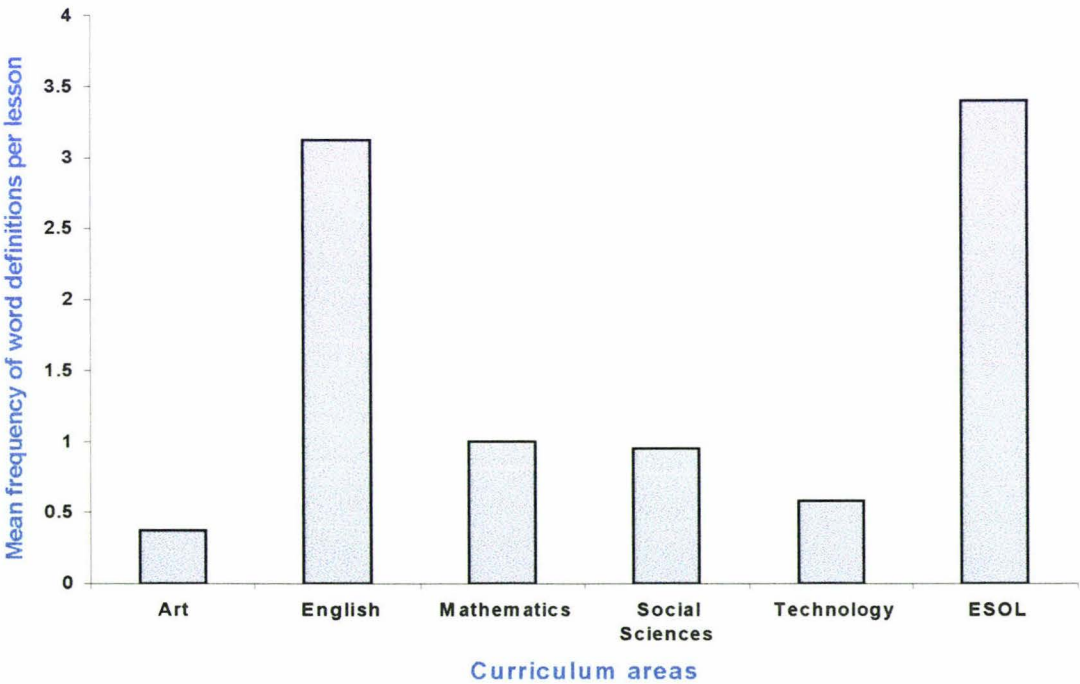


Figure 12 Teachers’ definition of words in curriculum areas

Figure 12 above presents the data for the use of word definitions in curriculum areas. That the mean of 3.4 in ESOL classes was three times the overall mean frequency is not unexpected, since ESOL teachers see themselves as language teachers. Three of the four mainstream English classes also recorded a mean of more than three usages per lesson. However, the data would seem to indicate that most mainstream teachers

of other subjects perhaps either rely on students working out for themselves the meaning of new words, or rely on ESOL and English teachers teaching students all the new words they need to know. This surely is naïve in the least, and negligent in the extreme. All teachers should see themselves as teachers of language. A Mathematics teacher must teach the language of Mathematics; an Economics teacher teaches the language of Economics.

One exceptional mainstream class, recording a mean of 3.3 definitions of words per lesson, was Year 12 Geography at School E. This teacher excelled in her understanding of students' learning needs through her interest in their world, and through her close attention to their academic progress. She made connections between what she wanted them to learn and other parts of their lives, as in the reference to Mathematics in the first example below. These factors were assisted by the small class numbers, averaging only five students at each lesson. Small numbers also meant that the teacher was able to give the ESOL student valuable individual attention during mainstream class time, which seldom occurs in large mainstream classes. This teacher recognised her role as a geographical language teacher. Some examples of her definition of words include:

Teacher to class: *They're called radial roots... so there's a new word for you... so they spread out... do you do Maths? It's like a radius... (draws a diagram)*

Teacher to ESOL student: *Decomposition... the other English word for that is rots. It rots away... falls to the ground...*

Teacher to ESOL student: *Roots... it's got two 'o's, so it's a long sound... not rots... got only one 'o'... these are roots (pointing)... but rots in the ground is... goes away.*

Sometimes defining words is not a quick process, as the following two examples from a Year 12 Practical English class show:

Teacher: (reading aloud from the short story) *...despite the glowing references... Now, if I gave you a glowing report, would you like to take that home? A glowing report... Would you like*

that? ... a glowing report would make you smile. And make your parents smile. So what sort of report would that be?

Student: *A good one?*

Teacher: *Yes, so what does glowing mean? ... What else can be glowing? ... What about on a cold night, in my house ... some of you might not have one of these...*

Student: *Fire?*

Teacher: *Yes, a fire could be glowing.*

Teacher: *Amy, what does courteous mean?*

Student 1: *Dunno.*

Teacher: *Anyone. Courteous. What...*

Student 2: *Nice?*

Teacher: *Mmm. There's another meaning. Anyone know another meaning? Look at the story. The report card said she was a courteous student.*

Student 3: *Polite?*

The next example of word definition shows how this technique can sometimes mislead students if not used accurately. It occurred in a Year 10 Mathematics lesson on probability:

Teacher: *Random... which means you just go and select somebody without thinking about who you're going to select.*

The main problem with this definition was that for the emergent ESOL students listening, there were too many words. Furthermore, *select* was unlikely to be known to these students. The repetition of *select* simply compounded the loss of comprehension, when a synonym, such as *choose* instead of the second usage of *select*, could have clarified. Furthermore, this teacher gave a very contextualised explanation, not the core meaning of the word. This definition did not enable students to apply the word *random* to a wider range of usages.

(f) Reconstructive discourse

A teacher’s repertoire of language techniques will include the use of reconstructive discourse, which is a systematic reproduction of text. This means that in explanation or summary the teacher reiterates parts of the text in some way. It is different from elaborative simplification, because it does not seek to reduce the level of complexity. Nor does it use more words than the original source text. Rather the teacher highlights parts of the text by reproducing them in some form.

In this study, reconstructive discourse (item 73) is the sixth most common technique of explanation and summary used by teachers. However, its mean across all subjects was only 1.21 usages per lesson, with a standard deviation of 1.59. Considering that this study only recorded data from those segments of lessons in which text was used, one might expect teachers to have used this technique much more frequently. Figure 13 below shows the use of reconstructive discourse in curriculum areas.

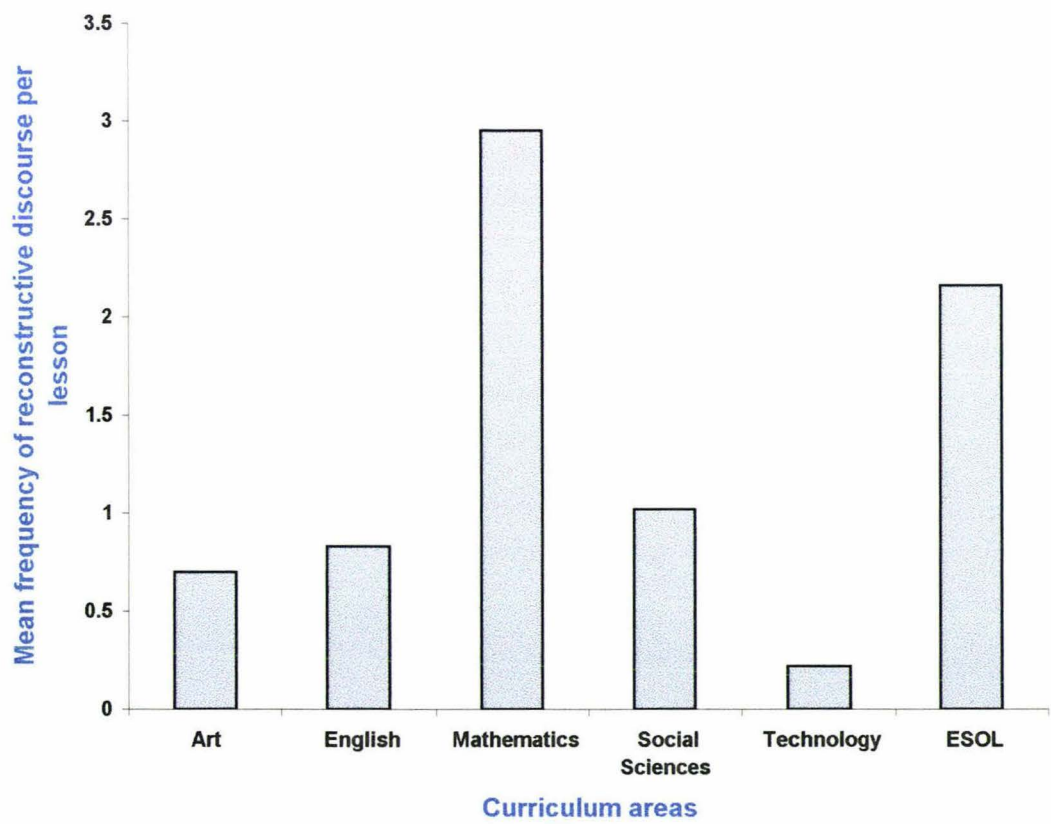


Figure 13 Teachers’ use of reconstructive discourse in curriculum areas

As Figure 13 shows, ESOL teachers used this technique more than twice as often as teachers of mainstream subjects, with a frequency of 2.16 and standard deviation of 2.41. However, the highest frequency was in the Mathematics curriculum area, recording a mean of 2.95. Technology had the lowest mean frequency, with only 0.22 usages per lesson.

An example of reconstructive discourse is transcribed below from a Year 12 English class. The teacher was mediating the text of a written language assignment. She read aloud parts of the assignment instructions, which are in bold type below, and accompanied this by reconstructing these words in her own way, as well as embellishing it where she considered the explanation needed this.

Teacher: *The marking schedule for that... you will get... marks...*

*there's three marks for each **identification and accurate***

***example**... so for each one there is a mark... you identify it and copy it down, and then a mark each for the comment... and it gives you the type of comment you're supposed to make...*

for example it must be explained in specific terms...

In this example, ESOL students in particular were likely to benefit from hearing the text reproduced in this way, especially since the teacher spoke quite slowly, helped by frequent pauses.

The Mathematics teacher at School A used an exceptionally high amount of reconstructive discourse in one particular lesson. The topic was solving equations in fraction form, and students were working on exercises from the textbook. The teacher took one of the exercises and wrote a model answer for this on the board. She used reconstructive discourse to read aloud this model answer, adding brief explanations throughout. Her language repeated the explanation provided in the textbook, about how to solve these equations. It also repeated the material she had written on the board. The words she used were virtually the same as those in the textbook, but she used them in her own way: She repeated the parts she wished to emphasise, inserted pauses to slow down the presentation of the material and allow students to absorb each step, and used intonation to underscore the logical connections within the process. Thus she used reconstructive discourse in her mediation of the textual

material, considerably enhancing the students’ comprehension of the text by her explanation.

(g) Dramatic techniques – gesture

The use of gesture (item 78) as a visual aid to an oral explanation is innate human behaviour, as Desmond Morris (1994) attests. Teachers, then, can be expected to use this kind of body language to enhance their attempts to explain points from text materials. However, as Brown (1994a, p. 241) warns, “every culture and language uses ‘body language’ or kinesics, in unique but clearly interpretable ways.... As universal as kinesic communication is, there is tremendous variation cross-culturally and cross-linguistically in the specific interpretations of gestures.” Fortunately second language learners seem to acquire an understanding of these variations, if only unconsciously, as well as using their recognition of universal gestures. Thus, gesture can play a helpful role in facilitating ESOL students’ comprehension of text.

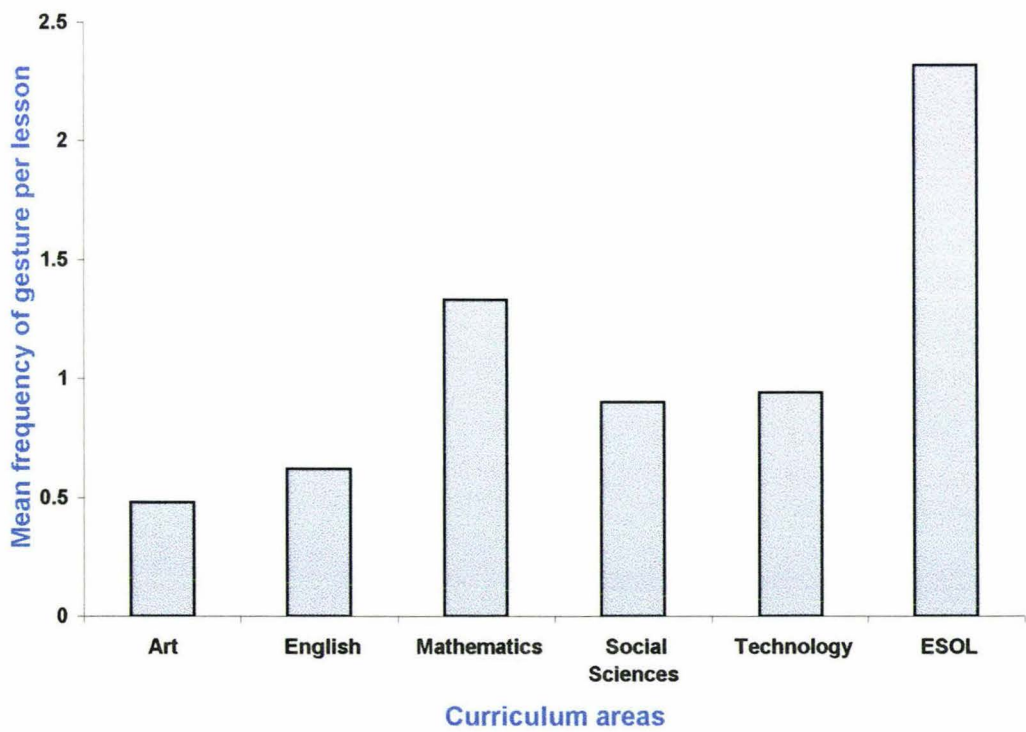


Figure 14 Teachers’ use of gesture in curriculum areas

Figure 14 above presents the data for the use of gesture in curriculum areas. The data shows that teachers used this technique much less often than might be expected in their mediation of text. Although it was the seventh most commonly used explanation technique in this study, the overall mean across all subjects was only 1.06 usages per lesson, with a standard deviation of 1.47. For mainstream classes, the rate was even lower, with a mean frequency of 0.84 usages of gesture per lesson, with a standard deviation of 1.1.

ESOL teachers in this study, on the other hand, made more use of gesture as an aid to explanation. Their mean frequency was 2.32 per lesson, with a standard deviation of 2.74. Using this technique two and a half times more often than mainstream teachers most likely reflects the fact that ESOL teachers are teaching second language learners exclusively. This means that they are always conscious of the likelihood that the student does not understand the words they use, thus seeking non-verbal ways to convey the message as well.

It is worth recording here some very effective examples of gesture observed in mainstream classes, where teachers took time to address ESOL students individually. In a Year 12 Mathematics Applied class, the teacher demonstrated on the ESOL student's calculator what he was explaining to the class. This was a considerable help, because it showed the student the numerals and symbols, to support the English vocabulary used.

In a Year 10 Food Technology class the usefulness of this technique as a tool for teaching is well illustrated in the following exchange, in which the ESOL student was a new arrival from Japan with little English:

Teacher: *Do you want coloured paper?*

ESOL Student: (looks puzzled)

Teacher: *Coloured paper?* (She gets a pile and shows it to the student.)

ESOL Student: *Yes, please.*

Teacher: *What colour?* (She spreads the pile so the student can see the range.)

ESOL Student: (Takes a piece.)

Teacher: *What colour's that?*

ESOL Student: *Blue.*

Teacher: *Blue! Yes, light blue.*

With the aid of gesture, the student received what was needed whilst at the same time learning new vocabulary. The teacher's language was appropriately short and simple. The exchange could have been even more useful to the student if she was required to repeat some of the new words, such as *coloured paper* and *light blue*.

These examples demonstrate how gesture can enhance oral explanation, with particular benefits for second language learners.

(h) Signposting

Signposting (item 82), defined briefly in this study as indicating the next step or lesson, is the eighth most frequent technique used by teachers in this study during their explanation or summary of textual material. With so much teacher control of lessons, as found in this study and discussed in chapter 5, it is very important that teachers clearly communicate to students what they are planning to do, why, and when. This enables students to understand the purpose of an activity, and helps them incorporate new learning into their schema. The mean in all subjects in this study was 1.06 usages of signposting per lesson, with a standard deviation of 0.96. On the other hand, mainstream teachers used signposting nearly four times as often as ESOL teachers. Figure 15 below shows this data.

The much greater use of signposting by mainstream teachers most likely reflects the strong curriculum focus of mainstream classes, especially in the senior secondary school, where all lessons relate closely to course objectives and qualifications' prescriptions. ESOL classes, on the other hand, are much more student-centred, with teachers tailoring the course to the specific needs of the particular second language learners in the small class. In this situation, much of the lesson tends to be reactive, with teachers responding to difficulties as they arise from the students. ESOL teachers have clear course objectives, but these tend to be more global than in other curriculum areas.

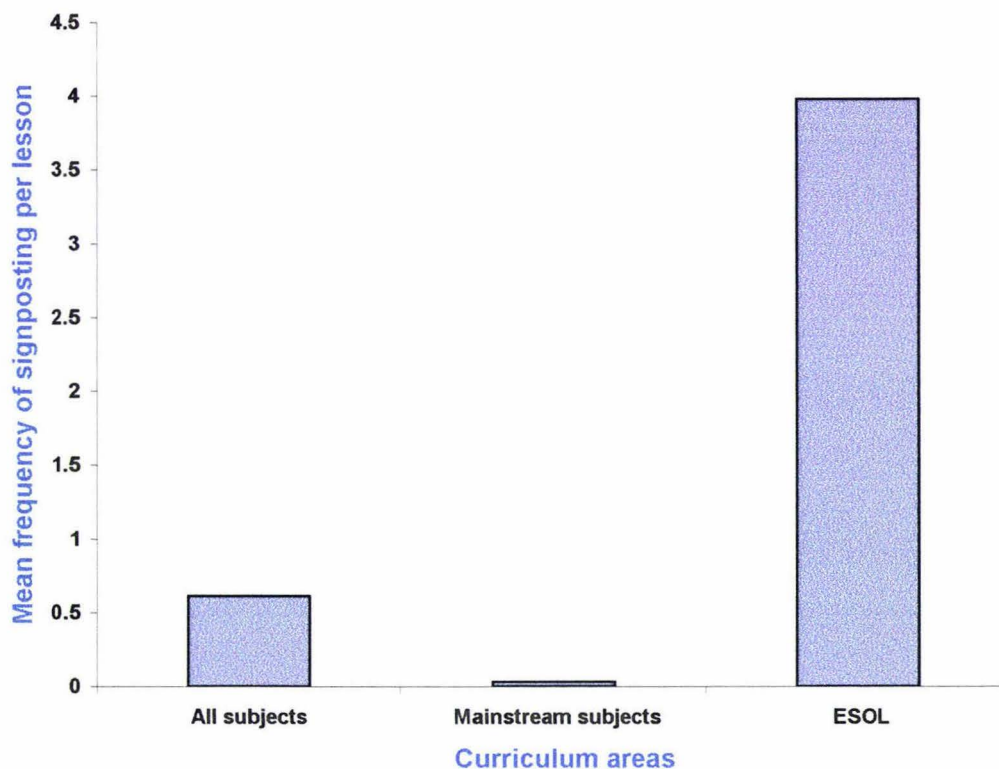


Figure 15 Teachers' use of signposting

In mainstream classes in the present study, many examples demonstrated the value of signposting. A Year 12 Mathematics teacher told her class, *I'm going to go on to inequalities tomorrow... Inequalities are easy*. This not only put the current learning in a framework, it also served an encouraging purpose by suggesting that the hardest part of the topic had already been learned.

Using signposting to motivate students is a very common function, but there were also other interesting differences in teachers' approach. In some cases a slightly threatening overtone was implied, as in the example of the Year 12 Mathematics Applied teacher who urged his rather reluctant students to make an effort with the current task, saying, *This'll be in a test coming up*. A Year 12 Practical English teacher, however, faced with similarly low-achieving and somewhat reluctant students, took a more encouraging approach with, *It's a very short story... it won't take you long to read*. She later told her students, *The next part of the unit standard is not so hard*, which was obviously designed to encourage persistence. The motivational effect of signposting was also found in quite neutral statements, such as

the one used by a Year 12 English teacher who said, *It will help you when you do your language assignment.*

Another major use of signposting found in this study was to outline a procedure or stages of learning. In a Year 12 Economics class, the example below, the teacher signposted the time frame of the rest of the lesson, which helped students allocate their effort to various activities. She also gave them advance notice of how much help she intended to offer them with the next task.

Teacher: *I'll stop you in a few minutes and give out the assignment... and I'll give the chapter references and page references for that.*

A Year 12 English teacher used this same approach in signposting her plan for their assignment:

Teacher: *We've got class time and homework time this week, so you're able to work in class and homework time. We'll practise a few so you'll be getting feedback on whether you're making the right types of comments... so don't feel like you're on your own with these... so ask for help.*

Giving clear indication of future lesson structure in this way is a very helpful use of signposting for all students, including ESOL students.

One instance of signposting observed in this study, on the other hand, simply serves to reveal embarrassingly poor lesson planning and management. In a lesson observed in the Social Science curriculum area, the students were watching a video, but they had not been told why they were watching it.

Teacher: *You have to watch it closely cause there's a question sheet on it.... You have to watch everything... cause there's a questionnaire... asks you even about the surfboard...*

Nevertheless, no question sheet was given to the students at all during the lesson using the video. Nor were they told at any stage what they should particularly be watching for. For the ESOL student, this greatly increased the difficulty of whatever task the teacher would eventually present on the text. The video was difficult enough to understand, as it used rapid, colloquial English: But not knowing what she was looking for meant that it was unlikely the student would be able to answer whatever

specific questions the teacher asked after viewing. One wonders what the intention of a lesson like this could have been.

Fortunately, such a misleading use of signposting was the exception, and most teachers in this study used the technique to assist students' learning. To ensure that ESOL students benefit from signposting as much as native-speaking students do, teachers should consider reinforcing their oral expression of it, by writing a brief lesson structure or list of signposting points on the board. Then, if ESOL students do not totally understand the teacher's spoken comment, they can refer to the written word for support.

6.3.4 Summary

Two of the main functions of textual mediation by teachers are explanation and summary. Teachers' language in these functions uses eight common techniques: declarative statements, elaborative simplification, personal or emotional associations, representation of material in a different mode, definition of words, reconstructive discourse, gesture, and signposting. Although overall there is a wide variety of usage of these techniques, some very effective use was observed in individual cases. ESOL classes generally revealed a stronger usage of these techniques than mainstream classes.

6.4 Enquiry

The *Enquiry* category of the teacher interaction section of the observation schedule covers items 88 to 105. The first seven items (88 – 94) are grouped into the elicitation category. These are various kinds of questions that teachers might use to elicit responses from students when engaging with texts. The next two items (95 and 96) form a binary system, recording whether a teacher's reaction to student input concerns form or message. The last nine items (97 – 105) are various ways that teachers might react to students' input. The data recorded for the use of these enquiry techniques is ranked, and the six most frequent techniques are discussed in section 6.4.1.

6.4.1 High frequency enquiry techniques with text

(a) Pseudo request, display or recall questions

The very common use of this enquiry technique (item 88) has long been recognised in pedagogical circles. Pseudo requests, display questions, and recall questions are virtual synonyms, all referring to questions asked by teachers to invite students to display knowledge already known to the teacher. Often they require students to display knowledge that has been very recently acquired by the student, in the course of the lesson. As such, these questions perform a reiterative function, strengthening memory, and allowing teachers to check students’ awareness of main points. However, as discussed in section 3.6.1, many students become very skilled at answering such questions, without necessarily transforming such information into any deep cognitive process of comprehension, or learning in its broadest sense.

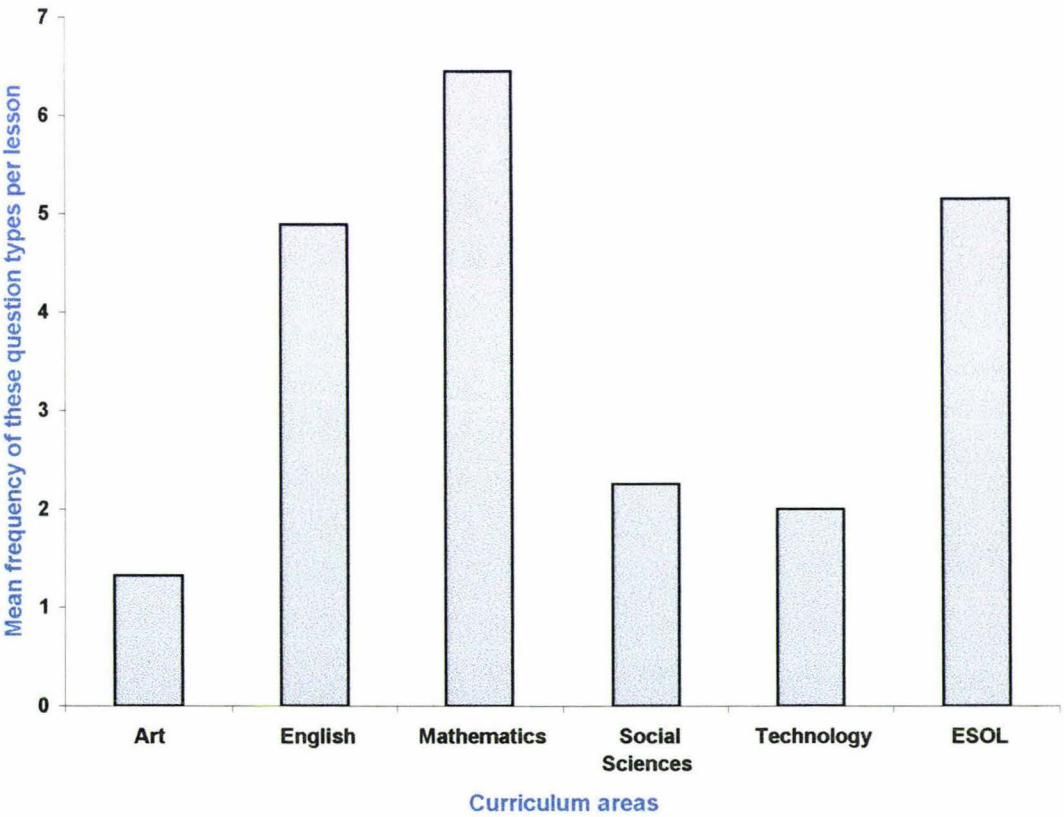


Figure 16 Teachers’ use of pseudo request, display or recall questions in curriculum areas

This technique was the most common form of enquiry used by teachers in this study. Mathematics, English, and ESOL teachers used it more than twice as often as Art, Technology, and Social Science teachers. Figure 16 above displays data on the use of pseudo request, display and recall questions by teachers in the various curriculum areas of the study.

From the highest frequency curriculum area, an example was recorded from a Year 12 Mathematics Applied class:

Teacher: *I'm talking about, is it going to be a very large or a very small number?*

Clearly, the teacher knew exactly the answer he was anticipating, and this would reveal the students' understanding of the explanation he was giving them.

Another high frequency area, English, provided some typical usage of display questions. A Year 12 English teacher, enquiring about the students' understanding of a language assignment instruction to comment on striking features, asked, *What kinds of things are they asking you to find here? What are vocabulary features?* Later in the same lesson she asked, *What types of sentence structure do we have?* Various answers were offered by students and the teacher wrote these on the board. Then the teacher continued the enquiry by asking, *We had a few more (sentence types). Anyone remember some of the others?* These are clear examples of the way teachers use such questions to elicit responses from students that demonstrate their recently-acquired knowledge.

Although Social Science teachers in the study used these kinds of questions less than half as often as the high usage learning areas, one teacher stood out in her usage. The Year 12 Geography teacher at School E produced the fourth highest frequency of this technique of all subjects in the study. She mainly used pseudo requests to lead students through a logical process of constructing knowledge. Two examples illustrate this here:

Teacher: *What do many streams form?* (Expected answer: a river)

Teacher: *Where do people put compost?* (Expected answer: on the garden)

Pseudo request, display, or recall questions are likely to be quite helpful to ESOL students because they often involve the repetition of vocabulary, and the representation of material in a different mode. Thus, textual material is mediated in a straightforward way by teachers through the use of these types of questions. However, obviously there are cognitive limitations of such questions, because they do not generally require students to analyse, synthesise, or extrapolate textual material.

(b) Comprehension check

The second most frequent enquiry technique in this study was comprehension check (item 105). This is a similar type of question to pseudo request, display and recall questions, but has a more specific function. In the expanded observation schedule, comprehension check is defined by Long (1983, in Ellis, Tanaka et al, 1995, p. 188) as occurring when “the speaker (teacher) checks whether the interlocutor (student) has understood something”. As such, it generally occurs in reaction to elicited student input.

ESOL teachers in this study generally used comprehension checks more than twice as often as mainstream classes did. The mean frequency in ESOL classes was 4.58, with a standard deviation of 2.70, whereas the mean frequency in mainstream classes was 2.09, with a standard deviation of 2.55. However, much higher usage of this technique could be found within both groups: The teachers of Practical English, Mathematics, and ESOL in School A, ESOL in School B, and Mathematics in School D, all made exceptionally high use of comprehension check. Their mean frequencies ranged between 6 and 9 recorded significant usages per lesson, compared with a mean of 2.46, and a standard deviation of 2.67 in all subjects.

When the data is grouped according to curriculum learning areas, as in Figure 17 below, some interesting patterns emerge. Practical subjects such as those in Art and Technology curriculum areas recorded extremely low use of comprehension check. Perhaps this reflects the nature of these areas, where comprehension is more easily demonstrated by doing something physical, without the necessity of verbal exchange.

As such, these subjects would seem to offer ESOL students more chance of success than heavily language-dependant ones do. The inclusion of some practical subjects in an ESOL student’s programme, then, is clearly appropriate, because these subjects do not rely so heavily on language, thereby enabling ESOL students a greater chance of success. Furthermore, although these subjects could also be seen to offer rather limited opportunities for developing the student’s English language competence, the collaborative group work they tend to employ offsets this disadvantage.

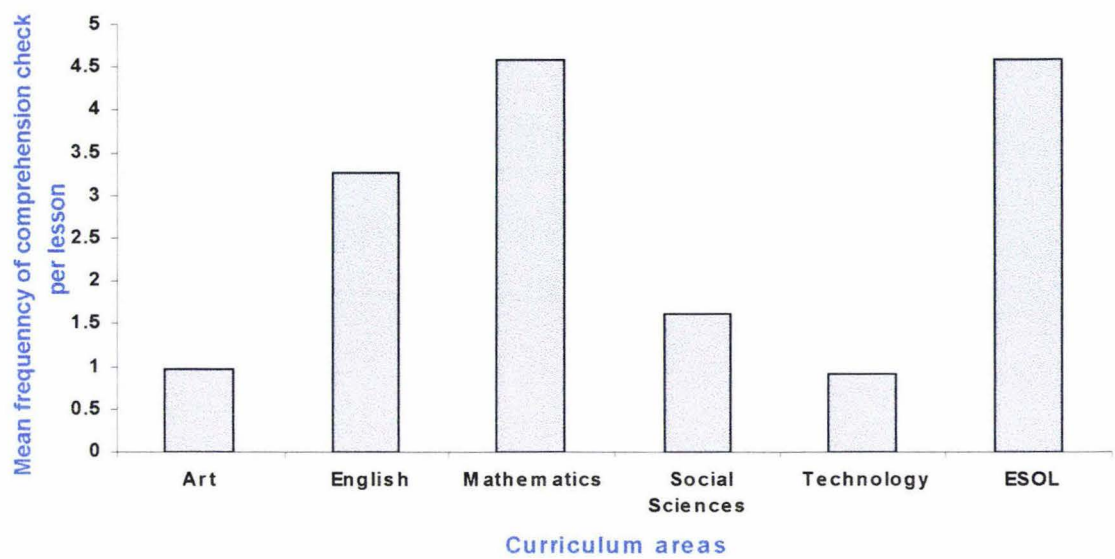


Figure 17 Teachers’ use of comprehension check in curriculum areas

A typical example of comprehension check was found in a Year 12 Mathematics class where the teacher asked, *Okay? Is everyone okay with that?* This gave students an opportunity to express their incomprehension if necessary. In another class, a Year 12 Mathematics Applied teacher pointed to where the decimal point might go, but not necessarily correctly, and asked, *It goes here, doesn’t it?* He was using the comprehension check to test the students’ understanding of a key part of his explanation.

A teacher working one-to-one with a Year 12 ESOL student used comprehension check to test whether the student knew a vocabulary item, *branches*, used in a text. When no positive response was received, the teacher used a more general kind of comprehension check to confirm the student’s incomprehension.

Teacher: *Where’s the branches?*

Student: (Silence)

Teacher: *You're not sure?*

In an amusing but familiar example, a Year 12 Art teacher had just spent three minutes explaining the instructions. Then he asked, *Jeremy, what do you have to do?* This comprehension check, directed at an individual student, served two secondary purposes, apart from the obvious primary one of simply ascertaining whether the student had understood. It usefully invited a student to summarise the instructions for the rest of the class. It also could have served to humiliate the student if he had not been listening carefully, thus demonstrating to the class that they should listen carefully in future, to avoid being exposed in this way.

(c) Comment

After a teacher has elicited some response from a student, some sort of comment on this response is generally expected. The reasons for this expectation are twofold. The first lies in classroom dynamics, where the teacher is the holder of power and authority, and whose opinion is considered valuable. The second lies in the student's insecurity, so that some reassurance concerning the student's response is valued. This technique (item 100) is defined in the expanded observation schedule as a positive or negative response to a student's utterance, but it is not correction.

An example from a Year 12 ESOL class is provided below to illustrate the difference between comment (item 100) and correction (item 97) as classified in this study.

Teacher: *What are vegetables? What things are vegetables? Tell me what vegetables you eat.*

Student: *Orange?*

Teacher: *No, that's not a vegetable.*

Student: *Apple?*

Teacher: *No, that's not... They're fruit.*

Student: *Fruit.*

Comment is when the teacher said, *No, that's not a vegetable*, and *No, that's not...* . Correction is when she said, *They're fruit*. Interestingly, here we see the way teachers use comment to guide students to a clearer understanding. Even though this

ESOL student had not yet understood *vegetable* through this exchange, he had learnt another superordinate noun, *fruit*, and by elimination was on his way to understanding *vegetable*.

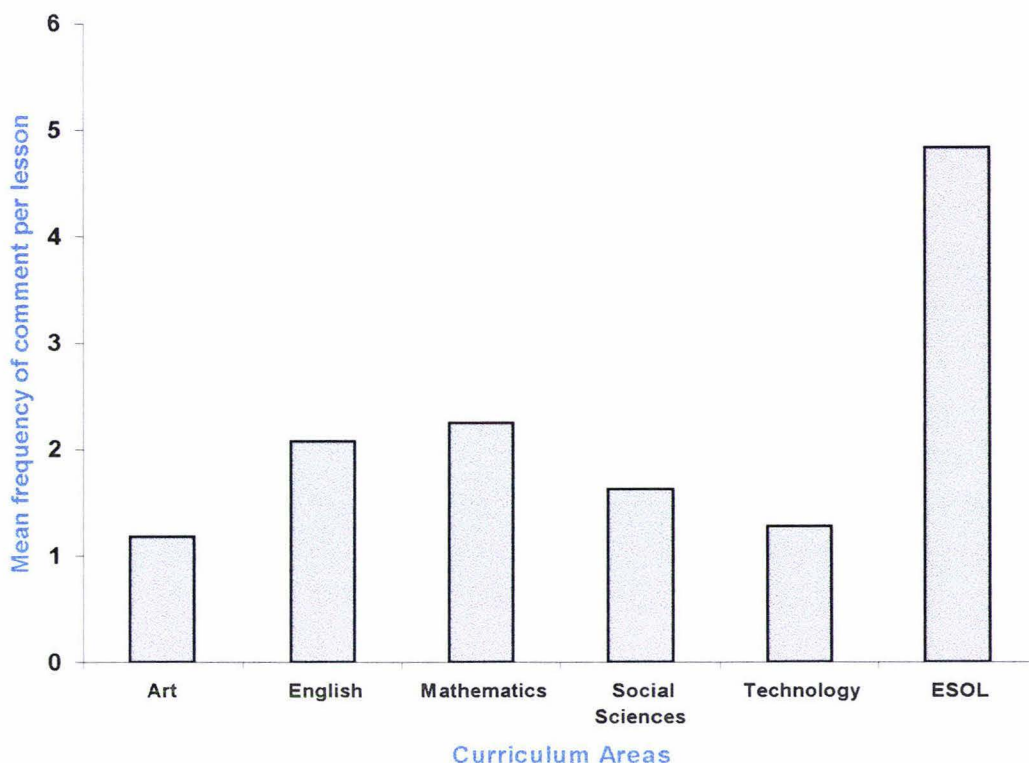


Figure 18 Teachers' use of comment in reaction to students' input in curriculum areas

Data showing the comparative usage of comment across the curriculum areas is represented above in Figure 18. The mean frequency of comment by teachers in all subjects of this study was 2.1, with a standard deviation of 1.92. ESOL teachers, though, had a much higher usage of this technique, with a mean of 4.83, and a standard deviation of 2.93. The ESOL teachers at Schools B and D in particular showed an exceptionally high usage of this technique, with means of 6.00 and 8.33 respectively. Mainstream teachers in this study used comment much less often, with a mean frequency of 1.62, and a standard deviation of 1.27. The Geography teacher from School E was the only mainstream class teacher in this study to use this technique more than one standard deviation above the mean. Her mean frequency was 5.00 comments per lesson.

An exchange in a Year 12 Practical English class illustrates the way a teacher's comment responds to a student's utterance. In this case, the teacher notified the student that she was wrong, but she did not go as far as correcting her. Instead the teacher's comment was used to encourage the student.

Teacher: *A decade. How long is a decade?*

Student: *A hundred...?*

Teacher: *No, not quite. But you're on the right track.*

In a Year 12 English class, the teacher used comment to confirm that the student's answer was correct and also to add a suggestion as to how students should deal with that aspect of an assignment:

Teacher: *Any more (language techniques)?*

Student: *Assonance?*

Teacher: *Something like assonance... now that can be quite a hard one to spot... so you might want to make sure you've found the right thing before you start commenting on it.*

Perhaps the most valuable use of comment, however, is when it leads students into further response, especially extending their ideas and language further than usual. An example from a Year 13 Art class demonstrates this. The teacher was helping the ESOL student use the printing press to make a print:

Teacher: *That Japanese artist... used to print it on fish skins.*

Japanese Student: *Oh yes, my grandad used to do that!*

Teacher: *Really? Did you like it?*

It was not only the reference to the student's own world here that elicited a longer response than this student had given in any other class that day. The teacher's comment showed sincere interest in the student's response, and encouraged a continuation of the conversation. Such use of this technique is a simple but very valuable aid to developing the communicative competence of ESOL students.

(d) Genuine request or referential questions

Virtually the opposite of pseudo-request or display or recall questions (item 88), which ask for a predictable response already known by the teacher, genuine request or

referential questions (item 89) refer to the student's "real world" (Nunn, 1999, p. 24) and the teacher does not necessarily know what to expect in answer. In this study, a mean frequency of 1.17 genuine request or referential questions per lesson was recorded over all subjects, with a standard deviation of 1.70. However, ESOL teachers used this type of question more than twice as often as mainstream teachers, with a mean frequency of 2.06 compared to 1.01 respectively. The respective standard deviations for these means are 3.74 and 1.17.

As the standard deviations suggest, though, these statistical differences may be rather misleading, since only three teachers in the study showed a very high use of these questions, above one standard deviation. These were the Art teacher at School D, the Geography teacher at School E and the ESOL teacher at School D, with mean frequencies of such questions per lesson of 3.00, 4.6 and 7.66 respectively. Two other Art teachers, those at Schools B and E, had a moderately high usage of these questions, recording mean frequencies per lesson of 2.00 and 2.6 respectively. Furthermore, 50 per cent of the ESOL classes and 26 per cent of the mainstream classes recorded no usage of these questions. A table in Appendix N shows the data for genuine request or referential questions in each of the 27 subjects of the study. These figures seem to indicate that the use of genuine request or referential questions might be governed by individual factors such as teaching style, rather than by the curriculum.

As an elicitation technique this type of question was second only to pseudo-request or display or recall questions used by teachers in this study, but was used less than half as often. A comparison of the two question types is shown below in Table 5. The much lower use of genuine request or referential questions is very disappointing in senior secondary school classes, since these are more likely to develop students' critical thinking skills. For ESOL students especially, this type of question has the additional benefit of valuing the students' own cultural experience by tapping into the students' own world and encouraging the application of prior knowledge to the new learning.

Description	Mean frequency in all 27 subjects	Mean frequency in mainstream subjects	Mean frequency in ESOL classes
Pseudo request / display/recall questions	3.48	3.18	5.15
Genuine request / referential questions	1.17	1.02	2.06

Table 5 Comparison of frequency of question types

Typical usages of genuine request or referential questions were found in some of the English classes in this study:

Year 12 English Teacher: *Any other symbols (in the text) that we may have come across?*

Year 12 Practical English Teacher: *How did this story make you feel? How did it make you feel? How do you feel about Mr Harding? How about Soesa? Okay, we'll do one question at a time.*

Year 12 Practical English Teacher: *What do we learn about Mum from that letter... that she wrote to the teacher?*

In each of these examples the teacher was eliciting a personal response from the students, inviting them to draw on their own worlds in reaction to the text. Of course, such questions arise naturally from the study of fiction, since one of the inherent functions of literature is to evoke that response in a reader. This type of question may be less obviously relevant to informative texts, but a Mathematics teacher in the study demonstrated how to pose a question drawing on the students' own world:

Year 10 Mathematics Teacher: *How many of you have played Lotto?*

Here the teacher was beginning a series of genuine request or referential questions that related the rather dry textbook explanation of probability to the actual lives of the students in his class.

Another use of this type of question is to elicit students' perception of their progress. Teachers of senior secondary school classes often rely on dialogue with students to

decide how long to spend on a task. Two examples from a Year 12 Mathematics teacher illustrate this:

Teacher: *Are you getting fed up with them?*

Students: *No!*

Teacher: (surprised) *You're enjoying them?*

Teacher: *Who feels totally at sea with those?*

The second example here, interestingly, was followed by the student asking, *Whaddya mean at sea?* This shows that native-speaking students too have difficulty at times understanding the language of their teachers.

Art teachers in this study used genuine request or referential questions more often than teachers in many other curriculum areas. Two examples from Year 12 Art classes at School A and B show the way these invite students to contribute something from their own experiences to the construction of the learning:

Teacher: *Do you like those colours?*

Teacher (to a student who is having difficulty choosing a background for a self-portrait): *What means something to you?*

This latter question, especially, demanded that the student apply something of his own experience to the learning arising from the text in this lesson. Rather than simply accepting the authority of the internationally-acclaimed artists in the book used in this task, or calling on the authority of the teacher to select an appropriate painting as a model background, the student was required to use critical thinking skills and prior knowledge to construct meaningful knowledge here, in order to successfully complete the task.

This approach can help to counteract the cultural alienation of second language learners from their new learning environment. However, teachers also need to remember that students from different cultures have different experiences and expectations of the educational context, and may take some time to accept such an active and unpredictable role in their own learning. As always, teachers must be sensitive to the cultural differences of the students in their classes.

(e) Expansion

Expansion (item 101) occurs when the teacher reacts to student input by extending the content of the student's utterance, or adding information that is related to it. Across all subjects this study recorded a mean frequency of 1.15 expansions per lesson, with a standard deviation of 1.65. There was no significant difference found between mainstream and ESOL classes, with mean frequencies of 1.1 and 1.41 and standard deviations of 1.66 and 1.81 respectively.

A Year 12 Design teacher illustrated how expansion can be used to maximise an opportunity to teach students a very specific point:

Student: *I wanna do it in negative...*

Teacher: *We don't go round saying positive, negative, positive, negative.... In the graphics world we call it invert... the computer command invert doesn't mean turn it upside down... it means it changes the colour values of it...*

Two other examples illustrate the way teachers often use expansion to lead students to answers that they cannot at first produce. The first example was from a Year 10 Technology class:

Teacher: *Think about what you want to make.*

Student: *I don't know what I want to make.*

Teacher: *Well, think about what you could make for the wall of your bedroom... or by your stereo...*

The second example was from a Year 12 English class:

Teacher: *We had a few more (sentence types). Anyone remember some of the others?*

Student: (Inaudible.)

Teacher: *Sorry?*

Student: *Major?*

Teacher: *Maj... No... major doesn't come into it... no. That was a different type from minor... but it encompasses simple, compound, complex...*

After students had finished suggesting language techniques for a list on the board, this English teacher continued to use expansion to supply the answer she was hoping to elicit:

Teacher: *Any more? No? Okay, I've thought of a few more ..um, repetition's an important one ..because you can often see the reason that repetition is used ..it might be to emphasise something ..so yeah, repetition's an easy one to comment on ... and we need to find three ..and I would say that it's best to find three of different types as well.*

Expansion is, then, a common technique used by teachers both to respond to student input and to add information that needs to be considered at this time. As such, it is helpful because it ensures coverage of important information. Nevertheless it is inclined to act as a disincentive to students to think very hard, as they soon realise that the teacher will supply any points they do not contribute themselves. Because of this, expansion should be used sparingly so that it does not reinforce the traditional transmission role of the teacher, and discourage students from active participation in a collaborative approach to learning.

6.4.2 Summary

Enquiry is one of the major functions used in teacher mediation of text. Teachers use two main types of questions in this enquiry: pseudo request, display or recall questions; and genuine request or referential questions. Other commonly used techniques include comprehension check, comment, and expansion. These techniques can significantly improve ESOL students' understanding of text, but it seems that not in all cases is such mediation helpful.

6.5 Conclusion

Teachers' interactions with text involve a complex variety of language. Whilst less phatic communion was observed than expected, teachers in this study used many of the anticipated explanation and summary techniques, and enquiry techniques, to

mediate textual language for students. Whilst the most frequent of these might be an indispensable component of teacher language, some of the less frequent might be chosen more often by teachers for more effective interaction with text. The following chapter explores three lessons from the present study in which teachers demonstrate effective use of some of these techniques.

Chapter 7

Analysis of significant features of individual lessons

7.1 Introduction

Analysis of some of the tape-recorded lessons reveals teacher usage of a number of significant linguistic features, in the mediation of textual material. In many ways these lessons present models of effective teacher mediation of texts for both mainstream and ESOL students. They show how teachers use many of the language techniques discussed in chapter 6. During the analysis of these lessons, we are able to see techniques of mediation and the scaffolding of learning in context. The recorded and collated data from each of these lessons is in Appendix F.

7.2 A Year 13 Calculus lesson

This Year 13 Mathematics with Calculus lesson was the second of the three observed, and eight students attended. The topic was exponential series, using a textbook called *Delta Mathematics. A course in Mathematics with Calculus*, by Barton, Johnson, and Laird. The relevant pages in this textbook were classified as minimal text, because virtually all of the text comprised very short mathematical ‘sentences’ using numbers and symbols. Pages 119 – 122 and 252 - 255 of this textbook, which were the focus of this lesson, are included in Appendix O. The lesson lasted 44 minutes, which was slightly shorter than usual because of a special assembly that day. The first 30 minutes of this lesson were tape-recorded, as this was when most of the teacher’s interaction with the class as a whole occurred. The teacher was female, in her thirties, with a position of academic responsibility in the school. The ESOL student in this class was a Japanese private fee-paying student, in her second year at the school.

The lesson followed a clear structure, which can be classified according to Edelhoff's classification of learning phases, as described by Spada and Fröhlich (1995, p. 150) in their discussion of the COLT observation scheme. This structure is summarised in Figure 19 below.

Lesson minutes	Learning phase	Duration	Activity
0 – 1	Information and motivation phase I	1 minute	Teacher conversed informally with students: phatic communion.
2 – 7	Input Phase I	6 minutes	Teacher explained exponential series; made notes on board; students listened and copied notes.
8	Input Phase II	1 minute	Teacher outlined lesson structure.
9 – 13	Working phase I	5 minutes	Teacher and students did exercises on board from teacher notes.
14 – 15	Working phase II	2 minutes	Teacher answered students' questions on work.
16 – 23	Working phase III	8 minutes	Teacher and students did exercises on board from textbook.
24 – 26	Transfer Phase I	3 minutes	Students worked individually on exercises from textbook; teacher gave individual help as necessary.
27	Information and Motivation Phase II	1 minute	Teacher interrupted students to clarify an exercise and explain why this work is necessary.
28 – 44	Transfer Phase I (continued)	17 minutes	Students worked individually on exercises from textbook; teacher gave individual help as necessary.

Figure 19 Year 13 Calculus lesson structure

In the first minute, the teacher conversed with the class, which was Information and Motivation Phase I. Next she entered the Input Phase, spending six minutes explaining exponential series, based on pages 252-253 of the textbook, while making notes on the board summarising what she said. She then spent a minute outlining the structure of the rest of the lesson.

This was followed by the Working Phase. First there were five minutes of working through exercises on the topic, lead by the teacher but with considerable oral contribution by the students. This activity enabled the teacher to model mediation of

text and her own metacognition in the way she worked on the problems with the students. In the next two minutes the teacher solicited and answered questions first about this, and then about the work students did the previous day, when the teacher was absent. After this, the teacher did exercises from page 121 of the textbook on the board, again with considerable oral input from the students. This lasted for eight minutes.

Finally, the Transfer Phase began, with the students spending a total of twenty minutes continuing to work individually on one of three exercises from the textbook, depending on their rate of progress to date. However, 27 minutes into the lesson a second Information and Motivation Phase interrupted this for one minute. Here the teacher clarified one of the exercises and explained how these relate to the students' learning goals. The bell ended the lesson.

7.2.1 Explanation and summary techniques

(a) Elaborative simplification

Elaborative simplification (item 67) is defined in the expanded observation schedule as extra information/explanation in an attempt to simplify – including oral use of vocabulary not in written text. This common didactic technique is discussed in some detail in section 3.6.2. In the data gathered in this research, elaborative simplification was the second most common language technique used by teachers when they were explaining or summarising.

Ten significant usages of elaborative simplification are recorded on the observation schedule for this lesson. These compare remarkably against the overall mean frequency of 2.95 usages per lesson, with a standard deviation of 2.63, and the ESOL mean frequency of 3.9, with a standard deviation of 2.78. The mean incidence in all Mathematics lessons observed in this study is 6.45, so this lesson uses nearly double that.

Eight of the ten teacher's elaborative simplifications are transcribed below in Figure 20. Brief pauses are indicated by three dots, but longer pauses are indicated by the duration of the pause in brackets. Most pauses were accompanied by the teacher writing on or pointing to the board.

Lesson minutes	Learning phase	Teacher's use of elaborative simplification
2.5	Input Phase I(A)	<i>What if, on the other hand, you are asked for the general term?... (5 seconds.) So you aren't asked for... the first four terms... You aren't asked for... after an expansion to combine the first... lowest powers or anything like that... You are asked for the general term. So in other words... if we substituted it in and we had a general term I could then find out... term two... term ten... term fifteen... whatever.... So have a look here... going back to this... (She points to a previously written example on the board.)</i>
5	Input Phase I(B)	<i>So if we had... this can be your general term... this can be put a box around it... right? So if for example we had... example... e to the power of five x... calculate the nth term or the general term... (10 seconds) what's it going to be...? (6 seconds) What is x replaced with?</i>
9	Working Phase I(A)	<i>So expand... three plus... x to the power ah multiplied by e to the power of... $2x$... (8 seconds) What's the first thing you're going to have to do...? You should've had a go... at this... on Wednesday... What's the first thing you're going to do...? Look back. (Student: e to the power of $2x$?) Yep, e to the power of $2x$... So... what is that...? What is e to the power of two x...? Using the formula on the board... There... First thing I wrote up... (6 seconds) Are we asleep today? Yep? (Student: $2x$...) No, we're not doing the general term... We're just expanding it.</i>
11	Working Phase I(B)	<i>Now combine the terms... right...? So we're going to gather the terms that have got the same power.</i>
16.5	Working Phase III(A)	<i>One over n plus one... we have to prove... that it is either strictly increasing... or strictly decreasing... Right? And... two b, page 121... Right...? To prove that... if it is... strictly increasing... (5 seconds) we have to show... that term n plus one... is greater... than term n... Or if it is decreasing... strictly decreasing... we have to have the sign the other way round... Right...? That term n plus one... is less than... term n... So how do you know which sign we're going to use...? How do you decide if it's increasing or decreasing? What's the easiest way to decide... if it's going to be increasing or decreasing? (Student: inaudible contribution) No... Substitute some numbers in... In other words if I go here... and I take one... what is that fraction going to be...? If n equals one...? What's the fraction?</i>

18	Working Phase III(B)	<i>Now what we have to do... is to divide it. Or rather... we have to substitute this in... and solve it. Okay?</i>
18.5	Working Phase III(C)	<i>So it's decreasing isn't it... That way... (Student: Yeah.) And if it's strictly decreasing... is it going to be bounded above... or below...? If it's decreasing all the time... (Student: Below.) Below...(8 seconds) So therefore every single term... is going to be greater than... whatever the... the lower value... lowest value... is likely to be.</i>
21.5	Working Phase III(D)	<i>Why have I written this in brackets...? At this stage...? (Student: Because you're subtracting them?) Cause we're still subtracting them... and I can't just do that... I couldn't just write... this bit... cause I have to remember to subtract the two as well.</i>

Figure 20 Transcript of teacher's use of elaborative simplification

These instances of elaborative simplification demonstrate well the teacher's important role in mediating between the technical difficulties of textbook language and the language abilities of the learner. They are analysed here in some detail.

Early in the lesson, during Input Phase I, in which the teacher explained exponential series to the class, she used simpler vocabulary and syntax than the textbook explanation of the same concepts. For example, *alluded*, *exponential function*, *derived function*, *growth function*, *base*, *the argument*, *evaluated*, *dominate*, *reciprocal*, and *in the expansion of* appear in the page 252 textbook explanation, but this polysyllabic specialised vocabulary was not used by the teacher at all.

Instead the teacher used more standard English vocabulary and syntax, which was less technical and less concise but easier for student listeners to comprehend. For example, in Working Phase I(A) she said, *we're not doing the general term... we're just expanding it*, which related to the textbook phrase, *the general term in the expansion of...* In this example, the teacher's syntax replaced the embedded structure of the textbook phrase with two simple sentences. The simplicity of these was enhanced by the parallel structure of the two sentences. The subject of each sentence, *we*, put the listener immediately into the position of an active participant, followed by the informal active present tense of *are not doing* and *are expanding*. The insertion of the intensifier, *just*, reassured the student listener of the simplicity of the procedure being explained.

In Working Phase III, the eight minutes in which teacher and students did exercises on the board from page 121 of the textbook, there were many more examples of the teacher's simplification of the textbook language. The textbook exercise succinctly asks students to *decide whether the following sequences are strictly increasing or decreasing, and prove your result*. During Working Phase III(A), the teacher began her mediation of this instruction by reading the problem aloud (*One over n plus one*) and then employing elaborative simplification, using some of the words of the textbook, as well as many of her own: *We have to prove that it is either strictly increasing or strictly decreasing*. The teacher continued to elaborate the textbook phrase, *prove your result*, with her use of *we have to show that....* This elaborative use of five monosyllabic words in the place of three words, one of which has two syllables, is typical of classroom language. The teacher also employed a comprehension check strategy (*Right?*) in the course of this elaborative simplification, in order to give the students opportunities to register any uncertainties they may have had, as the explanation progressed.

In total, from line 1 to line 6 of the Working Phase III(A) transcript, the teacher used 43 words to explain the 18 word instruction and problem 2(b) of the textbook. The interruption (*two b, page 121*) to confirm the textbook reference to a tardy student is not included in this tally. For the listener, especially one for whom English is a second language, this increase in the number of words has the advantage of extending the duration of the message, providing the listener with more time to absorb it. However, it can also have the disadvantage of swamping the listener with an unnecessary quantity of language, making extraction of the essential idea more difficult.

This example also conditioned the student's reaction to the exercise by replacing the demanding tone of the imperative of the textbook, *prove*, with the gentler effect of the simple sentence, *we have to show that....* This elaborative simplification worked to encourage students to consider how they might show this, without presenting this in such a confrontational way. The use of the first person plural pronoun, *we*, also served to reassure the student that this would be achieved collaboratively, by the teacher and the students working together to solve the problem. These

conversational language techniques were used by the teacher to simplify and elaborate on the technical textbook language.

Another example from the same Working Phase III(A) transcription also illustrates the teacher's use of smaller words but longer phrases to explain an idea from the textbook. *Decide whether the following sequences are strictly increasing or decreasing*, instructs the textbook exercise. Working on the board with the participation of the students, the teacher expressed this as interrogatives: *How do you decide if it's increasing or decreasing? What's the easiest way to decide if it's going to be increasing or decreasing?* Ten words in the textbook were expressed by 23 in the elaborative simplification. The textbook *whether* was replaced by the shorter *if*. *Are* in the textbook instruction was replaced by the teacher's phrase *it's going to be*. These typical features of informal spoken language are likely to be easily understood by second language learners.

As found earlier, there are many words and phrases in the textbook that were avoided by the teacher in her discussion during this phase of the lesson. From page 120 of the textbook these include *generalise*, *convergent* and *convergence*, *trivially* and *trivial*, *likewise*, *require*, *the equivalent*, *examine*, *this expression*, *sufficient conditions*, *by themselves*, *the value of the limit*, and *may apply*. None of these were used by the teacher in her oral explanation of the exercises on this page. Rather, she used elaborative simplification to mediate the difficulty of this polysyllabic vocabulary and dense syntax. For example, the textbook uses technical terminology to express a general concept about exponential series: *Note however that these two sufficient conditions for convergence do not by themselves tell us the value of the limit*. The teacher, on the other hand, slowly and simply elaborated this in explanation of a specific example: *So therefore, every single term... is going to be greater than... whatever the... the lower value... lowest value... is likely to be*. There was only one tri-syllabic word, *whatever*, in the teacher's explanation, compared to four in the textbook sentence. This was effective mediation, although it would also have been helpful to students if the teacher had acknowledged the difficulty of the text and defined some of the more complex words.

Several techniques were used by the teacher in this elaborative simplification to allow the listener additional listening time to absorb it. Redundancy was used effectively. For example, two synonymous conjunctions, *so* and *therefore*, were used for emphasis. Also, the redundant use of the adjective, *single*, worked to reinforce *every*. Another helpful technique was the teacher's use of pause. This assisted the student listener by extending the duration of the explanation, as did her self-correction (*the lower value... lowest value*).

Generally, then, this lesson illustrates well the way that teachers may use elaborative simplification in their explanations. Although at times its unspecialised vocabulary and loose syntax may obfuscate the student's attempts to comprehend the text, students, and especially second language learners, often benefit from this kind of mediation of the text by their teacher.

(b) Declarative statement and signposting

These techniques are considered together here because both of the signposting are demonstrated within some of the declarative statements. Declarative statements (item 79) were the most frequently recorded explanation and summary technique in teachers' interactions in this study. Declarative statements are those in which the teacher declares some personal opinion or position. They often begin with *I...* and do not require any immediate response from the class. Rather, students might be expected to digest the declaration, and perhaps modify behaviour as a result. The mean frequency of declarative statements in all subjects in this study was 3.41 usages per lesson, with a standard deviation of 2.76. This Calculus lesson, then, was remarkable for its twelve recorded declarative statements. Eight of the twelve declarative statements are transcribed below in Figure 21.

Signposting (item 82) was the eighth most frequently used technique in teachers' explanation and summary in this study. It is important for its contribution to the overall context of students' learning, because it puts the immediate lesson, or aspect of a lesson, into a broader framework of learning. It specifically looks ahead to some

goal, towards which the current learning is aimed. In this way it can be highly motivational for students. It is also useful for explaining to students how the lesson will proceed. This often prevents students asking premature questions, and also enables them to understand the development of learning within the lesson. The mean incidence of signposting in all subjects of this study was 1.06 instances per lesson, with a standard deviation of 0.96. However, this Calculus lesson nearly tripled that amount, with three usages recorded. Signposting was demonstrated within the Input Phase II and Information and Motivation Phase II transcriptions in Figure 21 below, but also occurred at the end of the lesson.

Lesson minutes	Learning phase	Teacher's use of declarative statement and signposting
2	Input Phase I(A)	<i>Notice that I have changed... from factorials... into the actual numbers already...cause those numbers are easy to remember.</i>
6	Input Phase I(B)	<i>I could be wrong here. I don't know where to find it on this calculator.</i>
8	Input Phase II	<i>There is nothing else...There is...oh jeez...nothing else... we can do...Finished. (7 seconds) So what I'm gonna do... it's a shortened period remember ten past eleven...what I'll do this period...is continue with exponential series...as well as...the work that we were doing on Monday...where you have to decide...whether a series...was...increasing...? Strictly increasing...decreasing...strictly decreasing...what was the other one...? (Student: Bounded.) Bounded above... or bounded below...or none of the above...Right...? So we'll go back to that exercise because I did promise you that I would have we would have another look at it as to whether... we could come to some... decision... about those terms... and we will very quickly finish off exponential series... which means that on Monday...we can start differentiation...(6 seconds) So very quickly...an example on... exponential series...very quickly going back to sequences... and... also doing a quick example on that... and then I'll leave you to do some book work... and I'll come and help individual people.</i>
10	Working Phase I	<i>Cameron let's help me... help me out here.</i>
24	Transfer Phase I(A)	<i>If you don't bother to copy it down that's up to you...</i>
25	Transfer Phase I(B)	<i>For some reason we have taken the easiest one to prove.</i>
26.5	Transfer Phase I(C)	<i>So that's all that you have to do... for those kinds of questions.</i>

27	Information and Motivation Phase II	<i>Question seven...on page 121...oh and question six as well...are Bursary questions...which means...that at some stage in the past...Calculus Bursary Calc...Bursary Calculus had a question in that asked you to do exactly that... Right? So if you look at question six...jeez if you can do question 6...that's on the worksheet that's due on the 27th of April as well...Makes it all the more reason to have a look at it today.</i>
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Figure 21 Transcript of teacher's use of declarative statement and signposting

The teacher's high frequency of declarative statements was partly a reflection of her relaxed but purposeful relationship with the students in this class. The atmosphere in each of the lessons observed was consistently warm but professional, relaxed but purposeful. The weekly ritual of students taking turns to bake a cake for the class was indicative of the more informal aspects of this relationship. So too were the large quantity of work achieved during each lesson and the active participation of the students in the working through of exercises on the board with the teacher. Examples evidencing this mutually respectful, collaborative, and supportive working relationship include these declarative statements from the teacher:

Teacher: *I could be wrong here. I don't know where to find it on this calculator.*

Teacher: *I did promise you that we would have another look at it as to whether we could come to some decision.*

Teacher: *Cameron, help me out here.*

Offering reassurance to the students was a clear role of some of this teacher's declarative statements. Some words and phrases that achieved this, transcribed in Figure 21 above, include *easy to remember*, *nothing else*, *quick*, *quickly*, *easiest* and *that's all you have to do*. Only once in the lesson did the teacher use a declarative statement in a slightly negative tone, and this was an aside to a particular student, not to the class as a whole.

Teacher: *If you don't bother to copy it down that's up to you...*

The intention of this expression was clearly to admonish the student for apparent laziness, but the teacher chose to use a declarative statement of her attitude here, rather than take a coercive approach.

Within Input Phase II was a fine example of a teacher's use of signposting to enlighten students about the shape and procedure of the lesson:

*...what I'll do this period is continue with exponential series...
 ...as well as the work that we were doing on Monday...
 So we'll go back to that exercise because I did promise you that...
 ...and we will very quickly finish off exponential series...
 ...which means that on Monday we can start differentiation...
 So very quickly going back to sequences...
 ...and then I'll leave you to do some book work and I'll come and help
 individual people.*

The teacher clearly outlined the stages at which different material and activities on the topic would occur. She made explicit when it would be appropriate for the students to raise their questions about various points and exercises. Not surprisingly, then, the lesson proceeded in a very effective manner, with students actively participating in the activities at the appropriate time. Issues of potential distraction, such as the student who was absent the previous day, the student who had not been able to do the homework exercise, and the student who did not understand the new exercise presented in class that day, were thus managed in an orderly and logical way. Each issue was allocated a clear place in the lesson, which meant that students could focus on the stage in hand, without having to worry about when they could have their particular concerns met.

A disadvantage of this example of signposting is that it was entirely oral. A lot of information was conveyed in a dense stream of spoken language. For a second language learner in particular, this is likely to be too much and spoken too quickly. It would have benefited all of the students in the class to have this lesson structure simply listed on the side of the board at the start of the lesson. This would have ensured that all of the valuable functions of signposting were intelligible to all the students in the class.

The second significant use of signposting in this lesson occurred within Information and Motivation Phase II. Here the teacher clearly encouraged the students to look ahead to their ultimate academic goal, the University Bursary examination.

Teacher: *Question seven on page 121 and question six as well are Bursary questions.*

She also drew their attention to a more immediate goal, an assignment.

Teacher: *Question 6 that's on the worksheet that's due on the 27th of April as well.*

Teacher: *Makes it all the more reason to have a look at it today.*

Both of these goals served the purpose of placing the current learning into the broader context of the Bursary Calculus syllabus. The teacher also tried to motivate the students by reassuring them of the transferability of the day's learning.

7.2.2 Enquiry techniques

(a) Reformulated questions

Reformulated questions (item 91) are defined in the expanded observation schedule as questions rephrased by the teacher when a student gives a wrong answer to a previous question. Of course, quite often students simply do not answer a question, and this is often an indication that they do not know the correct answer. Thus, no response may also be interpreted as an incorrect response. The purpose of reformulated questions is generally to make the previous question more specific, but certainly to help the student reach a correct answer or clearer understanding.

This study recorded a very low use of this technique generally, with a mean frequency of 0.92 reformulated questions per lesson, and a standard deviation of 1.14. Even so, it was the fourth most frequent elicitation technique recorded, and the eighth most frequent enquiry technique generally. In this particular Calculus lesson, though, six reformulated questions were recorded; a much higher use, even compared to the ESOL mean of 1.48 usages per lesson, with a standard deviation of 1.13. The

six reformulated questions are transcribed in Figure 22 below. Some of these also appear previously as part of the elaborative simplification examples in Figure 20.

Lesson minutes	Learning phase	Teacher's use of reformulated questions
9	Working Phase I(A)	<i>So... what is that...? What is e to the power of two x...? Using the formula on the board... There... First thing I wrote up... (6 seconds) Are we asleep today?</i>
10.5	Working Phase I(B)	<i>What's next...? How do you expand... this over that?</i>
12	Working Phase I(C)	<i>Who's going to do that...? Who's going to multiply everything... by x?</i>
17	Working Phase III(A)	<i>So how do you know which sign you're going to use...? How can you decide if it's increasing or decreasing? What's the easiest way to decide... if it's going to be increasing or decreasing?</i>
20	Working Phase III(B)	<i>Now you have to prove those two things... Can we remember how to do that...? Anyone want to make a start on that...? Look back over your work... Tuesday's... no Monday's... cause we don't have it on Tuesdays... How did we prove something was strictly decreasing? (7 seconds) Okay, forget it... Right...? What is term n? (5 seconds) It is one over n plus one... What is term n plus one...? In other words... n is substituted with... n plus one.</i>
23	Working Phase III(C)	<i>If I wanted to prove that... how can I get rid of... this fraction...? How can I... What do I multiply both sides by (pause) to get rid of the fraction?</i>

Figure 22 Transcript of teacher's use of reformulated questions

The predominant use of reformulation here was when the teacher discovered, by the lack of student response, that the initial question was ahead of students' comprehension. The initial question was often expressed in a truncated or elliptical form. This may have seemed obscure or ambiguous to the student, as in the Working Phase I(C) transcription, *Who's going to do that?* This was either too imprecise for the students to know what the teacher was asking them to do, or else the next step in the process was too far beyond their current level of understanding for them to be able to recognise what they were being asked to do. Either way, there was no response to this question. However, the teacher then reformulated the question in order to make it more explicit, by expanding the phrase *do that* into a simple and specific expression of what she was asking them to do. So the short question became, *Who's going to multiply everything by x ?* Not surprisingly, this question

received an immediate and correct response from a student. The reformulated question was a success.

There were occasions, however, when teachers' reformulated questions did not achieve the desired clarification of students' understanding. For Working Phase III(B), reveals an example of an unsuccessful reformulation of questions. The initial question related to something the teacher believed the students knew, because it had been in a lesson earlier in the week. She made several attempts to reformulate this in a way that would revive students' memories of the procedure:

Now you have to prove those two things. Can we remember how to do that?

Anyone want to make a start on that?

Look back over your work... Monday's...

How did we prove something was strictly decreasing?

Traces of the teacher's frustration were evidenced next by a number of signals, such as the long seven second pause, as she waited for a response; her dismissive *forget it*; and her futile *Right?* when clearly it was not.

The subsequent question began a new inductive sequence. Here the teacher's reformulation was quite radical, as she approached the point from another angle.

Teacher: *What is term n ?*

Still, however, there was no response from the students. She paused for five long seconds, disguising her inevitable frustration while she pondered where to go next with her attempted explanation. Eventually she resorted to a strategy all teachers will ruefully recognise, answering her own question.

Teacher: *... is one over n plus one.*

Now it was time for another reformulated question, which she used to check whether the students understood the answer she had just provided.

Teacher: *What is term n plus one?*

However, a continued silence from the students indicated that she had still not managed to clarify this point for them. After yet another pause, she rephrased her question:

Teacher: *In other words... n is substituted with... n plus one.*

A skilled teacher, such as the one in this Calculus lesson, then, uses reformulated questions to test students' comprehension. Students' progress can be informally observed in the way they respond to varying degrees of specificity and clarity of questions.

(b) Reflective statement

A teacher's full or partial repetition of a student's oral contribution in class is classified in this study as a reflective statement (item 98). As such it is recorded on the observation schedule as a technique used during the process of enquiry. In this study, the mean frequency of reflective statement was 0.99 per lesson, with a standard deviation of 1.1. However, this technique was a strong feature of the teacher of this Year 13 Mathematics with Calculus lesson, in which five significant reflective statements were recorded. They are transcribed below in Figure 23.

Lesson minutes	Learning phase	Teacher's use of reflective statement
6	Input Phase I	Teacher: <i>I don't know where to find it on this calculator.</i> Student: <i>One.</i> Teacher: <i>It is one! Thank you!</i>
8	Working Phase I	Student: <i>e to the power of 2x?</i> Teacher: <i>Yep, e to the power of 2x... So...what is that...? What is e to the power of two x...? Using the formula on the board.</i>
16	Working Phase III(A)	Teacher: <i>How many numbers is there from 24 to 93?</i> Student: <i>69</i> Teacher: <i>69...? Does that include 24 and 93?</i> Student: <i>I dunno.</i> Teacher: <i>Okay... There's... seventy. Because you did the subtraction 93 take away... 24... you got 69... If you actually added up...</i>
18.5	Working Phase III(B)	Teacher: <i>And if it's strictly decreasing... is it going to be bounded above... or below...? If it's decreasing all the time?</i> Student: <i>Below.</i> Teacher: <i>Below. (8 seconds). So therefore every single term... is going to be greater than... whatever the... the lower... value... lowest value... is likely to be.</i>
21.5	Working Phase III(C)	Teacher: <i>Why have I written this in brackets...? At this stage?</i> Student: <i>Because you're subtracting them?</i>

		Teacher: <i>Cause we're still subtracting them... and I can't just do that... I couldn't just write... this bit... because I have to remember to subtract the two as well.</i>
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Figure 23 Transcript of teacher's use of reflective statement

The most obvious purpose of reflective statement in this lesson was to confirm the correctness of a student's answer. The teacher's falling intonation indicated that she was agreeing with the student, not querying the answer.

However, this teacher frequently capitalised on her students' involvement in their construction of meaningful learning, by extending their response into a further development of understanding. For example, in Working Phase III(C), the student's answer *subtracting them*, which was expressed with interrogative uncertainty, was repeated in a reflective statement:

Teacher: *Cause we're still subtracting them...*,

and then developed by the teacher into:

Teacher: *... and I can't just do that. I couldn't just write this bit because I have to remember to subtract the two as well.*

The example in Working Phase III(A) illustrates both the limitations of reflective statement, and the ability of a skilled teacher to explore a student's response. Thus the student's answer was repeated by the teacher in a questioning tone, followed by a pause:

Teacher: *69...?*

This indicated to the student that the answer may have been incorrect and would require some further discussion to explore its validity. The teacher's subsequent question and the student's response revealed that in fact the student was not fully cognisant of the point:

Teacher: *Does that include 24 and 93?*

Student: *I dunno.*

At this stage, the teacher realised that the student needed further explanation to refine a rather imprecise understanding. This time a reflective statement would have been inappropriate (and sarcastic). Instead, the teacher used the moment to clarify a simple point of arithmetic:

Teacher: *Okay. There's seventy. Because you did the subtraction 93 take away 24... you got 69... If you actually added up...*

7.2.3 Summary

This Year 13 Calculus teacher modelled the use of language to invite students to collaborate in the construction of learning. Rather than following a traditional transmission learning process, where the teacher works through text to impart information to students, she interacted extensively alongside the students to glean information and understanding of text. The opportunities this afforded the ESOL student, in particular, contributed to a rich language learning environment within the context of a senior mainstream curriculum class. The most obvious single improvement to this teacher's mediation of text would be to include explicit use of word definitions for difficult vocabulary in the text.

7.3 A Year 10 English lesson

In this Year 10 mainstream English class were 21 exuberant, mixed-ability, male and female students. Two Japanese girls in the class were private fee-paying ESOL students, living in home stay accommodation arranged by the school. They had been in the country for three months. The male teacher had long experience in the classroom, and specialised in teaching drama. He had a friendly but firm relationship with his students, an energetic teaching style, and an entertaining personality. The lesson analysed here was the last of three observed. Unusual in this lesson was the teacher's greater use of discipline, pushdown, and humour than other classes observed in this study. There were also some interesting aspects of the activities of the lesson, with many more links with previous lessons made, and allowing for much greater use of prior knowledge than other classes in the study. Roleplay is one dramatic technique in the teacher interaction category that was used strongly in this

lesson. Analysis of all these aspects within this lesson examines their use by teachers in mediating text, and considers how they might have impacted on the learning of the ESOL students in the class. The structure of the lesson is summarised below in Figure 24.

Lesson minutes	Learning phase	Duration	Activity
0 – 8	Input Phase	8 minutes	Teacher explained the difference between a topic and an idea. The main points were already written on the board, as were some examples of topics. The students were asked to suggest ideas to add to the topics.
9 – 21	Working Phase I	12 minutes	Students wrote down their own ideas on the topics from the board. After seven minutes, the teacher checked their progress by asking how many they had done.
22 – 27	Working Phase II	5 minutes	The teacher solicited students' ideas and wrote these on the board. There was some class discussion about the usefulness of these ideas.
28 – 55	Transfer Phase	27 minutes	The students and teacher went to the library. During this time, the teacher spent eight minutes talking to the ESOL students about some worksheets he wanted them to work on during subsequent lessons.

Figure 24 Year 10 English lesson structure

The lesson had four phases, based on two main activities. The first three phases concerned the preparatory brainstorming stages of essay writing, and the fourth phase was a visit to the school library for individual reading. The text used was some prepared notes that the teacher had written on the board, about turning a topic into an idea.

7.3.1 Content: Management

Three aspects of classroom management were recorded in this lesson as occurring much more frequently than the mean in all subjects in the study: discipline; pushdown; and humour. Collectively these three aspects present an area of potential difficulty for ESOL students, because they interrupt the main educative purpose of

the lesson. For an ESOL student already struggling to comprehend the lesson, the teacher's diversion from the didactic function of the lesson is likely to be confusing, whether it is to attend to discipline or to deal with interruptions from outside or to make humorous asides. Nevertheless it is quite common in New Zealand secondary schools for Year 10 mainstream lessons to include a relatively high frequency of these distractions, whereas more senior classes tend to be more focused.

(a) Discipline

In this lesson four significant instances of discipline (item 9) occurred in the 27 minutes before the class went to the library. Two of these are transcribed in Figure 25 below.

Lesson minutes	Learning phase	Teacher's use of disciplinary language
4	Input Phase	<i>Ah, ladies and gentlemen, ah, particularly Paul... what's happening is... I'm doing the work and because I have my back to you... I have to stop, turn around, and I have to start the lesson all over again. I expect you to be ready to carry on concentrating...</i>
20	Working Phase I	<i>Could I have your attention please! Could I have your attention please! I'm begging you...</i>

Figure 25 Transcript of teacher's use of disciplinary language

The first of these examples was constructed by a series of declarative statements in which the teacher described the disciplinary problem as he saw it.

What's happening is...

I'm doing the work and because I have my back to you...

I have to stop, turn around, and I have to start the lesson all over again...

Only in the last sentence did he actually state what he wanted students to do, and even this was in rather vague terms.

I expect you to be ready to carry on concentrating...

The volume of description preceding this reduced the impact of the statement of expectation. ESOL students, particularly the emergent English learners in this class, are unlikely to have comprehended much of this extended speech beyond the first

few words. However, they are very likely to have understood the gist of the teacher's complaint through non-verbal messages, such as his stopping writing on the board, his facial expression, and the behaviour of the class, which changed from rather rowdy to subdued and attentive with this teacher's speech. In this case, whilst the language was probably not exactly confusing, it could be seen to be a disruption to the lesson and therefore an impediment to the learning of the ESOL students. For the other students in the class, though, it may in fact have helped their learning by drawing their attention back to the task at hand.

The second transcribed example is typical of this teacher's style of discipline, combining admonition with humour. The ESOL students would have benefited from the repetition of the sentence, but are likely to have been bemused by *I'm begging you...* Of course, most of this mixed ability Year 10 class are also unlikely to have appreciated the self-deprecating irony of a teacher begging rather than demanding that his students pay attention.

(b) Pushdown

The expanded observation schedule defines this aspect (item 10) as "a point in conversation at which the talk is 'put on hold' while a problem is sorted out" (Lynch, 1996, p.9). Although discipline could be seen as a type of pushdown, it has been separately recorded and is therefore not included in this item.

There were two major interruptions to the Year 10 English lesson, categorised as pushdown, and transcribed below in Figure 26. Both these pushdown incidents occurred during Working Phase II where students were sharing some of their written answers with the rest of the class. The teacher was inviting individual students to contribute, the class was listening, and the teacher then gave specific feedback about the success of the student's answer. Twice this process was interrupted by students from elsewhere in the school entering the room on errands.

Lesson minutes	Learning Phase	Teacher's use of pushdown
22	Interrupting Working Phase II	Teacher: ... <i>a strong idea. Thank you very much...</i> (Then to unknown student who has just entered the room) <i>Can I help you? Excuse me...</i> Unknown student: <i>Um... do you have a sound effects CD?</i> Teacher: <i>A sound effects CD. A sound effects CD... Who's this for?</i> (hands it to him) <i>Okay, Rakei... can I hear one of yours please?</i>
24	Interrupting Working Phase II	Teacher: <i>Christina, please. Hands down please Johnno. Christina.</i> Christina: <i>Um... Spain is a country that enjoys bull fights.</i> Teacher: <i>I missed that.</i> Christina: <i>Spain is a country that enjoys bull fights.</i> Teacher: <i>Spain is a country which enjoys bull fights. Okay, um...</i> (Then to another unknown student, who's just entered the room) <i>What's that please... Oh...it's just... another...I'm a message boy now... I don't mind being a message boy... It's an important job... Thanks very much... Interruptions... we're getting so many interruptions...</i> Student: <i>They're good.</i> Teacher: <i>It depends where you are, though, doesn't it...? Okay, um... In Spain they... Could you go a little bit further and explain why Spain enjoys bullfights? And come up with an idea... the reasons why it's a worthwhile activity or not a worthwhile activity?</i>

Figure 26 Transcript of teacher's use of pushdown

In both of the cases transcribed here in Figure 26, the teacher stopped, literally mid-sentence, and restarted, again virtually mid-sentence, in an attempt to maintain the flow of this phase of the lesson. The teacher paused between these stops and restarts for no longer than he did elsewhere in his speech. The transitions from teaching to pushdown, and from pushdown back to teaching, each time, are pinpointed in the transcribed excerpts below:

First pushdown commenced:

Teaching: *Thank you very much...* (to student reading out his answer)

Pushdown: *Can I help you?* (to unknown student entering the room)

First pushdown ended:

Pushdown: *Who's this for?* (hands the CD to the unknown student)

Teaching: *Okay, Rakei...* (to next student in the class invited to contribute)

Second pushdown commenced:

Teaching: ... *enjoys bull fights. Okay, um...* (to Christina reading out her answer)

Pushdown: *What's that please...* (to unknown student entering the room)

Second pushdown ended:

Pushdown: *It depends where you are, though, doesn't it...?* (to class generally, about interruption)

Teaching: *Okay, um... In Spain they...* (back to Christina)

In the fluent way that he handled these interruptions, the teacher's experience and competence in classroom management is evident. However, to ESOL students, it may be rather confusing if the change from one function to another is so fluid as to be barely discernible. It may take a second language learner some time to recover from the confusion caused by the smooth merging of the interruption with the lesson itself.

(c) Humour

As discussed in section 5.3.1, humour is a disappointingly rare feature of secondary school classrooms, but this may in fact be an advantage for the language learning needs of ESOL students, at least in the very early stages. The teacher of this Year 10 English class, however, could be described as a natural comedian. As a Drama teacher, and sometime performing Clown, it is not surprising that he spontaneously used witty and playful language throughout his lessons. Five significant usages of humour were recorded in the first 27 minutes of this lesson, before the class went to the library. Three of these are transcribed below in Figure 27.

Lesson minutes	Learning phase	Teacher's use of humour
3	Input Phase	<i>Hush, please. Hush, please. I won't say it twice... That was a joke.</i>
15	Working phase I(A)	Teacher: <i>Johnno, how many have you done?</i> Johnno: <i>One, two, three, four, five.</i> Teacher: <i>Excellent... how many have you done, Phillip?</i> Phillip: <i>Four.</i>

		Teacher: <i>Ex- cel- len... Daniel, how many have you done?</i> Daniel: <i>Um... just about... five...</i> Teacher: <i>Just about five? That means two doesn't it?</i> Daniel: <i>Yep.</i> Teacher: <i>That's ex- ce...</i>
21	Working Phase I(B)	<i>Candice... Oh, not Candice...Rebecca... Oh, what's her name? I'll never forget what's her name!</i>
28	Transfer Phase	<i>Daniel... Daniel... please don't stress out... Remember... the foolish man becomes... the foolish man becomes angry... the wise man... understands...</i>

Figure 27 Transcript of teacher's use of humour

The first example is typical of the way this teacher was simultaneously both himself and an observer of himself, frequently making comments about what he had just said. The language and the structure of this were simple enough to be easily understood, although the humour could have been missed by many students. The teacher's comment, *That was a joke*, alerted not only ESOL students but also inattentive or unthinking native-speaking students to his humour.

Another example of this use of humour was in the Working Phase I(B) example in Figure 27. The teacher commented on his own error in using an incorrect name for a student, making fun of it by adding a well-worn joke (although these students had probably never heard it before):

Oh, what's her name? I'll never forget what's her name!

The Working Phase I(A) example is certain to have puzzled the ESOL students because it drew its humour from two sources through quite an extended exchange. One source of humour was the teacher's measured reaction to the students' efforts:

Five exercises done receives the response: *Excellent*

Four exercises done receives the response: *Excellen*

Two exercises done receives the response: *Exce*

Emergent second language learners, such as the Japanese girls in this class, may well have understood *excellent*, but would not appreciate the subtlety implied in the diminishing enunciation of the word in relation to the diminishing amount of work done by the students. In fact, there was little indication in this lesson that the rest of the class understood this humorous gem either.

Another source of humour in this exchange was the teacher's quick reaction to Daniel's prevarication and hesitant fabrication:

Daniel: *Um... just about... five...*

Teacher: *Just about five? That means two doesn't it?*

The sniggers of the class at this showed their satisfaction that Daniel's laziness had been uncovered, and their enjoyment of the teacher's light-hearted reaction. The Japanese students in this class, though, showed no sign at all of understanding this subtext. Of course, it should be noted here that students' experiences of different classroom cultures may also contribute to difficulties in comprehending the language of the classroom.

In the last example of humour in Figure 27 above, Daniel again was used as the target of fun by the teacher. Here is another example of how this teacher used humour as an agent of discipline, because as the students entered the Transfer Phase, where they needed to rely on themselves to apply learning, Daniel was once more distracting the class with his attention-seeking behaviour. The teacher effectively marginalised the boy's behaviour from the rest of the class by belittling it. However, his reference to the boy as a foolish man was so oblique that the ESOL students (and most of the rest of the class too) did not appear to understand the connection at all. In cases like this, humour simply presents a confusing blur of language for ESOL students, compounding for them the difficulties of understanding the language of the classroom.

7.3.2 Activities

This Year 10 English lesson included greater use than elsewhere in this study of two aspects of activities. Firstly, in this lesson the teacher made three clear links with previous lessons (item 40) whereas the mean frequency of this in all subjects in this study was only 1.46 such links per lesson, with a standard deviation of 0.97. Secondly, this teacher required students to use their own prior knowledge (item 42) more often in the activities of this lesson, with a score of 7.00 compared to the mean frequency in all subjects of only 1.26, with a standard deviation of 1.74.

(a) Links with previous lessons

Two of this teacher's links with previous lessons are transcribed in Figure 28 below. In the first link, the teacher presented a fine example during the Input Phase of how to connect current learning with previous learning. In this case, the students had written essays which showed the teacher that most of them still did not understand how to develop points to present ideas on a topic. Consequently, he planned an exercise that would give his students further opportunity to practise this vital cognitive step in essay writing. Explaining why an exercise is necessary might seem an obvious teaching technique, but it occurred all too rarely in the lessons observed in this study. ESOL students, like all students, benefit from recognising the place of learning within its wider context.

Lesson minutes	Learning phase	Teacher requires students to make links with previous lessons
1	Input Phase	<i>Shortly I will return the essays... the ones that were handed in... and at the same time collect all the ones that... weren't handed in... but first of all, can we do this little exercise... I'll explain it... Okay, here on the board... here on the board, I've got a number of subjects... topics... and as they stand... they're just words... and you see the heading... Turning a topic into an idea... And I looked at your essays... I realised that some of you haven't quite made that step... and I just want to give you a little practice on that...</i>
25	Working Phase II	Teacher: <i>Information supports... your ideas. It's a way of thinking. What are four inner powers? Keith? No-one call out... Keith? It's a memory test... Keith... and everybody...</i> Keith: <i>Thought... imagination...</i> Teacher: <i>Thought, imagination.</i> Teacher: <i>Okay, Jonno...</i> Jonno: <i>Comprehension.</i> Teacher: <i>Comprehension... And... Jackie?</i> Jackie: <i>Memory?</i> Teacher: <i>Memory... I said it's a memory test, didn't I.</i>

Figure 28 Transcript of teacher's links with previous lessons

In the second example, the teacher deliberately and spontaneously seized an opportunity during Working Phase II to revise something taught previously. The

ESOL students recognised this because the teacher used the same phrasing and formulaic expression as when it was first taught. Reiteration of points in this way is very helpful for all students, and particularly ESOL students, by restating important points in new but relevant contexts. In this way the teacher reminds students that learning is not discrete, but interrelated and contributing to a whole.

(b) Use of prior knowledge

The central activity of this lesson was the students’ writing down ideas about a list of essay topics that the teacher had put on the board. Inherent in this activity was the need for students to draw on their own knowledge and experience of things identified in the topics. Two examples are transcribed in Figure 29 below.

Lesson minutes	Learning phase	Teacher requires students to use their prior knowledge
20	Working Phase I	Teacher: <i>Paul, can you read out one of your ideas?</i> Paul: <i>The police serve and protect the people and the streets.</i> Teacher: <i>The police serve and protect the people and the streets. That’s an idea. Clear.</i>
24	Working Phase II	Christina: <i>Spain is a country that enjoys bullfights.</i>

Figure 29 Transcript of teacher’s use of prior knowledge

In both of these examples, students showed how they had applied their own individual prior knowledge to the exercise, turning topics into ideas. The value of this for the ESOL students was potentially strong, because it offered them a chance to contribute things of importance to them, from their distinctive cultural backgrounds, which does not happen in many classroom activities. In this way, the use of prior knowledge can affirm the relevance of ESOL students’ experiences, in an environment where they often feel estranged.

7.3.3 Dramatic techniques: Roleplay

Dramatic techniques are overt physical behaviours that might be used to enhance a verbal message. On the observation schedule they are divided into three: roleplay,

props, and gesture. These techniques can significantly facilitate the comprehension of oral language for ESOL students in particular. The Year 10 English teacher at School C used dramatic techniques much more often than did most other teachers in the study.

In particular, this teacher’s use of roleplay (item 76) was higher than any other teacher in the study, with a mean of 4.66 occurrences per lesson, compared with the mean frequency in all mainstream subjects of only 0.26, and a standard deviation of 0.97. In the lesson analysed here, two usages of roleplay were recorded, and these are transcribed in Figure 30 below.

Lesson minutes	Learning phase	Teacher’s use of roleplay
2	Input Phase	Teacher: <i>Take, er... in fact, Phillip, just give me one of the subjects from up here... one of the ones up here...</i> Student: <i>Um... Guns.</i> Teacher: <i>Guns... okay, I could... if I wrote an essay, or if I wrote about guns, if I wrote... (in monotonous, flat, slow voice of a school boy, reading out his unintelligent essay) There are all kind of guns. There are big guns and there are small guns. There are guns that make a big bang and guns that do not make much of a bang at all. There are guns that are black and there are guns that are silver and there are guns that you can hold in your left hand... and there are.... This is really just a list, isn’t it?</i>
18	Working Phase I	ESOL student: (to teacher individually): <i>What is this?</i> Teacher: (to ESOL student) <i>Shouting... Ah...</i> (then to whole class) <i>Excuse me everybody... Excuse me everybody... (Maniacal screaming which is unable to be typographically represented here)... You’re shouting...</i>

Figure 30 Transcript of teacher’s use of roleplay

In the first transcribed use of roleplay, the teacher assumed the persona of an archetypal low-performing student. He imagined how this student’s essay might be, and using the voice and demeanour of such a student he gave this as an example to the class of the undeveloped ideas many of them presented in their essays. By doing this, many students were more likely to understand what was wrong with an essay like this, because the teacher acted the role in such a realistic and recognisable way. However, as far as ESOL students, and even the lower ability native-speaking

students, are concerned, it would seem unlikely that they would have been able to perceive the specific problems demonstrated by the roleplay. It would be more helpful to many students to have seen this example in print, perhaps on the whiteboard or an overhead transparency, so that they could closely identify the shortcomings of the ideas. There was also an excessive number of sentences in the roleplay, which was likely to overwhelm ESOL students by their quantity. Most probable is that students who recognised this problem from the oral roleplay, were already the students who write better essays. The students most in need of this analysis probably were not able to understand exactly what was wrong with an essay like this, just from an oral roleplay. A combination of roleplay and a written form of this example would have been more effective.

In the second example, however, the teacher used roleplay to very clearly demonstrate the meaning of a word. During Working Phase I, while the class was working individually on turning topics into ideas, an ESOL student asked the teacher what *shouting* is. Rather than confuse the student with an extensive verbal definition, the teacher chose to illustrate it by doing it. This roleplay was extremely dramatic, highly amusing for the whole class, and likely to be long remembered by the ESOL students.

7.3.4 Summary

The teacher of this Year 10 English class used oral and visual language confidently and vibrantly to mediate the text he had written on the board about how to improve the quality of ideas in essays. The lesson was lively and generally focused, mostly well-tailored to the learning needs of these students, with the effect that most would have learnt much more about this important aspect.

7.4 A Year 13 ESOL lesson

There was only one student in this Year 13 ESOL class, which was timetabled four times a week. As such, the teacher worked on an individualised programme with the student, tailored to her specific language learning needs. The teacher was female,

employed part-time by the school only to teach the ESOL programme. She also worked elsewhere as an ESOL tutor. The ESOL student was a Japanese private fee-paying student, in her second year at the school. All of these factors constitute a common situation in New Zealand secondary schools.

Three activities with text occurred in this lesson, which was the second of the three observed. In the first activity the teacher read aloud an article about language that she had found in the local newspaper. She interrupted this reading frequently to explain and relate the article to the student. The second and third activities required the student to write. These tasks were prescribed by a textbook, but used the personal experiences of the student as content. The dominant writing task in the lesson was a personal letter about a racist incident the student had experienced recently at school. In these tasks the teacher worked closely with the student in the composition of her written work. The lesson structure is summarised in Figure 31 below.

Lesson minutes	Learning phase	Duration	Activity
0 – 5	Input Phase	5 minutes	Teacher read aloud a newspaper article about language.
5 – 30	Working Phase I	25 minutes	Student wrote a letter to a friend on a set topic, racism. The task was set in a School Certificate English revision book. The teacher helped the student by working closely with her on each step.
30 – 38	Working Phase II	8 minutes	Student read aloud the letter she had just written.
38 – 45	Working Phase III	7 minutes	Student started writing a description of Disneyland.

Figure 31 Year 13 ESOL lesson structure

The teacher’s language in this lesson was remarkable for her use of some very important techniques that elsewhere recorded such a low usage in this study that they fell below the 1.00 mean frequency criterion for discussion in chapter 6. These techniques are inferences, metaprocess questions, and reaction to the form of student input. Other outstanding features of this lesson are the teacher’s extensive discussion of sociolinguistic aspects of language, and the amount of conversation instigated by the teacher.

7.4.1 Sociolinguistic content

Sociolinguistic content (item 18) is defined in the expanded observation schedule as referring to the appropriateness of forms/styles for particular contexts. In mainstream classes in this study only an infinitesimal part of lesson content dealt with such references, with a mean frequency of only 0.09 instances recorded per lesson. Even in ESOL classes, where a much greater proportion might be expected, the mean frequency was only 1.99 references per lesson. In this particular Year 13 ESOL lesson, however, eight sociolinguistic references were recorded. Three of these are transcribed below in Figure 32, with discussion following.

Lesson minutes	Learning phase	Teacher’s sociolinguistic reference
6	Working Phase I(A)	Teacher: <i>Okay, so that’s what we’ve done... we’ve made our tree diagram... And now we’re up to writing the first two or three sentences... If you choose to write a letter to a friend... would you want to write a letter to... to Chico? ... or to me? ... or do you want to write an essay? ...</i> Student: <i>I um... I was um... I write... Do I have to write like... write about... you know...</i> Teacher: <i>Well, you can choose... do you want to write it as... um... as an essay? ... or do you want to write it as a letter ?... Which would be easier?</i> Student: <i>A letter.</i> Teacher: <i>A letter. Okay... So this is where we get back to using that very informal language... so you can use contradictions... ah, contractions, not contradictions... contractions...</i> Student: <i>Yeah... okay</i> Teacher: <i>Okay.</i>
15	Working Phase I(B)	Teacher: <i>So he did that...he did this by, um... making his eyes... You don’t want to say he made his eyes look like Japanese eyes, do you? Cause your eyes aren’t like that...</i>
25	Working Phase I(C)	Teacher: <i>Because it’s a letter you can say personal things like... “You wouldn’t believe... what happened when he did this...” You wouldn’t say that in an essay to a teacher, but you can say it in a letter to a personal friend...or your sister... “You wouldn’t believe what happened when he did that” would be a good way to start a new paragraph... and then you can introduce the laughing...</i>

Figure 32 Transcript of teacher’s use of sociolinguistic reference

These examples all focused on the use of appropriate language for personal letter writing. In the first example, in Working Phase I(A), the teacher first offered the student a choice of genre, either an essay or a letter. When she asked, *Which would be easier?* she was alluding to the linguistic requirements of each of these genres. The student's choice of letter-writing probably indicates that she felt more competent with informal language than formal. The teacher's response, *This is where we get back to using that very informal language*, indicates that they had discussed appropriateness of language before.

In Working Phase I(B), the teacher subtly made a point about the inappropriateness of racist language, when she suggested, *You don't want to say he made his eyes look like Japanese eyes, do you? Cause your eyes aren't like that....* Her suggestion leads the student into a consideration of a more appropriate way of expressing this idea.

Twenty-five minutes into the lesson, in Working Phase I(C), the teacher discussed the sociolinguistic nuance of a specific phrase, *You wouldn't believe what happened....* She explained the different levels of formality by comparing an essay with a personal letter, using this phrase as an example of what is appropriate for one but not the other.

Sociolinguistic references like these are very helpful for an ESOL student, because they explicitly explain subtle differences in the effect of language in context. This is a vital aspect of language learning, in which all subject teachers should assist students within their subject specific contexts.

7.4.2 Conversation

Conversation (item 60) is one of the aspects of phatic communion recorded on the observation schedule. It can make an important contribution to second language learning by establishing a relaxed relationship between teacher and students, which encourages ESOL students to take more opportunities to practise their oral expression, as well as feeling comfortable about asking the teacher for help if

necessary. Overall, there was a disappointingly small amount of conversation between teachers and their classes in this study, with a mean of only 0.48 per lesson, and a standard deviation of 0.86. Both mainstream and ESOL classes recorded a similarly low usage of conversation. This Year 13 ESOL lesson had a higher incidence, though, with two extended usages recorded. One of these is transcribed in Figure 33 below. It demonstrates how conversation can be used by teachers to enhance the learning environment for second language students.

Lesson Minutes	Learning phase	Use of conversation
10	Working Phase I	Teacher: <i>While you're printing that out I'll just tell you... my sister rang me last night from London... telling me how her wedding went... she's just got married last weekend.</i> Student: <i>Really!</i> Teacher: <i>Mmm.</i> Student: <i>Oh! Didn't you go there?</i> Teacher: <i>No.</i> Student: <i>Oh, how about your parents?</i> Teacher: <i>No...</i> Student: <i>Oh, okay!</i> Teacher: <i>...but she's coming out to New Zealand with her husband... that's funny I've got a brother-in-law...next summer... so...</i> Student: <i>Oh! That's exciting!</i> Teacher: <i>It is exciting...</i> Student: <i>What... didn't you do anything for her?</i> Teacher: <i>... I rang her up on the day that she got married... she was a bit nervous...</i> Student: <i>Mmm.</i> Teacher: <i>...but my uncle and aunt and cousins all went to the wedding...</i> Student: <i>Oh, okay.</i>

Figure 33 Transcript of teacher’s use of conversation

One very helpful feature of this dialogue was the extent to which it engaged the ESOL student. More than any other part of the lesson, this conversation captured the student’s genuine interest, creating a communicative need in her. Because the student was keen to know about the topic that the teacher had raised, her sister’s wedding, the student asked several specific and well-phrased questions to find out more:

Didn't you go there?

How about your parents?

Didn't you do anything for her?

As such, this conversation gave the student valuable practice in developing a personal relationship by extending a topic. This type of practice has a positive impact on a second language learner's confidence in her own communicative competence, especially when it arises spontaneously, as this conversation does. Being able to converse clearly about an impromptu topic is a relatively advanced language skill.

This conversation also illustrates the opportunity for an ESOL student to practise giving appropriate feedback, which is another valuable skill for a second language learner. The student's *Really!* was a typical response designed to encourage a speaker to tell more. When she responded, *Oh, okay!*, the speaker showed that she understood the implicit subtext of the speaker's preceding statement. The student's *That's exciting!* played an important role in confirming the personal relationship between herself and the teacher, by showing that she shared the feeling that the teacher was obviously experiencing.

This example demonstrates that this ESOL student had acquired many of the important finer points of conversation in English. The opportunity for second language learners to practise this skill should be part of every lesson during the school day. Teachers should not underestimate the value of conversation in the classroom.

7.4.3 Explanation and summary techniques

(a) Inferences

This technique (item 81) is used by teachers in explanation or summary. Essentially, it involves making connections between parts of content. It is a very important part of learning, since inferences result from higher cognitive thinking. One would expect to find extensive evidence of inferential thinking in senior secondary school

classrooms, but the mean frequency in this study was extremely low; only 0.72 per lesson with a standard deviation of 1.14, with no significant difference between mainstream and ESOL classes. In this Year 13 ESOL lesson, however, there were five significant inferences recorded. They are transcribed in Figure 34 below. Whilst many of these were expressed as questions, they mostly operated as guiding the student into inferential thinking.

Lesson minutes	Learning phase	Teacher's use of inference
13	Working Phase I(A)	Teacher: <i>So now you want to tell her how he did that...</i>
18	Working Phase I(B)	Teacher: <i>So, you were surprised... that the school didn't... do anything to stop him doing it...</i> Student: <i>Yeah, 'Cause Miss F. was there... and she was organise...</i> Teacher: <i>Mmm... they might not have known he was going to do that... And she may have been embarrassed when that happened... we don't know that, do we?</i>
20	Working Phase I(C)	Teacher: <i>So now talking about racism... Do you think that... he probably doesn't have a lot of... good feelings for Japanese people if he can do that? Do you think I would do that?</i> Student: <i>No.</i> Teacher: <i>No. So, how do you think he feels about Japanese people? ... Do you think if he had a Japanese friend or he'd been to Japan...</i> Student: <i>Or maybe watching tv or something...</i> Teacher: <i>...that he wouldn't have done that?</i>
23	Working Phase I(D)	Teacher: <i>Now, racism isn't something that you've come up against in (name of the town), is it? No one's done anything like that before...? So... that was the first thing that upset you, wasn't it?</i>
26	Working Phase I(E)	Teacher: <i>So, now we get to the really tough one... the part about emotions... how it made you feel...</i> Student: <i>Yeah.</i> Teacher: <i>Now, they say that before you feel anger... before you get to anger... you feel something else first...</i> Student: <i>Sad?</i> Teacher: <i>Yes, sad... Hurt?</i> Student: <i>Mmm.</i> Teacher: <i>Okay, so this is where you can talk about how you felt... and what your friends said to you.</i>

Figure 34 Transcript of teacher's use of inference

In the Working Phase I(A) example, the teacher made a connection between what the student said a visiting speaker to the school did, and the way he did it. Her emphasis on *how* made this inference clear.

The second example, in Working Phase I(B), is a fine example of the way a teacher can use language to prompt a student to think more analytically. She began by restating an idea that the student had already attempted to explain:

So, you were surprised... that the school didn't... do anything to stop him doing it...

But then the teacher took that idea and developed the student's thinking on it by presenting two new salient points that linked with the student's expression of surprise that the school had not stopped this visitor's racist behaviour:

They might not have known he was going to do that...

She may have been embarrassed when that happened...

In this example, the teacher developed the student's thinking about the incident by introducing other relevant ideas from which inferences could be drawn.

In Working Phase I(C) the teacher used inference to encourage the student to think more carefully about how to explain the visiting speaker's racist behaviour.

Do you think that... he probably doesn't have a lot of... good feelings for Japanese people if he can do that?

She then approached the same idea from a much more personal angle, knowing that the student would confidently know the answer to this question:

Do you think I would do that?

This lead naturally into the inference that the visiting speaker would not be racist if he had the sort of relationship that the teacher and student clearly had:

Teacher: *Do you think if he had a Japanese friend or he'd been to Japan...*

Student: *Or maybe watching tv or something...*

Teacher: *...that he wouldn't have done that?*

In the fourth example, in Working Phase I(D), the teacher made an inferential connection between the student's experience with the visiting speaker and her overall

experience as a newcomer to the town. She used this to point to the next main idea for the letter, that this incident was the first time the student had experienced racism in this country:

Teacher: *So... that was the first thing that upset you, wasn't it?*

The final example of inference, in Working Phase I(E), shows how a teacher can lead a student's thinking into a broader analysis of an experience:

Teacher: *Now, they say that before you feel anger... before you get to anger... you feel something else first...*

The student and the teacher then identified two emotions, *sad* and *hurt*, rather than just the one that the student might more likely have named. The teacher's next comment also developed the student's ability to make inferences in her letter-writing, by identifying two stages in the structure of ideas at this point:

Teacher: *Okay, so this is where you can talk about how you felt... and what your friends said to you.*

These examples of inference demonstrate how teachers can help ESOL students in particular to extend and deepen their thought processes, and consequently their use of language, during a writing exercise. It is interesting to note that the teacher did not need to use complex language, which would have confused the student. Rather, she helped the student to think inferentially through the careful selection and connection of ideas.

7.4.4 Enquiry techniques

(a) Metaprocess questions

Teachers use this enquiry technique (item 94) to focus student attention on learning strategies. Given the exponential growth of information in the past century, and that what one needs to know today is mainly the processes and procedures of how to find and apply knowledge, one would expect metaprocess questions to have a strong presence in senior secondary school classrooms. However, the mean frequency per lesson of all subjects observed in this study was an extremely low 0.25 metaprocess

questions per lesson, with a standard deviation of 0.59. What is most disturbing is that 70 per cent of the subjects observed showed no recorded use of this type of question at all. ESOL classes scored slightly higher than mainstream classes in their recording of this technique, with mean frequencies of 0.83 and 0.15, and standard deviations of 1.1 and 0.42 respectively. The teacher of this Year 13 ESOL class, however, used metaprocess questions on seven occasions that were significant enough to be recorded. Five of these are transcribed below in Figure 35.

Lesson minutes	Learning phase	Teacher's use of metaprocess questions
8	Working Phase I(A)	Teacher: <i>You probably want to start off with where it happened... or how it happened, do you?</i>
14	Working Phase I(B)	Teacher: <i>Do you know why we put commas in? So, if we took out "towards these people", which is between the commas, it would read "but he pretended to be a Japanese person". Would it still make sense?</i>
17	Working Phase I(C)	Teacher: <i>So you want to now write about how he did it, do you? And then you can say that you were surprised that the school didn't do anything to stop him doing it?</i>
19	Working Phase I(D)	Teacher: <i>Perhaps you could talk about how that made you feel...</i> Student: <i>Yeah.</i> Teacher: <i>Oh, no...cause we're talking about the racism ... So... by doing that... what was he doing?... by making funny eyes and speaking funny...funnily...how would that...how did that make you feel? He wasn't being very nice about Japanese people... or Asian people, was he?</i>
23	Working Phase I(E)	Teacher: <i>Do you think he would have done it if he had some kind of contact with someone from Japan?</i>

Figure 35 Transcript of teacher's use of metaprocess questions

In the first metaprocess question, the teacher helped the ESOL student focus on the structure of the letter she was writing. The question asked about a clearly defined stage of writing, *start*, and identified two prospective elements of content, *where it happened ... or how it happened*. In this way, the teacher's metaprocess question during Working Phase I(A) encouraged the student to sort her thinking about the event in a logical way, before trying to put her thoughts into written words.

The third example, in Working Phase I(C), continued the use of metaprocess questions for this purpose. Further structural components of the letter were identified in the teacher's questions:

So you want to now write about how he did it, do you?

*And then you can say that you were surprised that the school didn't
do anything to stop him doing it?*

It should be noted that although this used a declarative syntax with the usual subject verb word order of *you can say* and *you were surprised*, rather than an interrogative syntax (*Can you say...?*) with the inversion of subject and verb, the teacher's rising intonation clearly indicated that here she was asking a question.

A different purpose was demonstrated in the teacher's metaprocess question in Working Phase I(B) though. *Do you know why we put commas in?* helped the student consider the precise meaning of what she had just written, by focusing on the syntax of the sentence, through reference to punctuation. The technique was repeated at the end of the explanation, with *Would it still make sense?* Such questioning built up the ESOL student's writing strategies, because it modelled a way for the student to make future decisions about the use of commas and inserted phrases in her writing.

The last two examples in Figure 35 above reveal the way that metaprocess questions can be used to help students learn to sort their ideas more clearly. The necessity of clarity of thought as a learning strategy for writing cannot be overstated, and this ESOL teacher used metaprocess questions to challenge and extend the student's preparatory thinking, as she worked orally with her ideas before shaping them into writing. Again, the teacher began, in Working Phase I(D), by focusing on the structure of the letter, and relevant content:

Perhaps you could talk about how that made you feel...

Cause we're talking about the racism...

However, then the teacher posed a series of questions that encouraged the student to focus on isolating exactly what thoughts were most relevant to the point she was trying to make in this part of the letter:

What was he doing?

How did that make you feel?

*He wasn't being very nice about Japanese people... or Asian people,
was he?*

In Working Phase I(E), the teacher was still using metaprocess questions in this same way:

*Do you think he would have done it if he had some kind of contact
with someone from Japan?*

This question was pointing the student towards the inferential thinking that was a necessary strategy in producing an effective letter explaining this experience to a friend.

The key message from this teacher's use of metaprocess questions is that they are extremely helpful not just to ESOL students, but to all students, in their insistence that students focus on the strategies that enable them to learn.

(b) Reaction to student input: Form

For ESOL students in particular, there is a useful role for teachers' reaction to form, or to their use of English. Obviously, for much of the time it is better for teachers to simply accept the content of an ESOL student's contribution to class discussion in order to encourage active participation. Negative reaction to the language used can have a severely inhibiting effect, humiliating the student, and causing withdrawal from oral participation. However, positive reaction to students' language can build confidence, if it is sensitively handled and not patronising.

Unfortunately, in all the subjects in this study an extremely low mean frequency of only 0.61 reactions to the form of student input (item 95) was recorded, with a standard deviation of 1.76. There is a marked disparity, however, between ESOL and mainstream classes. ESOL classes recorded a mean of 3.98 such reactions per lesson, with a standard deviation of 3.02, compared to mainstream classes' mean frequency of 0.02, with a standard deviation of 0.09. In fact only 9 per cent of the mainstream subjects in this study recorded any teacher reaction to student form at all.

This supports the findings of this present study concerning teachers' use of word definitions (item 65), as discussed in section 6.3.3 (e), which seem to indicate that mainstream teachers do not recognise their role as teachers of the language of their subject. The Year 13 ESOL teacher at School D had the highest number of reactions to student form, with ten significant instances recorded. Five of these are transcribed in Figure 36 below.

Lesson minutes	Learning Phase	Teacher's reaction to the form of student's input
9	Working Phase I(A)	Student: <i>I'm going to tell you... it happened...?</i> Teacher: <i>Yep... what happened.</i>
19	Working Phase I(B)	Student: <i>He made... eyes? ... He made... funny eyes.</i> Teacher: <i>Made funny eyes... that's good.</i>
24	Working Phase I(C)	Teacher: <i>So, how can you put that into words?</i> Student: <i>Mmm... He had a... friend from Japan?... he wouldn't do that?</i> Teacher: <i>That's right.</i>
25	Working Phase I(D)	Teacher: <i>Something between the I and the v... there it is!</i> Student: <i>Oh.</i> (Writes in an apostrophe.) Teacher: <i>That's it!</i>
30	Working Phase I(E)	Student: <i>Can I put "But my friends...?"</i> Teacher: <i>Yes, you could do "but"... you need a conjunction in there of some description...</i>

Figure 36 Transcript of teacher's reaction to form

The first four of these reactions served the function of reinforcing and encouraging the student's input, in simple and unobtrusive ways. In the first two examples, the student was not entirely certain of her expression, and the teacher's responses offered explicit positive endorsement, to encourage the student to continue writing:

Yep...

That's good.

The teacher's responses in Working Phases I(C) and I(D) also used very simple expressions to reinforce the student's use of appropriate form:

That's right.

That's it.

It should be noted here that whilst most teachers use these particular phrases often, they are usually in reaction to the content or message of the student's input (item 96 on the observation schedule), rather than to the form.

At times, though, a teacher needs to help the student modify the form of language used. For example, the teacher's reaction in Working Phase I(A), provided a minor correction:

What happened. (what rather than it)

The example in Working Phase I(E) in Figure 36 above shows how a teacher can react to a student's language in an equivocal way. The first part of her reaction was a positive acceptance of the student's expression:

Yes, you could do "but"...

However, the teacher followed this with a declarative statement indicating that maybe the student's choice of conjunction was not ideal:

*You need **a** conjunction in there of some description...*

Her emphatic *a*, shown here in bold print, and pronounced / ei /, revealed this. This fulfilled the dual function of both encouraging the student's initiative in suggesting how to express this idea, as well as presenting the teacher's viewpoint that there might have been an even better way of expressing this.

These examples illustrate how easily teachers can help students improve the quality of their language. The positive acknowledgement of effective language can encourage students to continue to improve their expression in any curriculum area. Nevertheless, it should be acknowledged that the one-to-one relationship afforded by this sole pupil class is rarely available to mainstream classes. The issue of class size as it affects ESOL students in particular cannot be ignored.

7.4.5 Summary

This Year 13 ESOL lesson modelled how a teacher may use language to mediate text with a particular focus on the student's language. This attention is especially helpful in the second language learning process, and ideally should also occur in mainstream classes to some extent.

7.5 Conclusion

The three lessons analysed in this chapter reveal many effective examples of teacher mediation of text. They portray how many common techniques are used, as well as demonstrating how some of the less frequent techniques can contribute to a better comprehension of text by ESOL students. Inevitably such interactions around text can make a major contribution towards native-speaking students' comprehension of text as well.

Chapter 8

Conclusions

This study worked with observations of classroom practice in 80 lessons over five weeks with 27 classes in five secondary schools. In each school, an ESOL student was followed through his or her timetabled programme, to gather data on the language of textual interactions experienced by such students. The results of these observations reveal some very effective teacher mediation of text, as well as some that is disturbingly ineffective. The implications of this study generally, for pedagogy, and for research, are discussed in this chapter.

8.1 General conclusion

Teachers must increase their awareness of their role as mediators of the texts they use with students. Professional development in this field would benefit not only their ESOL students but all students in their classes. Learning from those teachers who already exhibit this awareness and demonstrate it in their teaching practices could be quite inexpensively and easily implemented. ESOL students themselves, if asked, are likely to be able to identify those of their teachers who manage textual interactions most effectively.

Teachers must also remember the importance of actively involving students in the construction of knowledge, especially providing frequent opportunities for students to use language to do so. This is one of the most helpful practices teachers can offer to the ESOL students in their classes.

In both of these areas, inter-curricular communication must occur, to share best practice amongst teachers. The usual senior secondary school focus of neatly packaged subjects should not obscure the commonality of all teachers as teachers of language. The role of ESOL teachers in schools could be expanded to facilitate

discussion among all teachers about how best to fulfil this function of teaching language in mainstream classes.

8.2 Pedagogical implications

The findings of this study have some significant implications for the theory and practice of teaching. In particular, this study strongly supports a need for teachers to select a variety of text types for use in the classroom, to teach and reteach reading strategies, and for teachers to plan lessons that require students to engage actively in texts, especially for students to use more oral language when working on texts. These aspects are discussed in the next four sub-sections. Appendix P contains three practical lists for teachers. The first is *Six simple things teachers can do for ESOL students in mainstream classes*. The second is a series of thought-provoking points about *Teachers' Questions*. A *Selected reading list for teachers* is the third.

8.2.1 The value of variety of texts and text type

Very few authentic materials were used in classes in this study. To some extent this is a disadvantage to students, because authentic materials help students make links from their institutionalised learning to the real world. The use of authentic texts can highlight the relevance of learning, which is an area of common concern particularly in senior secondary school curricula. Furthermore, using some authentic materials boosts second language learners' confidence to be able to use the second language in the world beyond the classroom. All second language learners appreciate the feeling that developing competence in English can be carried over to daily transactions beyond school. This contributes considerably to feelings of success and achievement for ESOL students.

Additionally, most texts used in classes observed in this study, whether authentic or made for teaching purposes, were designed for use by native speakers. There was very little use of texts made specifically for second language learners. This can disadvantage ESOL students because the embedded context of texts made for native

speakers can present a difficulty for second language learners, as Clegg (1996) shows. Teachers need to recognise the cultural knowledge implied by most texts, and help ESOL students unpack this when necessary. It is likely that such an awareness would benefit all students in mainstream classes too, since increasingly native-speaking senior secondary students also struggle to comprehend many texts used in curriculum areas.

8.2.2 The need to teach reading strategies

This study shows that most teachers of mainstream subjects in New Zealand senior secondary school classrooms seem either to expect that their students can comprehend the text used, or not to know how to teach students reading strategies that will improve their comprehension of text. Goldman (1997) refers to many of these reading strategies:

- Identifying topic sentences;
- Mental imagery;
- Single-sentence rereading;
- Selective rereading of paragraph initial sentences;
- Reviewing initial and final parts of passages;
- Skipping ahead in the passage;
- Use of surface text cues (e.g. enumeration markers and paragraph indentations);
- Self-assessment of coherence and comprehension;
- Explaining and elaborating what is read;
- Integrating the text information with prior knowledge;
- Constructing logical relationships among ideas presented in the text.

However, she also cautions that “the success of various strategic learning activities is constrained by insufficient prior knowledge in the domain, working memory limitations, interest, or motivation” (1997, p. 362). Teachers should also remember to teach students genre-specific reading strategies. For example, narrative texts will often have a chronological structure, and make cause-and-effect connections between

events. Students can be taught to look for these and use them to develop their understanding. In expository texts, on the other hand, students should be taught to look for the assertion-evidence structure that is common in that genre.

Goldman (1997, p. 359) lists what she calls “learning-from-text problems” that often occur in a collaborative classroom environment, and that can be used to significantly develop advanced reading skills:

- Information search processes across multiple sources;
- Synthesising information across multiple texts;
- Learning material sufficiently to be able to explain it to one’s peers who have not read the material;
- Interacting in small groups about the meaning of text and solutions to problems.

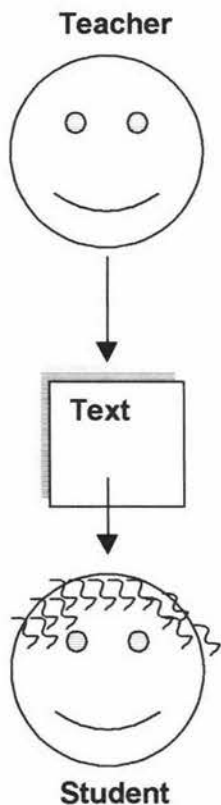
8.2.3 The value of active student engagement in text

Teachers spend a large proportion of each lesson with texts, but the question remains whether the considerable amount of time and energy expended on teacher talk reaps a commensurate increase in student comprehension of text. As Goldman (1997) suggests, students and teachers should interact in classrooms about the meaning of text and solutions to learning from text problems. The key concept here is interaction.

Too often, though, the mediation is uni-directional, from teacher through text to student. A truly interactive model would be more multi-directional. Figure 37 below compares the traditional, uni-directional model with a more interactive model. Chapter 1 discussed the importance of the facilitating classroom, or as Clegg (1996) describes it a “facilitating environment”, for ESOL students. This involves less dominance by teachers as receptacles of knowledge, and more emphasis on the students’ roles as seekers and builders of knowledge. Pedagogical literature, such as the works of Clegg (1996), Corson (1987), and Parkin and Sidnell (1992), shows that the greater the active participation of the student the greater the learning.

In order to have students working more collaboratively, teachers must structure tasks to ensure that this happens. This raises the issue of thoughtful and thorough lesson planning for collaborative activities. Without this planning, teachers will inevitably fall back on traditional methods, an automatic response based on years of educational experience both as a student and then as a teacher.

THE TRADITIONAL MODEL :



A MORE INTERACTIVE MODEL :

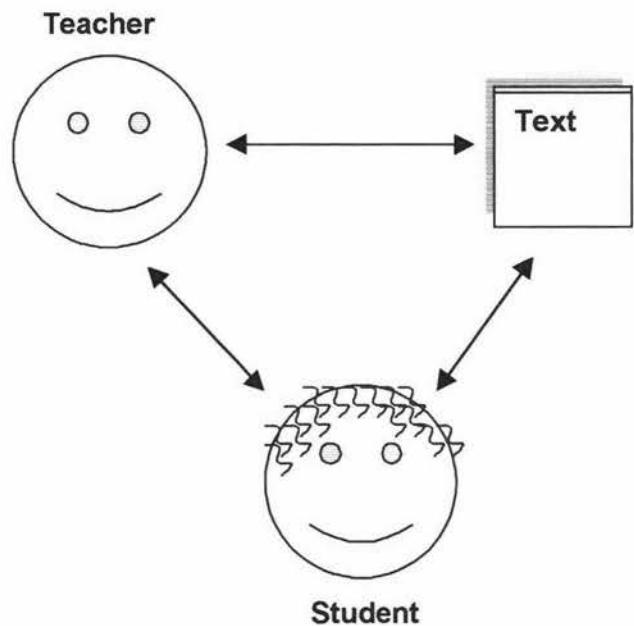


Figure 37 A comparison of traditional and interactive classroom models

In strong support of this approach, Goldman (1997, p. 371) writes: "Traditional models of education are falling short in producing the kinds of learning and literacy skills that are needed for an informed and skilled citizenry in the 21st century... The emphasis on individuals learning from content-area textbooks and 'telling' what they know...often results in knowledge that does not transfer to new situations." She argues for preparing students for "the team-oriented, collaborative work groups that

they are likely to find in the business world". She cites Collins' (1996) principles that are reflected in more interactive, constructivist classrooms:

- 1) Deep knowledge in a content area and conditions for acquiring it are important for effective thinking, problem-solving, and learning.
- 2) Fluent enabling skills (e.g. reading, spelling, and computing) are fundamental to knowledge acquisition.
- 3) Authentic, meaningful problems are highly motivating to students.
- 4) Feedback, and opportunities to revise one's work based on that feedback, enhance students' learning.
- 5) Social structures that encourage learning are those that help students feel valued and respected.

(Goldman, 1997, p.372)

8.2.4 The value of student speech in the classroom

Teachers should ensure that their programmes allow students plenty of time to use language: that is to produce it, not just to receive it. Second language learners especially need frequent opportunities to use the second language. This means:

- both speaking and writing;
- throughout the day;
- in each of the five hours of lessons attended at school each day.

In this way, ESOL students can learn to speak English by speaking English to learn.

Rubin (1975, in De'Ath, 1980, p. 14) describes two important qualities of a successful second language learner, which are "the strong desire to communicate" and "practising frequently". However, this study finds these two factors missing in many secondary school programmes for ESOL students in mainstream classes. All human beings have a strong desire to communicate, but for second language learners this desire may or may not also apply to their second language. Some ESOL students have an intrinsic motivation to communicate in English, whilst many others have an instrumental motivation, where English is perceived as a key component of

their future success. However, in some cases neither of these motivations is strong, making the teacher's role in developing motivation particularly important.

The need for language practice, the second quality identified by Rubin (1975), is paramount however. No matter how well second language instruction is delivered, without frequent practice the language acquisition process will be thwarted. As far as writing is concerned, the copying of notes does not fulfil second language learners' need to write. ESOL students need to practise using their English language skills to construct their own pieces of written language. This study finds relatively few opportunities for students in most classes to construct their own writing. Even less frequent are opportunities for students to use oral language. ESOL students participate more actively in ESOL classes than in other curriculum areas. However, students, parents, teachers, principals, and Boards of Trustees cannot expect three or four hours a week of ESOL tuition alone to give students sufficient practice using English to enable these students to perform well in other subjects. Therefore the importance of integrating language and content instruction is apparent. In addition to specific ESOL classes, English can be acquired simultaneously with subject matter by teaching students English indirectly through mainstream curriculum or content lessons. In America, the Sheltered Instruction Observation Protocol (Echevarria, Vogt, and Short, 2000) ensures suitably modified language of instruction for classes of ESOL students. In most parts of New Zealand small numbers of ESOL students make such classes uneconomic. It is even more vital, therefore, that teachers accept that all teachers are language teachers.

Mainstream teachers must recognise their role as language teachers, then, in encouraging all students, and particularly ESOL students, to speak more English in their classes. Inviting students to actively participate in the construction of their own learning provides an appropriate opportunity to enable this to happen. Coincidentally, it also provides the most effective model for all students' learning, as discussed in section 8.2.3. The value of student speech around text is expressed persuasively by Appel and Lantolf (1994, p. 449):

If comprehension as the construction of meaning is mediated activity, then it is essential to incorporate into instructional programs **post-reading** activities

that go beyond asking students questions about the content of the texts. These activities should engage students in talking about texts, not to ascertain if they have understood the text, but as a means of helping them to construct meaning from the text.

Goldman (1997, p. 385) endorses this approach when she reports that “curricular and instructional designs that explicitly encourage student use of multiple texts promote classroom conversations and student responses that involve deeper and broader knowledge and meaning construction”.

From their research, Wells and Wells (1984, in Edwards and Westgate, 1994, p. 167) suggest explanations for the “impoverished talk between teachers and pupils”. These are:

Large class size, which requires a “high percentage of talk devoted to management matters”.

A tightly-packed curriculum, which focuses on content that must “be covered to meet public expectations”.

A “less than whole-hearted belief in the value that pupils’ talk has for their learning”.

The first of these explanations is certainly supported to some extent by the findings of this study. Whilst it is not necessarily classroom management that is the main topic of teacher talk, the figure in Appendix K clearly shows that as class size increases, the oral output of ESOL students in particular decreases.

In the second explanation, Wells and Wells (1984) identify a common complaint of senior secondary school subject teachers, that there is too much content to be covered in too little time. This means that teachers naturally tend to resort to what they perceive is the most efficient mode of content delivery: a substantial textbook, copious board or overhead transparency notes, rapid oral explanation and summary by the teacher, followed by a small amount of class time for students to work on the material, and a lot of homework time expected to complete this. Yet most of these teachers freely acknowledge that whilst they “get through” the content, students frequently do not really learn much of it very well. Taking a more student-centred approach, incorporating more opportunities for students to talk about their learning,

may take longer, but is likely to produce more thorough learning with better results in the long term. The third of Wells and Wells' (1984) explanations, that teachers do not fully value pupils' talk, seems to be supported strongly by this study, since so little time is allowed in class for students to talk about the learning. Surely, if teachers valued student talk more they would facilitate this, ensuring it was incorporated into every lesson.

8.3 Research implications

The most important limitation of this study is its inability to measure the effect and effectiveness of teacher mediation of text, even though it seems clear to the researcher that some teachers' practices have a more profitable impact on students than others. This impact can be detected in observable phenomena in students such as their non-verbal displays of interest, their verbal responses, and their ability to do the work. Nevertheless, this impact cannot be quantified by the methodology of the present study.

Future research might take a process-product approach, in an attempt to make a more precise connection between teacher verbal behaviour around text and learning outcomes. For example, specific language techniques identified by this study as playing a significant part in teachers' textual interactions could be the focus of an observation programme, and correlated with various measures of students' comprehension of the text. This could reveal more about the helpfulness of teachers' textual interactions to ESOL students, or in other words whether these interactions do create more comprehensible input for these students.

Another suggestion for future research arising from this study is a narrower, macro-analysis of textual interactions. Detailed transcriptions could reveal in more detail how teachers use language to mediate text. Stimulated recall could then be used with the ESOL students to produce evidence of their response to these specific mediations.

Whilst this study has focused on teacher interactions with text, another study might well consider how students themselves interact with text. Under the majority of current classroom practices from the evidence of this study, however, this could be rather a barren field since in so many cases student interaction is minimal.

The influence of culture is a further aspect beyond the scope of this present study that could provide valuable insights. This study followed ESOL students from Brazil, Cambodia, Hong Kong, and Japan. Many ESOL students at the schools in this study also come from Polynesian and Melanesian Pacific Islands, as well as many European countries. How do the different cultural backgrounds of ESOL students affect both teachers' strategies in textual interactions and the ability of such students to benefit from these? Further research might investigate the influence of various cultural factors on learning from text in New Zealand classrooms. These cultural factors include attitudes to the role of teachers and students, social distance between the first and second language cultures, and the acculturation process.

Complex factors are at work within a classroom context, but this research has brought the focus onto the teacher. Professional development programmes should help teachers develop their awareness of successful methods of mediating texts with students. Perhaps crucial future research, in the light of the findings of this study, is the area of teacher beliefs. What do teachers believe about sources of knowledge; about the role of text; about what students bring to the construction of knowledge in the classroom? These questions would investigate the role of teaching style, personality, and philosophy in presenting texts to students.

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Appendix A

Observation schedule (reduced from two A3 pages)

Lesson Topic:

Duration of Visit:

[illegible]

[illegible]

[illegible]

Appendix B

Expanded observation schedule

(reduced from two A3 pages)

Item	Explanation of this item.
1	
2	
3	
4	
5	
6	
7	
8	Procedural directives (eg There's too much noise.) Including imperatives.
9	Disciplinary statements/directives/negative sanctions
10	"a point in conversation at which the talk is 'put on hold' while a problem is sorted out" (Lynch, 1996, p. 9)
11	
12	
13	
14	including questions such as "Who got more than half right?"
15	reference to grammar, vocab, pronunciation
16	reference to functions/communicative acts (asking, apologising)
17	Reference to how sentences > coherent sequences eg describing a process
18	Reference to appropriateness of forms/styles for particular contexts
19	intra-textual
20	making connections with knowledge beyond the text; prior/domain knowledge
21	Topic or task is determined by teacher or the text.
22	Topic/task is jointly decided by teacher, students and/or text.
23	Student(s) determine the topic/task.

24	tick main modes only (one or two). Indicate lesser modes in brackets.
25	
26	
27	
28	eg drawing, acting, creating a display etc
29	eg captions, isolated sentences, word lists etc, including on whiteboard
30	stories, dialogues, paragraphs, extended sentences
31	recorded for listening (NB. NOT listening to teacher/students)
32	pictures, cartoons etc on paper/whiteboard etc.
33	film, tv, stage drama etc.
34	specifically designed for L2 teaching eg. course books, exercises, etc.
35	originally intended for native speakers
36	native-speaker materials which have been adapted for L2 purposes
37	materials created by the students eg stories, reports etc
38	not designed specifically for use in classrooms (including most fiction)
39	devised for a specific educational purpose
40	includes recap of recently-learned information
41	revisiting previously learned vocabulary
42	ie. domain knowledge, not recently learned in the class; eg. listening "goes beyond the input" (Lynch, p.13)
43	connections across several texts which "help make the text more understandable by providing more context"(Lynch, p. 24)
44	
45	
46	
47	
48	re-reading aloud an excerpt of text which summarises; or oral recitation of previously-devised summary?
49	rewrite text by copying from the board, book, OHT etc.
50	written questions on the text (on board or handout)
51	teacher gives oral or written answers for students to check accuracy of their own answers
52	
53	list new vocabulary/new information
54	
55	interactive elicitation designed to trade information (Nunn, p.48)
56	eg make a diagram, chart, map, graph etc

TEACHER INTERACTION

57	
58	includes negotiation of meaning
59	
60	
61	follows a request; is easily anticipated and known to questioner
62	COLT p68 Tell something students don't know in advance, about language or content, including management/disciplinary directives
63	utterance consists of only one/two word fragments, long phrases, or one/two main clauses or sentences
64	utterance consists of at least 3 main clauses
65	
66	used to apply formal language of knowledge to students' personal world
67	extra information/explanation in an attempt to simplify - includes oral use of vocabulary not in written text
68	to add extra information about topics for which background knowledge is required
69	either oral or written (on board /OHT) list
70	Halliday & Hasan's 5 types: reference; substitution; ellipsis; conjunction; lexical cohesion (Emmitt, Pollock, Limbrick, p. 101)
71	repetition of a reference generally by use of a pronoun; reference to existing entity
72	to show comparative importance or relationship between words/ideas.
73	systematic reproduction of text
74	eg reading > oral; oral > whiteboard
75	illustrate with examples from students' real world; exploit real-time events to relate to material: analogy
76	
77	
78	
79	eg "I did point out (Wellington) on the map yesterday." (Cazden, p 41)
80	explain how idea is constructed/how information might be remembered
81	making connections
82	indicating next step/lesson
83	(NB macrostructure = embedded support devices / coherence conventions = overall organisation of text)
84	
85	
86	
87	

88	to get student to display knowledge already known to teacher - often recently acquired by student (Nunn, p. 23)
89	teacher does not necessarily know what to expect in answer; which refers to the student's 'real world' (Nunn, p. 24)
90	scaffolding questions (Cazden, p. 109) ie. preface the question with utterances which orient the student to the answer
91	when the answer is wrong, teacher rephrases, generally to make it more specific (Cazden, p. 42)
92	eg "Can you come up & put Wellington on the map?" (Cazden, p. 41)
93	Teacher does not expect a response; intended for consideration by students, for later application of idea
94	eg "How did you know that?" eg "What are you doing when you skim read?" - focus on learning strategies
95	reaction to language used by student
96	reaction to content of student's contribution
97	linguistic or factual correction of student's utterance; indication of incorrectness
98	full or partial repetition of student's utterance
99	reformulation of student's utterances (incl. Translation)
100	positive or negative response to student's utterance - not correction
101	extension of the content of student's utterance; or addition of information that is related to it
102	indicates that student's utterance was not clearly understood by teacher and a repetition or reformulation is required
103	request for further information related to subject matter of student's utterances
104	"speaker attempts to ascertain whether s/he has heard or understood something interlocuter said" (Long (1983) as below)
105	"speaker(teacher) checks whether interlocutor (student) has understood something" (Long (1983) cited in Ellis, Tanaka et al, p.188)

Appendix C

Letter to principals

26 January 2001

The Principal
High School
P.O. Box

Dear

I am conducting research into classroom interactions and would greatly appreciate your permission to observe in your school for one week early in Term 2.

Who am I?

I am Head of English at New Plymouth Girls' High School, but have won a Ministry of Education study award giving me leave for 2001, in order to research and write my M.A. thesis. I have 25 years experience in teaching English and ESOL, and have just completed my Post-graduate Diploma of Second Language Teaching from Massey University.

What am I doing?

My research is in the field of applied linguistics, specifically how teachers mediate texts, in order to bring texts to students, and students to texts. I have devised an observation schedule which comprises a detailed list of anticipated techniques that teachers might use in their classroom interactions.

I intend to conduct four consecutive days of observation at each of six secondary schools, at least four of which will be in North Taranaki. Initially I am contacting your school as well as _____, _____, _____, and _____. If all are agreeable, then that will comprise my sample of schools.

Who would I observe?

The survey will be conducted from the vantage point of the ESOL student in the classroom. One ESOL student in each school will be selected and I will attend all this student's regular timetabled classes for four days. I would like to be able to interview the student at the conclusion of the observation. In order to provide a valid sample for my research, the criteria for selection will be:

- (a) Ideally, the student is in **Year 11 or 12**.
- (b) English is the student's second or subsequent language; and the student has been **learning English for less than four years**.
- (c) The student receives **some timetabled ESOL tuition**, preferably but not necessarily in an ESOL class or small group rather than individually.
- (d) The student also attends **some mainstream classes** (eg English, Maths, Science, Geography, Accounting etc)

My observation of each class will record the incidence of specific interactions on an observation schedule. The observation schedule will list the anticipated interactions.

What I will be observing is not specifically the ESL student, but the teachers of this student; and with respect to the teachers, what I will be observing is the particular language strategies they use when presenting texts to students.

It is important that the teachers are NOT given **all** the details, to avoid any temptation to modify their teaching to meet any preconceived ideas they may have of what is desirable. It should be sufficient for the students and teachers to know that I am researching an aspect of classroom practice. I do not want teachers to be self-conscious of their language use especially.

I **attach** a copy of an Information Sheet and Consent Form for your perusal. Once a timetable is determined, I will provide copies of each of these for those concerned.

My assurance to you

I will comply with Massey University's Code of Ethics. My presence in the classroom will be as unobtrusive as possible. I will be an entirely non-participating observer. In my thesis, the schools, teachers and students will not be named, but described in generic terms only. The purpose of the research is not to judge, but rather to collate and generalise about the techniques used by teachers.

Outcomes

I expect to make some insightful and useful conclusions about the way teachers, in a wide range of curricula, use language strategies to present texts to students in the New Zealand secondary school classroom. On completion of this research (January 2002), I would happily provide you with a summary of my findings.

What next?

I would like to schedule my observation at your school from **Monday 19 to Thursday 23 March** inclusive, but am able to change this if required.

I will **ring you on Thursday 1 February** to confirm your willingness to participate in this research. If you will be unavailable, perhaps you could either ring me earlier, or leave a message with your office staff. Perhaps you could refer me to one of your staff (DP? Dean? ESOL teacher?) to make more specific arrangements.

Your support of this research is much appreciated. I look forward to visiting your school.

Yours sincerely

Sarah Davey.

Appendix D

Information sheet

M.A. research into interactions in the New Zealand secondary school classrooms of ESOL students.

Information Sheet

The Researcher

I am Sarah Davey, currently on leave from my position as Head of English at New Plymouth Girls' High School, in order to research and write my M.A. thesis.

Questions may be directed to me at :

My supervisor is Dr Margaret Franken, Convenor of Massey University's M.A. in Second Language Teaching. She may be contacted at :

Dept of Linguistics and Second Language Teaching, Massey University,
Private Bag 11222, Palmerston North.

The Research Topic

My research is in the field of applied linguistics, more specifically in the language used in classroom interactions.

I am conducting four consecutive days of observation at each of six secondary schools, at least four of which will be in North Taranaki. Initially I have contacted , , , , , . If possible, that will comprise my sample of schools.

The Participants

The survey will be conducted from the vantage point of the ESOL student in the classroom, throughout the students' regular timetabled classes. At least one ESOL student (or possibly a small group) in each school will be selected by the Principal or his/her delegated agent. In order to provide a valid sample for my research, the criteria for selection will be:

- (a) Ideally, the student is in **Year 11 or 12**.
- (b) English is the student's second or subsequent language; and the student has been learning **English as a second language for less than four years**.
- (c) The student receives **some timetabled ESOL tuition**, preferably but not necessarily in an ESOL class or small group rather than individually.
- (d) The student also attends **some mainstream classes** (eg English, Maths, Science, Geography, Accounting etc)

However, what I am observing is not specifically the ESOL student, but the interactions that occur within the class as a whole during the lesson.

The Observation Process

I will follow the selected ESOL student(s) through their school timetable for four days. During my observation of each lesson, I will be using an observation schedule which I have devised. It comprises a detailed list of anticipated language techniques that might be used in classroom interactions. I hope that lessons will proceed as usual, without any modifications due to my presence.

It may be useful, to tape- or video-record some selected lessons, or parts of these, for use in a discussion with the teacher or student after the lesson, although this is not my primary method of data collection. Comments elicited from some teachers or students in this way, about what they did / said, and why, may illuminate the data. Such discussions will take no longer than one hour, at a time to suit participants. This recording would only occur in the latter days of observation at any school. Please indicate your preference concerning recording on the Consent Form.

My presence in the classroom will be as unobtrusive as possible. I will be an entirely non-participating observer. In my thesis, the schools, teachers, and students will not be named, but described in generic terms only. The purpose of the research is not to judge, but rather to collate and generalise about classroom language techniques.

Massey University Code of Ethics asserts participants' right :

- ◆ to decline to participate;
- ◆ to refuse to answer any particular questions;
- ◆ to withdraw from the study at any time;
- ◆ to ask any questions about the study at any time during participation;
- ◆ to provide information on the understanding that your name will not be used unless you give permission to the researcher;
- ◆ to be given access to a summary of the findings of the study when it is concluded.

The Outcomes

I expect to make some insightful and useful conclusions about the language of the classroom, in a wide range of curricula, and its effect on the ESOL student. On completion of this research (January 2002), I will provide each participating school with a summary of my findings.

Your support of this research is much appreciated.

Sarah Davey.

Appendix E

Consent form

**M.A. research into interactions in the New Zealand
secondary school classrooms of ESL students.**

Consent Form

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at any time and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission. (The information will be used only for this research and publications arising from this research project.)

I agree / do not agree to the lesson being audio-taped.

I agree / do not agree to the lesson being video-taped.

I also understand that I have the right to ask for the audio-tape or video-tape to be turned off at any time during the lesson.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed: _____

Name: _____

School: _____

Date: _____

Appendix F

Samples of recorded and collated data

School D
Maths with Calculus
Year 13

Mean no. of students: 9

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
1	10	11	15	36	12
2					
3					
4					
5					
6	13	6	2	21	7
7		6		6	2
8	7		4	11	3.66
9			2	2	0.66
10	2		1	3	1
11			2	2	0.66
12					
13					
14	9	9	8	26	8.66
15			1	1	0.33
16					
17					
18					
19	19	11	10	40	13.33
20					
21		15	17	32	10.66
22					
23					
24	11	7	9	27	9
25		3	1	4	1.33
26		7	5	12	4
27	18	10	10	38	12.66
28					
29	19	15	17	51	17
30					
31					
32			7	7	2.33
33					
34					
35	19	15	17	51	17
36					
37					
38					
39	19	15	17	51	17
40	1	5		6	2
41	1	3		4	1.33
42					
43					
44					
45					
46			6	6	2
47					
48					
49	5		10	15	5
50	14	11	2	27	9
51	4	4	1	9	3
52					
53					

Teacher mediation: 73%
Textual interaction: 98%
ESOL student's oral output: 3.5%

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
54					
55					
56			5	5	1.66
57					
58					
59					
60		1	2	3	1
61		1	4	5	1.66
62	14	12	10	36	12
63	5	4	7	16	5.33
64	9	8	8	25	8.33
65	1		4	5	1.66
66		2		2	0.66
67	6	10	15	31	10.33
68					
69					
70			1	1	0.33
71			6	6	2
72					
73	1	3	5	9	3
74	9	5	11	25	8.33
75					
76					
77					
78	2	3	7	12	4
79	11	12	12	35	11.66
80			8	8	2.66
81			3	3	1
82	1	3	5	9	3
83					
84					
85	1	3		4	1.33
86					
87					
88	12	18	15	45	15
89		1	1	2	0.66
90		2	4	6	2
91	1	6	5	12	4
92		4		4	1.33
93	3	3		6	2
94			6	6	2
95			1	1	0.33
96	9	9	5	23	7.66
97	4	4	4	12	4
98	3	5	6	14	4.66
99	1		3	4	1.33
100	5	4	3	12	4
101	7	9	7	23	7.66
102		3	3	6	2
103		3	1	4	1.33
104		3		3	1
105	10	9	8	27	9
sub	115	150	180	445	148
total	286	303	349	938	312

School C
English
Year 10

Mean no. of students: 21

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
1	10	11	5	26	8.66
2					
3					
4			3	3	1
5					
6	8	6	4	18	6
7					
8	3	1	1	5	1.66
9	3	4	2	9	3
10	2	2	2	6	2
11	2	3	5	10	3.33
12	2	1		3	1
13	1			1	0.33
14	4	1	4	9	3
15			3	3	1
16					
17					
18		5		5	1.66
19	18	7		25	8.33
20			8	8	2.66
21	18	17	9	44	14.66
22					
23					
24	10	2	6	18	6
25	1	3	2	6	2
26	8	4		12	4
27	7	5	4	16	5.33
28					
29		10	9	19	6.33
30	18	7		25	8.33
31					
32					
33					
34					
35	18	17	9	44	14.66
36					
37					
38	18	5		23	7.66
39		12	9	21	7
40	3	1	3	7	2.33
41		1	1	2	0.66
42	2		7	9	3
43	1			1	0.33
44					
45	1	1		2	0.66
46	9	8		17	5.66
47					
48					
49	7	4		11	3.66
50		4	3	7	2.33
51	3	2	2	7	2.33
52					
53					

Teacher mediation: 69%

Textual interaction: 82%

ESOL student's oral output: 4%

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
54					
55					
56	2		1	3	1
57			1	1	0.33
58					
59					
60			1	1	0.33
61		4		4	1.33
62	15	9	7	31	10.33
63	6	2	2	10	3.33
64	9	9	5	23	7.66
65	2	1	1	4	1.33
66	1			1	0.33
67	3		3	6	2
68					
69	1			1	0.33
70					
71					
72					
73		2		2	0.66
74	2		2	4	1.33
75	3		3	6	2
76	7	5	2	14	4.66
77					
78	2		3	5	1.66
79	1	2	3	6	2
80	2			2	0.66
81	3	3		6	2
82	1			1	0.33
83					
84					
85					
86					
87					
88	3	6	3	12	4
89		2	2	4	1.33
90	1		1	2	0.66
91	1		3	4	1.33
92	4			4	1.33
93	1			1	0.33
94	1			1	0.33
95					
96	1		2	3	1
97		1	1	2	0.66
98	1	2	1	4	1.33
99	1	2	2	5	1.66
100	1	3	3	7	2.33
101			1	1	0.33
102			1	1	0.33
103	1	1		2	0.66
104					
105		2	2	4	1.33
sub	74	56	55	185	60
total	253	200	157	610	201

School D

ESOL

Year 13

Mean no. of students: 1

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
1					
2					
3					
4					
5					
6	18	15	16	49	16.33
7					
8	4			4	1.33
9					
10					
11					
12					
13					
14	3	5	7	15	5
15	9		4	13	4.33
16		1		1	0.33
17			1	1	0.33
18		8	11	19	6.33
19	9	2	5	16	5.33
20		4		4	1.33
21	12	5	9	26	8.66
22		8	7	15	5
23		2		2	0.66
24	3	5	5	13	4.33
25	8	5	9	22	7.33
26	11	2	6	19	6.33
27	7	8	11	26	8.66
28					
29	9			9	3
30	9	15	16	40	13.33
31					
32					
33					
34	12			12	4
35		13	16	29	9.66
36	6			6	2
37		2		2	0.66
38	3	4		7	2.33
39	15	8		23	7.66
40	1			1	0.33
41					
42	1	8	9	18	6
43					
44					
45	2			2	0.66
46	2	4	4	10	3.33
47	4	2	1	7	2.33
48					
49	1			1	0.33
50	10		3	13	4.33
51					
52					
53					

Teacher mediation: 57%

Textual interaction: 94%

ESOL student's oral output: 46.1%

Item	Visit 1	Visit 2	Visit 3	Total	MEAN
54					
55					
56			1	1	0.33
57					
58					
59					
60	2	2		4	1.33
61	3	5	5	13	4.33
62	9	8	10	27	9
63	7	8	7	22	7.33
64	6	5	9	20	6.66
65	1	5	6	12	4
66	2	1	1	4	1.33
67	3	4	12	19	6.33
68					
69					
70					
71					
72					
73	2	1	7	10	3.33
74	2	4	5	11	3.66
75	4	11	8	23	7.66
76	1		1	2	0.66
77					
78		1	3	4	1.33
79	1	6	12	19	6.33
80	5	3	4	12	4
81	3	5	2	10	3.33
82	1		1	2	0.66
83	3			3	1
84		1		1	0.33
85	1			1	0.33
86					
87					
88	3	2	9	14	4.66
89	6	9	8	23	7.66
90	1	4	4	9	3
91	2	2	5	9	3
92	4	4	4	12	4
93					
94		7		7	2.33
95	7	10	7	24	8
96	1	5	7	13	4.33
97	5	4	2	11	3.66
98	1	3	2	6	2
99	1	3	5	9	3
100	8	7	10	25	8.33
101	2	4	6	12	4
102					
103		5	9	14	4.66
104					
105	3	3	6	12	4
sub	100	142	177	419	141
total	259	268	318	845	283

Appendix G

**Mean frequency of data on
teacher interactions with text,
according to curriculum areas**

Mean frequency of data on teacher interactions with text, in curriculum areas

Item	Description	Art Mean	English Mean	Maths Mean	Social Science Mean	Technology Mean	ESOL Mean
57	Initiate interaction	0.55	0.33	0.45	0.25	0.22	0.24
58	Keep interaction open	0	0	0	0	0	0
59	Terminate interaction	0	0	0	0	0	0
60	Conversation	0.35	0.27	0.5	1.25	0.2	0.49
61	Predictable speech	0.06	2.29	0.99	0.5	0.26	2.73
62	Unpredictable speech	5.68	6.75	9.08	6.52	6.45	9
63	Minimal speech	2.47	1.87	5.39	3	3.87	7.24
64	Sustained speech	3.13	5.06	5.02	3.95	2.7	4.48
65	define words	0.37	3.12	1	0.95	0.58	3.4
66	colloquialism	0.61	0.16	0.49	0.32	0.43	0.33
67	elaborative simplification	1.94	1.66	6.45	3.07	1.58	3.9
68	premodification/apposition	0	0	0	0	0	0
69	key words	0.1	0.56	0.27	1	0.4	0.23
70	cohesive ties	0.12	0	0.08	0.75	0.28	0
71	anaphoric reference	0.33	0.12	0.58	1.02	0.46	0.08
72	word order / subordination	0.28	0.19	0.37	0.62	0.12	0.25
73	reconstructive discourse	0.7	0.83	2.95	1.02	0.22	2.16
74	represent material in different mode	0.96	1.91	3.08	2	0.88	2.75
75	personal associations/relevance	1.54	1.41	0.75	2.57	2.2	3.07
76	dramatic techniques - roleplay	0.05	1.33	0	0	0.08	0.91
77	dramatic techniques - props	1.07	0	0	0.07	0.54	0.56
78	dramatic techniques - gesture	0.48	0.62	1.33	0.9	0.94	2.32
79	declarative statements	3.61	1.46	4.7	3.25	4.31	2.64
80	metacognitive explanation	0.58	0.68	1.02	0.5	0.11	1.25
81	inferences	0.62	0.7	0.33	1.52	0.47	0.83
82	signposting	1.35	0.43	1.29	1	1.65	0.32
83	headings/subheadings	0	0	0.16	0	0.08	0.33
84	paragraphing / layout	0	0.14	0	0.12	0.57	0.25
85	bullet points / numbering	0	0.19	0.58	0.12	0.36	0.25
86	illustrations and captions	0.05	0	0	0.32	0.14	0.25
87	create a list of main points	0	0.25	0	1	0.3	0
88	Pseudo request/recall questions	1.32	4.89	6.45	2.25	2	5.15
89	Genuine request questions	1.59	1	0.4	1.52	0.64	2.06
90	preformulating questions	0.12	0.68	0.5	0.32	0.08	1.41
91	reformulated questions	0.68	1.06	1.4	1	0.29	1.48
92	directive questions	1.25	0.46	1.19	0.5	0.79	1.24
93	rhetorical questions	0.15	0.08	0.62	0.12	0	0
94	Metaprocess questions	0.12	0.14	0.58	0	0	0.83
95	Reaction to student input : form	0	0	0.08	0.07	0	3.98
96	reaction to message	0.72	2.46	3.61	1.25	0.75	1.32
97	correction	0.06	0.83	2.46	0.25	0.16	1.25
98	reflective statement	0.45	1.27	1.75	0.65	0.72	1.41
99	paraphrase	0.34	0.95	0.94	0.5	0.54	1.74
100	comment	1.18	2.08	2.25	1.62	1.28	4.83
101	expansion	0.61	1.37	2.29	0.9	0.68	1.41
102	clarification request	0.2	0.58	0.74	0.75	0.16	0
103	elaboration request	0.53	0.73	0.91	0.75	0.33	1.24
104	confirmation check	0.2	0	0.38	0.5	0	0
105	comprehension check	0.98	3.27	4.58	1.62	0.9	4.58

Appendix H

**Mean frequency of data on
the general classroom environment**

Mean frequency of data on the general classroom environment

Item	All Subjects Mean	Mainstream Mean	ESOL Mean
1	5.12	5.31	4.08
2	0	0	0
3	0	0	0
4	0.71	0.83	0
5	0.11	0.13	0
6	6.41	6.47	6.08
7	3.92	3.36	7.16
8	2.53	2.8	0.99
9	1.45	1.7	0
10	0.42	0.45	0.25
11	0.39	0.46	0
12	0.32	0.35	0.15
13	0.29	0.34	0
14	4.76	3.98	9.23
15	1.46	0.37	7.73
16	0.2	0.02	1.24
17	0.01	0	0.08
18	0.37	0.09	1.99
19	9.34	10.16	4.65
20	1.3	1.23	1.66
21	9.66	9.36	11.39
22	2.19	2.36	1.25
23	1.9	1.98	1.41
24	4.84	4.35	7.65
25	2.43	1.61	7.14
26	4.87	4.47	7.16
27	4.32	4.41	3.81
28	4.45	5.12	0.57
29	6.1	6.02	6.57
30	5.08	4.63	7.65
31	0	0	0
32	5.02	5.72	0.99
33	0.62	0.5	1.32
34	1.09	0	7.4
35	10.75	11.59	5.91
36	0.18	0	1.25
37	1.08	1.21	0.31
38	4.08	4.69	0.58
39	8.26	8.16	8.81
40	1.46	1.6	0.64
41	0.98	0.57	3.33
42	1.26	1.01	2.65
43	0.21	0.24	0
44	0.11	0.11	0.08
45	2.02	1.69	3.89
46	1.53	1.35	2.56
47	0.28	0	1.9
48	0.05	0.03	0.15
49	2.76	3.13	0.64
50	3.85	4.07	2.58
51	0.64	0.63	0.65
52	0.27	0.05	1.5
53	0.26	0.3	0.07
54	0	0	0
55	0.43	0.2	1.75
56	3.24	3.5	1.74

Appendix I

**Mean frequency of data on
teacher interactions with text**

Mean frequency of data on teacher interactions with text

Item	All Subjects Mean	Mainstream Mean	ESOL Mean
57	0.33	0.35	0.24
58	0	0	0
59	0	0	0
60	0.48	0.48	0.49
61	1.03	0.74	2.73
62	7.12	6.8	8.99
63	3.91	3.33	7.24
64	3.92	3.82	4.48
65	1.38	1.02	3.4
66	0.4	0.41	0.33
67	2.94	2.78	3.9
68	0	0	0
69	0.41	0.44	0.23
70	0.2	0.24	0
71	0.43	0.49	0.07
72	0.29	0.29	0.25
73	1.21	1.04	2.16
74	1.81	1.65	2.74
75	1.93	1.73	3.07
76	0.36	0.26	0.91
77	0.41	0.38	0.56
78	1.06	0.84	2.32
79	3.41	3.54	2.64
80	0.64	0.53	1.25
81	0.72	0.7	0.83
82	1.06	1.19	0.32
83	0.09	0.05	0.33
84	0.2	0.19	0.24
85	0.24	0.24	0.24
86	0.12	0.1	0.25
87	0.25	0.29	0
88	3.47	3.18	5.14
89	1.17	1.01	2.06
90	0.47	0.31	1.41
91	0.92	0.82	1.48
92	0.9	0.85	1.24
93	0.15	0.17	0
94	0.25	0.15	0.83
95	0.61	0.02	3.98
96	1.58	1.62	1.32
97	0.75	0.67	1.24
98	0.99	0.92	1.41
99	0.79	0.63	1.74
100	2.1	1.62	4.83
101	1.15	1.1	1.41
102	0.38	0.44	0
103	0.71	0.61	1.24
104	0.16	0.19	0
105	2.46	2.09	4.57

Appendix J

Ranked list of mean frequencies of data on teacher interactions with text

Ranked list of mean frequencies of data on teacher interactions with text

Item	Description	All subjects Mean	Mainstream Subjects Mean	ESOL Mean
88	Pseudo request/display/recall questions	3.48	3.18	5.15
79	declarative statements	3.41	3.54	2.64
67	elaborative simplification	2.95	2.78	3.9
105	comprehension check	2.46	2.09	4.58
100	comment	2.1	1.62	4.83
75	personal/emotional association/relevance	1.93	1.73	3.07
74	represent material in a different mode	1.81	1.65	2.75
96	reaction to message	1.58	1.62	1.32
65	define words	1.38	1.02	3.4
73	reconstructive discourse	1.21	1.04	2.16
89	Genuine request/referential questions	1.17	1.02	2.06
101	expansion	1.15	1.1	1.41
78	dramatic techniques - gesture	1.06	0.84	2.32
82	signposting	1.06	1.19	0.32
98	reflective statement	0.99	0.92	1.41
91	reformulated questions	0.92	0.82	1.48
92	directive questions	0.9	0.85	1.24
99	paraphrase	0.79	0.63	1.74
97	correction	0.75	0.67	1.25
81	inferences	0.72	0.7	0.83
103	elaboration request	0.71	0.61	1.24
80	metacognitive explanation	0.64	0.53	1.25
95	Reaction to student input : form	0.61	0.03	3.98
60	Conversation	0.48	0.48	0.49
90	preformulating questions	0.47	0.31	1.41
71	anaphoric reference	0.43	0.49	0.08
69	key words	0.41	0.45	0.23
77	dramatic techniques - props	0.41	0.39	0.56
66	colloquialism	0.4	0.41	0.33
102	clarification request	0.38	0.44	0
76	dramatic techniques - roleplay	0.36	0.26	0.91
57	Initiate interaction	0.34	0.34	0.24
72	word order / subordination	0.29	0.3	0.25
87	create a list of main points	0.25	0.29	0
94	Metaprocess questions	0.25	0.15	0.83
85	bullet points / numbering	0.24	0.25	0.25
70	cohesive ties	0.2	0.24	0
84	paragraphing / layout	0.2	0.19	0.25
104	confirmation check	0.16	0.19	0
93	rhetorical questions	0.15	0.17	0
86	illustrations and captions	0.12	0.1	0.25
83	headings/subheadings	0.09	0.05	0.33
58	Keep interaction open	0	0	0
59	Terminate interaction	0	0	0
68	premodification/apposition	0	0	0

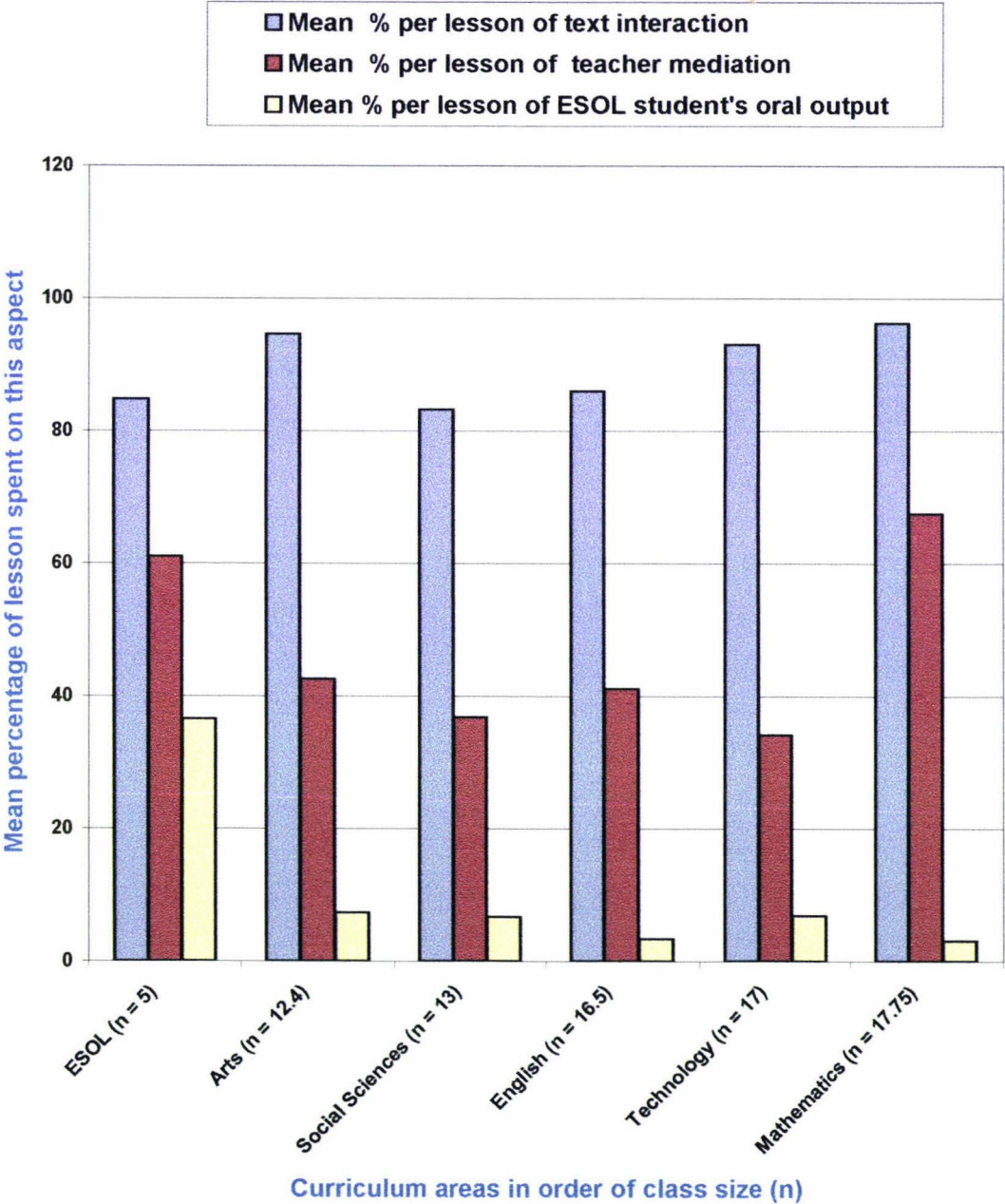
NOT RANKED:

61	Predictable speech	1.03	0.71	2.73
62	Unpredictable speech	7.13	6.52	9
63	Minimal speech	3.91	3.33	7.24
64	Sustained speech	3.92	3.82	4.48

Appendix K

Key aspects of the classroom language environment

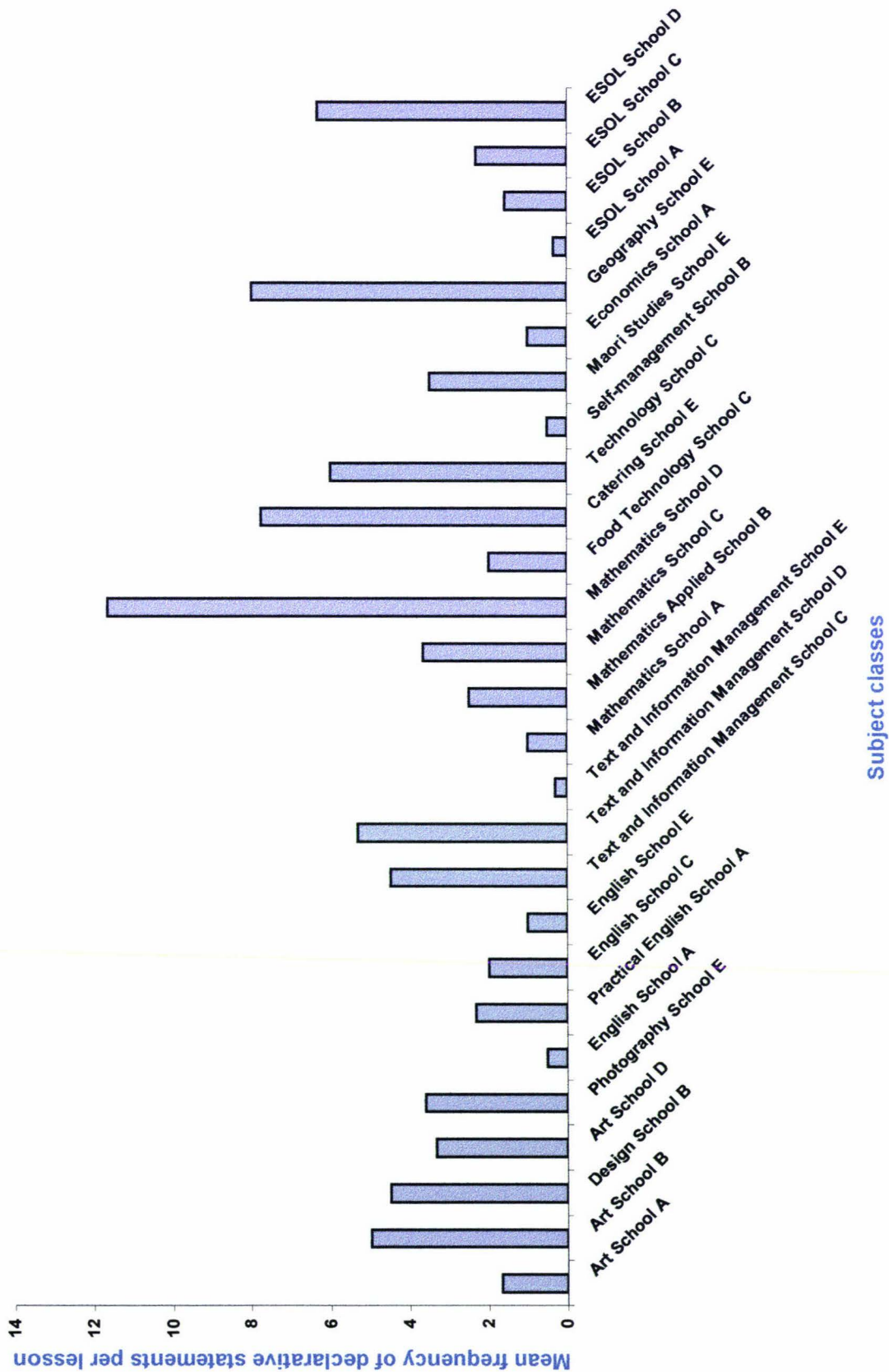
Key aspects of the classroom language environment



Appendix L

Teachers 'use of declarative statements in subject classes

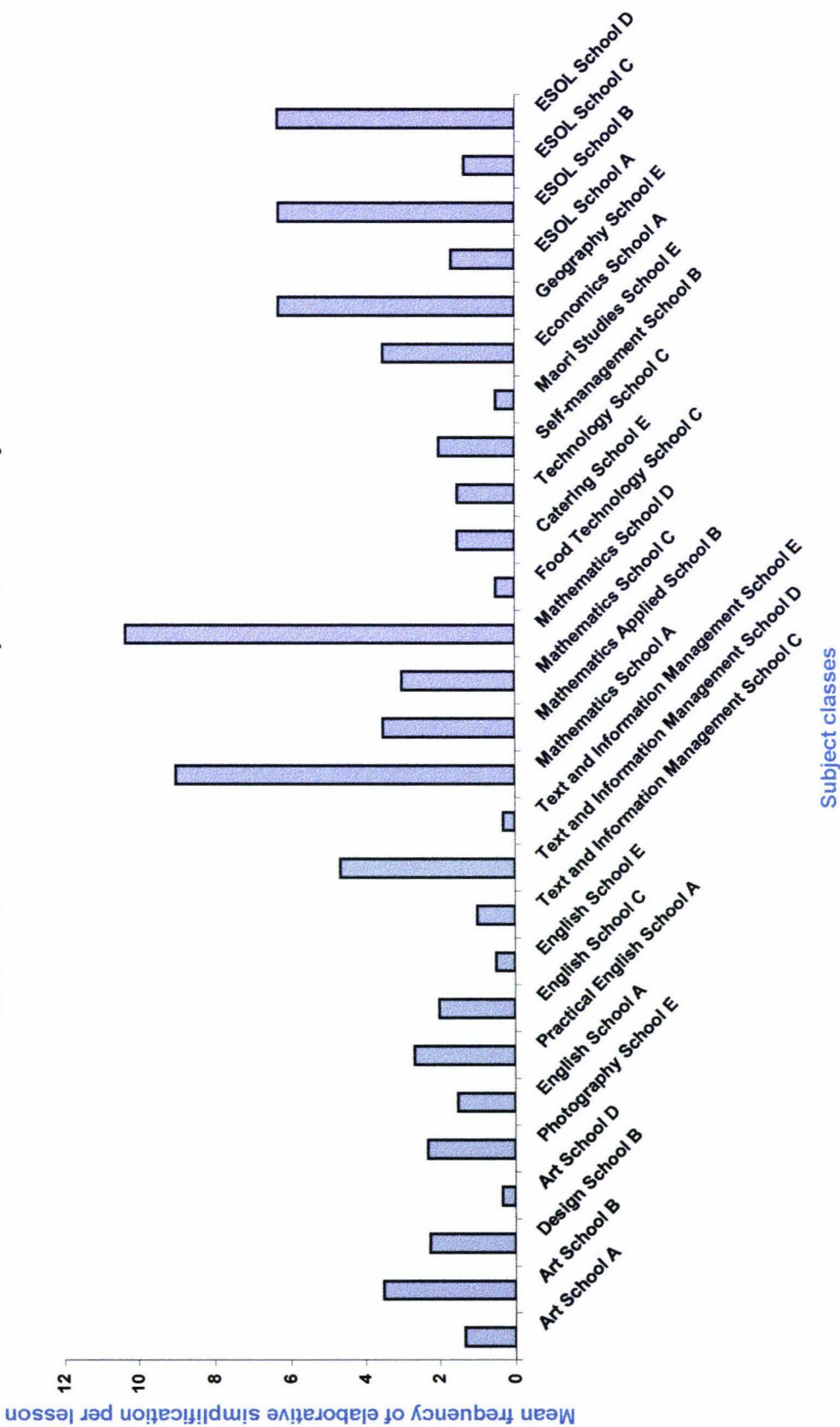
Teachers' use of declarative statements in subject classes



Appendix M

Teachers 'use of elaborative simplification in subject classes

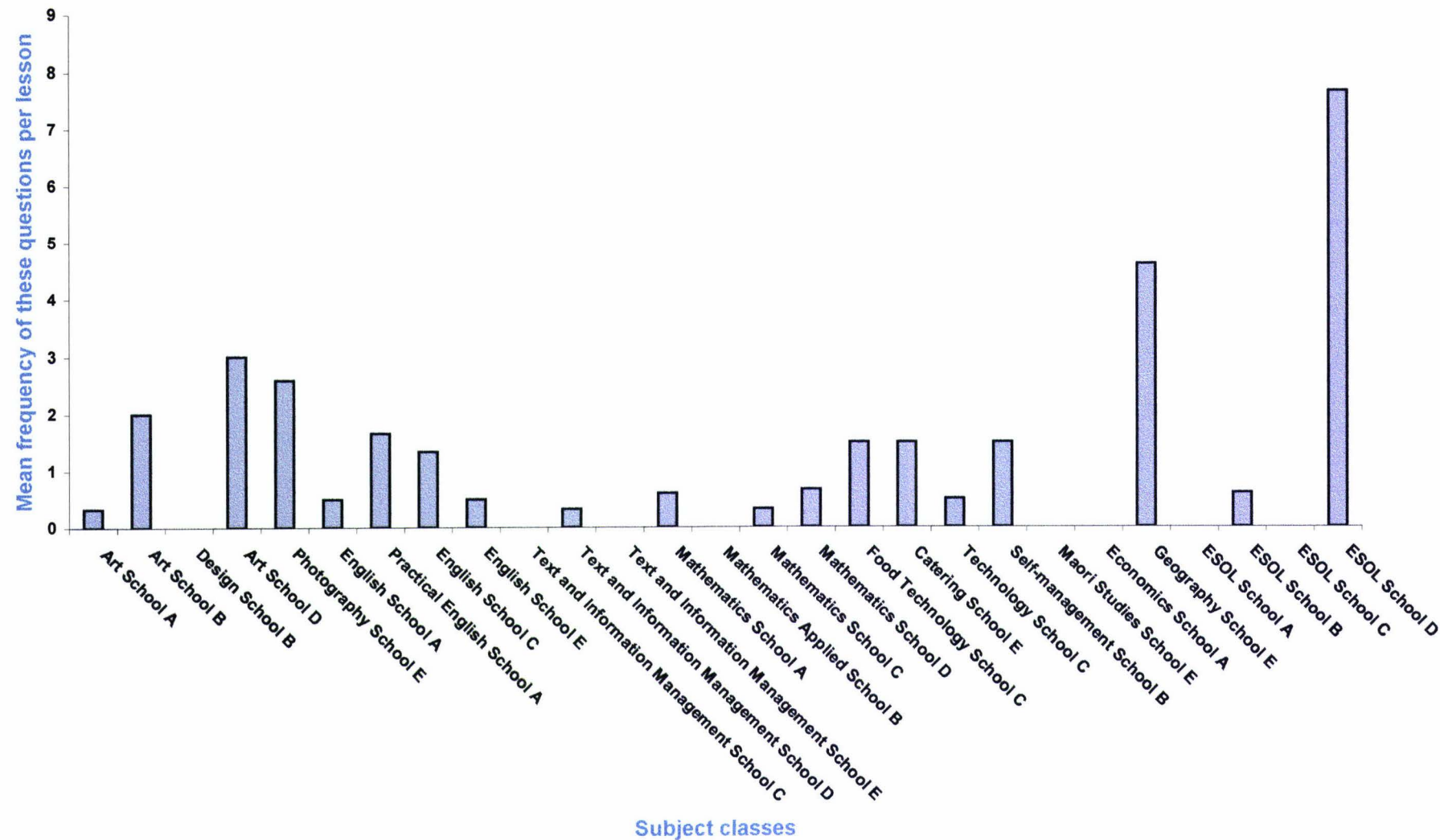
Teachers' use of elaborative simplification in subject classes



Appendix N

**Teachers 'use of genuine request or referential
questions in subject classes**

Teachers' use of genuine request or referential questions in subject classes



Appendix O

Excerpt from Year 13 Calculus textbook

- (c) Using your answers to (b), work out
 (i) $\lim_{n \rightarrow \infty} (s_n + t_n)$ (ii) $\lim_{n \rightarrow \infty} (s_n - t_n)$

(iii) $\lim_{n \rightarrow \infty} (s_n \cdot t_n)$ (iv) $\lim_{n \rightarrow \infty} \left(\frac{s_n}{t_n} \right)$

(d) (i) Is $\lim_{n \rightarrow \infty} (s_n + t_n)$
 $= \lim_{n \rightarrow \infty} s_n + \lim_{n \rightarrow \infty} t_n$?

(ii) Is $\lim_{n \rightarrow \infty} (s_n - t_n)$
 $= \lim_{n \rightarrow \infty} s_n - \lim_{n \rightarrow \infty} t_n$?

(iii) Is $\lim_{n \rightarrow \infty} (s_n \cdot t_n)$
 $= \lim_{n \rightarrow \infty} s_n \cdot \lim_{n \rightarrow \infty} t_n$?

(iv) Is $\lim_{n \rightarrow \infty} \left(\frac{s_n}{t_n} \right)$
 $= \lim_{n \rightarrow \infty} s_n \div \lim_{n \rightarrow \infty} t_n$?

Note that this shows a special case of the general result.

$$\begin{aligned} \lim_{n \rightarrow \infty} (s_n + t_n) &= \lim_{n \rightarrow \infty} s_n + \lim_{n \rightarrow \infty} t_n \\ \lim_{n \rightarrow \infty} (s_n - t_n) &= \lim_{n \rightarrow \infty} s_n - \lim_{n \rightarrow \infty} t_n \\ \lim_{n \rightarrow \infty} (s_n \cdot t_n) &= \lim_{n \rightarrow \infty} s_n \cdot \lim_{n \rightarrow \infty} t_n \\ \lim_{n \rightarrow \infty} \left(\frac{s_n}{t_n} \right) &= \lim_{n \rightarrow \infty} s_n \div \lim_{n \rightarrow \infty} t_n \end{aligned}$$

provided $\lim_{n \rightarrow \infty} t_n \neq 0$

- 16 Discuss the limit of the sequence

$$t_n = \frac{a_0 n^m + a_1 n^{m-1} + \dots + a_m}{b_0 n^p + b_1 n^{p-1} + \dots + b_p} \quad (a_0, b_0 \neq 0)$$

when

(i) $m < p$ (ii) $m = p$ (iii) $m > p$

- 17 State which of the following are true and which are false. If true, prove; if false, provide a counter-example.

(a) $\langle t_n \rangle$ converges $\Rightarrow \langle (-1)^n t_n \rangle$ converges.

(b) $\langle (-1)^n t_n \rangle$ converges to 0 $\Leftrightarrow \langle t_n \rangle$ converges to 0.

(c) $\langle t_n \rangle$ converges $\Rightarrow \langle |t_n| \rangle$ converges.

(d) A term of a convergent sequence cannot be equal to the limit.

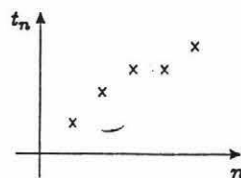
- 18 Show that the limit of a sequence is unique.
 (Hint: If there are two limits L_1, L_2 , show that $|L_1 - L_2| < \epsilon$ for any $\epsilon > 0$ by using $|A - B| \leq |A| + |B|$.)

Properties of sequences

Sequences can be classified in various ways.

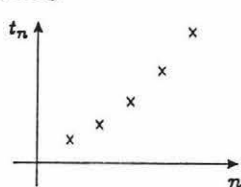
1(a) Increasing

$$t_{n+1} \geq t_n$$



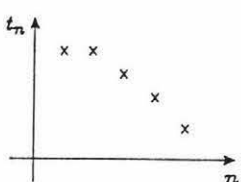
1(b) Strictly increasing

$$t_{n+1} > t_n$$



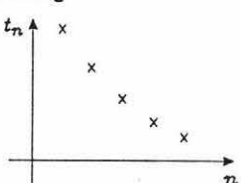
2(a) Decreasing

$$t_{n+1} \leq t_n$$



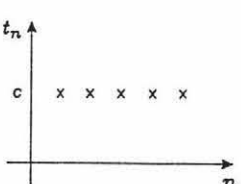
2(b) Strictly decreasing

$$t_{n+1} < t_n$$



3 Constant

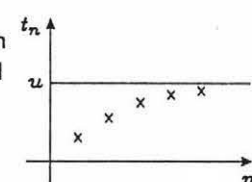
$$t_n = c$$



4(a) Bounded above

$$t_n \leq u$$

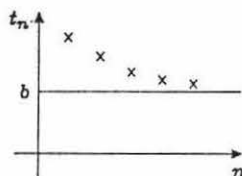
u is called an upper bound



4(b) Bounded below

$$t_n \geq b$$

b is called a lower bound



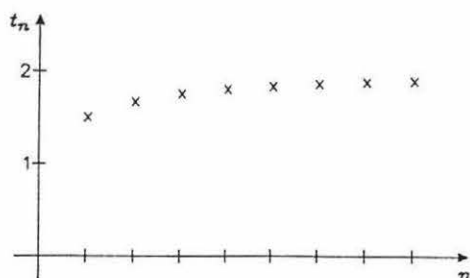
Example

Show graphically that $\frac{2n+1}{n+1} >$ is:

- (a) strictly increasing
- (b) bounded below by 0
- (c) bounded above by 2.

From the graph, what would be the greatest lower bound and the least upper bound possible?

Answer



(a) (b) (c) are all obvious.

Clearly the greatest lower bound is 1.5 (the first value) and the least upper bound is 2 (the limit).

We can generalise from this example to the very deep result:

If a sequence of numbers is strictly increasing and bounded above then it is convergent.

Similarly,

If a sequence of numbers is strictly decreasing and bounded below then it is convergent.

Note that if a sequence is (strictly) increasing we are usually only interested in whether it is bounded *above*—and this will occur at the end of the sequence, not at the beginning—where the sequence can often (trivially) be bounded *below*, by any value less than the first term. Likewise if a sequence is (strictly) decreasing we normally only examine it for lower bounds, and the fact that it is bounded above is trivial.

Example

Prove that $\frac{2n+1}{n+1} >$ has a limit by showing that it is strictly increasing and bounded above by 3.

Answer

To show a sequence is strictly increasing we require $t_{n+1} > t_n$ or the equivalent $t_{n+1} - t_n > 0$.

$$\begin{aligned} t_{n+1} - t_n &= \frac{2(n+1)+1}{(n+1)+1} - \frac{2n+1}{n+1} \\ &= \frac{2n+3}{n+2} - \frac{2n+1}{n+1} \\ &= \frac{(2n+3)(n+1) - (n+2)(2n+1)}{(n+2)(n+1)} \\ &= \frac{(2n^2+5n+3) - (2n^2+5n+2)}{(n+2)(n+1)} \\ &= \frac{1}{(n+2)(n+1)} \end{aligned}$$

> 0 (since $n \geq 1$ and therefore all terms in this expression are positive)

To show a sequence is bounded above by 3 we require $t_n < 3$ or the equivalent $t_n - 3 < 0$.

$$\begin{aligned} t_n - 3 &= \frac{2n+1}{n+1} - 3 \\ &= \frac{(2n+1) - 3(n+1)}{n+1} \\ &= \frac{-(n+2)}{n+1} \end{aligned}$$

< 0 (both $(n+1)$ and $(n+2)$ are natural numbers and hence positive, the minus sign makes the fraction negative)

This sequence is *strictly increasing* and *bounded above*, and therefore must have a limit. Note however that these two sufficient conditions for convergence do not by themselves tell us the value of the limit.

EXERCISE 9.3

- 1 By drawing graphs or otherwise, classify the following sequences as strictly increasing, increasing, strictly decreasing, decreasing, constant, bounded above, bounded below, or none of the above. More than one description may apply.

(a) $\frac{2n-3}{n+2} >$

(b) $\langle (-1)^n \sin n \rangle$

(c) $\langle ne^{-n} \rangle$

(d) $\langle ne^n \rangle$

(e) $\langle \frac{4}{3^n} \rangle$

(f) $\langle e^n \cdot \sin n \rangle$

(g) $\langle \frac{(-1)^n + 4}{n^2 + 1} \rangle$

(h) $\langle \frac{3^n}{2^n} \rangle$

(i) $\langle \frac{-(n^2 + 1)}{2 + n} \rangle$

(j) $t_1 = 4$
 $t_n = 3t_{n-1}$

(k) $\langle \ell n(n) \rangle$

(l) $t_1 = 3$
 $t_{n+1} = 4t_n - 9$

2 Decide whether the following sequences are strictly increasing or decreasing, and prove your result.

(a) $\langle \frac{3n - 4}{2n + 1} \rangle$

(b) $\langle \frac{1}{n + 1} \rangle$

(c) $\langle \frac{1}{n^2} \rangle$

(d) $\langle 2^{-n} \rangle$

(e) $\langle 3n + 7 \rangle$

(f) $\langle \frac{n - 1}{n + 1} \rangle$

3 Prove the following are bounded as shown.

(a) $\langle \frac{2n - 1}{3n + 1} \rangle$ above by 1

(b) $\langle \frac{n}{n^2 + 1} \rangle$ below by -1

(c) $\langle \frac{2n}{1 - n} \rangle$ above by -2 (for $n > 1$)

(d) $\langle \frac{2 - n}{2 + n^2} \rangle$ below by -5

4 Show that these sequences converge by

(i) proving that each is strictly increasing or decreasing

(ii) finding an appropriate upper or lower bound and proving that it is in fact a bound.

(a) $\langle \frac{n + 1}{n + 2} \rangle$

(b) $\langle \frac{2n - 3}{3n + 4} \rangle$

(c) $\langle \frac{2n - 3}{n + 4} \rangle$

(d) $\langle 2^{-n} \rangle$

5 Consider the sequence $\langle \frac{4n + 1}{2n - 1} \rangle$.

(a) Write out the first five terms (leave as fractions).

(b) Decide whether this sequence is strictly increasing or decreasing, and then prove your choice.

(c) Find an upper and lower bound and prove that these hold.

(d) Explain why this sequence converges.

(e) Guess the limit of this sequence.

(f) Find the value of n such that $\langle \frac{4n + 1}{2n - 1} \rangle$

differs from 2 by less than 0.01 for all values after this.

6 The sequence $\langle a_n \rangle$ is defined by

$$a_n = \frac{4n}{\sqrt{n^2 + 1}} \text{ for any natural number } n.$$

(a) List the first six terms of the sequence.

(Do not try to put your answers in decimal form.)

(b) State whether or not the sequence is decreasing.

(c) State the limit of the sequence. (U.B.)

7 The sequence $\langle a_n \rangle$ is defined by $a_n = \frac{n + 1}{n^2}$

for any natural number n .

(a) Prove that the sequence is decreasing, ie $a_{n+1} < a_n$ for all n .

(b) Write down an upper bound u and a lower bound ℓ for the sequence.

(c) For what values of n is $a_n < \frac{1}{8}$?

(d) State the value of $\lim_{n \rightarrow \infty} a_n$. (U.B.)

8 The sequence $\langle a_n \rangle$ is defined by

$$a_n = \frac{n + 100}{3n + 1} \text{ for any natural number } n.$$

(a) List the first six terms of the sequence and state whether or not the sequence is increasing.

(b) For what values of n will the terms of $\langle a_n \rangle$ lie within $\frac{1}{100}$ of $\frac{1}{3}$?

- (c) Find the limit of the sequence $\langle b_n \rangle$
 where $b_n = \frac{3}{4} a_n$. (U.B.)
- 9 (a) If $\langle r_n \rangle$ and $\langle s_n \rangle$ are both strictly increasing, which of the following must also be strictly increasing?
 (i) $\langle r_n + s_n \rangle$ (ii) $\langle r_n - s_n \rangle$
 (iii) $\langle r_n \cdot s_n \rangle$ (iv) $\langle \frac{r_n}{s_n} \rangle$
- (b) If $\langle r_n \rangle$ and $\langle s_n \rangle$ are both decreasing, which of the following must also be decreasing?
 (i) $\langle r_n + s_n \rangle$ (ii) $\langle r_n - s_n \rangle$
 (iii) $\langle r_n \cdot s_n \rangle$ (iv) $\langle \frac{r_n}{s_n} \rangle$
- 10 The sequence $T(n) = (2n + 1) \left(\frac{19}{20}\right)^n$ increases to start with, but is ultimately decreasing.
 (a) For what values is $t_n > t_{n-1}$?
 (b) Find the value of the greatest term to 4 sf.
- 11 Show that if a sequence is strictly increasing and convergent it must be bounded above.

Sigma notation

Sometimes we wish to *add* up some of the terms of a sequence. We use a special symbol:

Σ (meaning 'sum of')

to indicate addition of these terms. This is called 'Sigma notation'.

In general,

$$\sum_{i=1}^n a_i = a_1 + a_2 + a_3 + a_4 + a_5 + \dots + a_n$$

The limits of summation are written above and below the Σ sign.

Example

$$\sum_{i=1}^4 a_i = a_1 + a_2 + a_3 + a_4$$

$$\sum_{i=3}^8 a_i = a_3 + a_4 + a_5 + a_6 + a_7 + a_8$$

If the terms are known, the sum can be evaluated. For example,

$$a_1 = 4, a_2 = 7, a_3 = 8, a_4 = 12$$

$$\begin{aligned} \sum_{i=1}^4 3a_i^2 &= 3 \cdot 4^2 + 3 \cdot 7^2 + 3 \cdot 8^2 + 3 \cdot 12^2 \\ &= 48 + 147 + 192 + 432 \\ &= 819 \end{aligned}$$

A special case is the sum of *all* the terms of a sequence—later we shall see that this is called the 'sum to infinity' of a series.

This is written as

$$S_{\infty} = \sum_{i=1}^{\infty} a_i \text{ or just } \sum_{i=1}^{\infty} a_i$$

Note that the letter i here is a dummy letter. Any letter of the alphabet could be used—eg,

$$\sum_{k=1}^{\infty} a_k \text{ is the same as } \sum_{i=1}^{\infty} a_i$$

This explains why the letter is often omitted.

Sometimes the terms are defined inside the sigma sign.

Example

$$\sum_{i=1}^4 i = 1 + 2 + 3 + 4 = 10$$

Example

$$\begin{aligned} \sum_{i=18}^{20} (3i - 40) &= (3 \cdot 18 - 40) + (3 \cdot 19 - 40) \\ &\quad + (3 \cdot 20 - 40) \\ &= 14 + 17 + 20 \\ &= 51 \end{aligned}$$

Properties of sigma notation

Useful features of sigma notation include the following three properties.

- 1 Common factors to all terms can be factorised out to the front of the sigma sign.

$$\sum_{i=1}^n k \cdot a_i = k \cdot \sum_{i=1}^n a_i$$

- 19 Find the first term and common difference of the arithmetic series for which $S_n = n(n+2)$.

- 20 What infinite geometric series, starting at 1, has the property that each term is the sum of all the following terms?

Generalise the result for when the first term is a .

- 21 A ball is dropped from a height of c metres above a flat surface. Each time the ball hits the surface after falling a distance h , it rebounds a distance rh , where r is a positive number less than one. Find the total distance the ball travels up and down before it comes to rest. (U.S.)

- 22 Find $\sum_{i=1}^n \frac{1}{2^i}$. Hence show that $\sum_{n=1}^{\infty} \frac{1}{(n-1)!}$ exists.

Hint: Show that it is strictly increasing and bounded above.

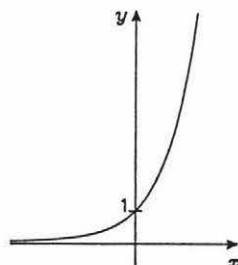
- 23 Find the sum of the series

$$1 + 2r + 3r^2 + \dots + (n+1)r^n + \dots$$

and state the restrictions on r . (U.S.)

Exponential series

At the beginning of chapter 9, Sequences, we alluded to the fact that many mathematical functions can be expressed in series form. One of the most important is the series for the **exponential function**—the special function which has itself as derived function and which is a type of growth function.



$$f(x) = \exp(x) \text{ or } e^x$$

The base for the exponential function, ie the number 'e' for which $\exp(x)$ can be written as e^x , is

$$e = 2.718\,281\,829\dots$$

When you use the exponential key on your calculator with 1 as the argument—ie $\exp(1)$ —the calculator will return the value of e . How does it work out e ? By using the exponential series.

$$\begin{aligned} \exp(x) &= 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots + \frac{x^n}{n!} + \dots \\ &= \sum_{n=0}^{\infty} \frac{x^n}{n!} \end{aligned}$$

If the factorials are evaluated, we get:

$$e^x = 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \frac{x^5}{120} + \dots + \frac{x^n}{n!} + \dots$$

Different values of x give different series. Of particular interest is the series for $\exp(1)$, or e^1 .

$$\begin{aligned} e = e^1 &= 1 + 1 + \frac{1^2}{2} + \frac{1^3}{6} + \frac{1^4}{24} + \frac{1^5}{120} + \frac{1^6}{720} + \dots \\ &= 1 + 1 + \frac{1}{2} + \frac{1}{6} + \frac{1}{24} + \frac{1}{120} + \frac{1}{720} + \dots \end{aligned}$$

Writing down the first eleven terms as decimals to 6dp:

$$\begin{aligned} &1.000\,000 \\ &+ 1.000\,000 \\ &+ 0.500\,000 \\ &+ 0.166\,667 \\ &+ 0.041\,667 \\ &+ 0.008\,333 \\ &+ 0.001\,389 \\ &+ 0.000\,198 \\ &+ 0.000\,025 \\ &+ 0.000\,003 \\ &+ 0.000\,000 \\ &= 2.718\,282 \end{aligned}$$

Convergence of the exponential series

We have previously discussed whether series converge or diverge. We saw that an arithmetic series never has a sum to infinity, while the geometric series only has a sum to infinity if $-1 < r < 1$.

In contrast, the *exponential series always converges*, no matter how large a number is substituted for x .

This is because ultimately the factorials on the bottom line always dominate the powers on top and make the terms very small after a certain stage. However the result that the exponential series always has a sum to infinity is not an easy one to prove.

Here is an argument which shows that the exponential series converges when $x = 1$.

$$\begin{aligned}\exp(1) &= 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots + \frac{1}{n!} + \dots \\ &= 2 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots + \frac{1}{n!} + \dots\end{aligned}$$

We show that the sum of

$$\frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots + \frac{1}{n!} + \dots \text{ is finite—ie less than}$$

A , say, and therefore $\exp(1) < 2 + A$.

Note that $2! \geq 2^1$

$$3! \geq 2^2$$

$$4! \geq 2^3$$

$$5! \geq 2^4$$

and in general $n! \geq 2^{n-1}$ because $n!$ is the product of $(n-1)$ terms each of which is at least 2, while 2^{n-1} is only the product of $(n-1)$ lots of 2.

Therefore when we take the reciprocal of each of these inequalities we get:

$$\frac{1}{2!} \leq \frac{1}{2^1} = \frac{1}{2}$$

$$\frac{1}{3!} \leq \frac{1}{2^2} = \frac{1}{4}$$

$$\frac{1}{4!} \leq \frac{1}{2^3} = \frac{1}{8}$$

$$\frac{1}{5!} \leq \frac{1}{2^4} = \frac{1}{16}$$

and in general $\frac{1}{n!} \leq \frac{1}{2^{n-1}}$

Combining these terms together:

$$\frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots + \frac{1}{n!} + \dots$$

$$\leq \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots + \frac{1}{2^{n-1}} + \dots$$

$= 1$ (sum to infinity of geometric series)

Therefore:

$$\begin{aligned}\exp(1) &= (1 + 1) + \left(\frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots + \frac{1}{n!} + \dots \right) \\ &\leq 2 + 1 \\ &\leq 3\end{aligned}$$

We can conclude that the exponential series in the case $x = 1$ is convergent because it is bounded above by 3, and also because the sequence of partial sums is strictly increasing since all terms are positive.

Expansions of exponential series

Many problems relating to exponential series involve so-called expansions where a series has to be written out in full. Here are two examples.

Example

Write down the first four terms of the series for e^{5x} .

Answer

$$\begin{aligned}e^{5x} &= 1 + (5x) + \frac{(5x)^2}{2!} + \frac{(5x)^3}{3!} + \dots \\ &= 1 + 5x + \frac{25x^2}{2} + \frac{125x^3}{6} + \dots\end{aligned}$$

Example

Write down the series for $(1-x)e^x$.

Answer

$$\begin{aligned}(1-x)e^x &= 1e^x - xe^x \\ &= 1\left(1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots\right) \\ &\quad - x\left(1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots\right) \\ &= 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots \\ &\quad - x - x^2 - \frac{x^3}{2!} - \frac{x^4}{3!} - \dots \\ &= 1 - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{8} - \dots\end{aligned}$$

General term for the exponential series

The general term in the expansion of e^x is

$$T(r+1) = \frac{x^r}{r!} \text{ is the term in } x^r$$

Example

Find the general term in the expansion of

(a) e^{-3x}

(b) $(1-x)e^x$.

Answer

$$(a) \frac{(-3x)^r}{r!} = \frac{(-1)^r 3^r x^r}{r!}$$

$$(b) (1-x)e^x = e^x - xe^x$$

$$\text{in } e^x: \frac{x^r}{r!}$$

$$\text{in } xe^x: x \cdot \frac{x^{r-1}}{(r-1)!} = \frac{x^r}{(r-1)!}$$

Note that we need to take the term before in the xe^x series. Since this series is multiplied by an additional x , the term in x^r must come from x times the term in x^{r-1} .

$$\begin{aligned} \text{Thus we have } \frac{x^r}{r!} - \frac{x^r}{(r-1)!} &= \frac{x^r}{(r-1)!} \left(\frac{1}{r} - 1 \right) \\ &= \frac{x^r}{(r-1)!} \left(\frac{1-r}{r} \right) \\ &= \frac{(1-r)x^r}{r!} \end{aligned}$$

EXERCISE 19.3

- 1 Expand these exponential series, giving

- (i) the first four terms
 (ii) the values of x for which this expansion is valid
 (iii) the general term.

(a) e^{2x}

(b) e^{4x}

(c) e^{-3x}

(d) $e^{x/3}$

(e) $(e^x)^2$

(f) $\frac{1}{e^x}$

(g) $\sqrt{e^x}$

(h) $\frac{1}{e^{x^2}}$

- 2 Expand these exponential series, giving the first four (non-zero) terms.

(a) $(1+x)e^x$

(b) $\frac{1+x}{e^x}$

(c) $(3+4x)e^{2x}$

(d) $\frac{1-2x}{e^x}$

(e) $e^{3x} + e^{-3x}$

(f) $e^{2x} - e^x$

- 3 Find the term in
- x^r
- for each of the series in question 2.

- 4 Find the first three terms in the series for
- e^{x^2+x}
- .

- 5 Calculate an approximate value (to 6 sf) for
- $e^{1.3}$
- , by working out the first five terms in an exponential series.

- 6 Write an infinite series of non-zero terms whose sum to infinity is

(a) e^{-2}

(b) $\frac{r}{1+r} \quad (-1 < r < 1, r \neq 0).$ (U.B.)

- 7 Express
- $(1-x)e^{2x}$
- as a power series, giving the first three terms. Show that the coefficient of
- x^r
- in the expansion is
- $\frac{2^{r-1}(2-r)}{r!}$
- . (U.B.)

- 8 Expand
- $(1+x)e^{x/2}$
- in ascending powers of
- x
- , giving the first four terms. What is the coefficient of
- x^n
- in this expansion? (U.B.)

- 9 Find the value of the largest term in the series for

(a) e^3 (b) e^6 (c) $e^{11.2}$

- 10 Here are some exponential series. The sum to infinity of each one can be expressed as some combination of
- e
- .

For example,

(1) $\frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots = e - 2$

(2) $\frac{2^2}{3!} + \frac{2^3}{4!} + \frac{2^4}{5!} + \frac{2^5}{6!} + \dots = \frac{e^2 - 5}{2}$

Find the sum to infinity of each series.

(a) $\frac{1}{3!} + \frac{1}{4!} + \frac{1}{5!} + \dots$

(b) $\frac{1}{1!} - \frac{2}{2!} + \frac{2^2}{3!} - \frac{2^3}{4!} + \dots$

(c) $\frac{5^2}{3!} + \frac{5^3}{4!} + \frac{5^4}{5!} + \dots$

(d) $\frac{1}{3 \cdot 6} + \frac{1}{3 \cdot 6 \cdot 9} + \frac{1}{3 \cdot 6 \cdot 9 \cdot 12} + \dots$

(e) $\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \dots$

(f) $\frac{2^2}{2!} + \frac{2^4}{4!} + \frac{2^6}{6!} + \dots$

- 11 (a) Show
- $\frac{n^2}{n!} = \frac{1}{(n-2)!} + \frac{1}{(n-1)!}$
- for
- $n \geq 2$
- .

Hence sum $\frac{1^2}{1!} + \frac{2^2}{2!} + \frac{3^2}{3!} + \dots$

- (b) Show
- $\frac{n-1}{n!} = \frac{1}{(n-1)!} - \frac{1}{n!}$
- for
- $n \geq 1$
- .

Hence sum $\frac{1}{2!} + \frac{2}{3!} + \frac{3}{4!} + \dots$

- (c) Show
- $\frac{n^3}{n!} = \frac{1}{(n-3)!} + \frac{3}{(n-2)!} + \frac{1}{(n-1)!}$
- for
- $n \geq 3$
- .

Hence sum $\frac{1^3}{1!} + \frac{2^3}{2!} + \frac{3^3}{3!} + \dots$

(d) Sum $\frac{3}{1!} + \frac{5}{2!} + \frac{7}{3!} + \dots$

(e) Sum $\frac{3}{2!} + \frac{8}{3!} + \frac{15}{4!} + \frac{24}{5!} + \dots$

12 Sum to infinity the series whose r th term is

$$\frac{(3r-5)2^r}{r!} \quad (\text{U.S.})$$

13 Prove that the sum of n terms of

$$n^n - \frac{n}{1}(n-1)^n + \frac{n(n-1)}{1 \cdot 2}(n-2)^n - \dots$$

is $n!$

Hint: try expanding $(e^x - 1)^n$ in two ways.

The logarithmic series

Consider the geometric series

$$1 - x + x^2 - x^3 + x^4 - \dots, \text{ with } |x| < 1.$$

This has sum to infinity $\frac{1}{1+x}$.

$$\text{So } \frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - \dots$$

$$\text{Now integrate both sides: } \int \frac{1}{1+x} dx = \ln(1+x)$$

$$\begin{aligned} \text{and } \int (1 - x + x^2 - x^3 + x^4 - \dots) dx \\ = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots \end{aligned}$$

(if we assume we can integrate term by term.)

Thus

$$\begin{aligned} \ln(1+x) \\ = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots + \frac{(-1)^{n-1}x^n}{n} + \dots \\ \text{provided } -1 < x \leq 1 \end{aligned}$$

Note:

- The general term is $\frac{(-1)^{n-1}x^n}{n}$.
- The series is for $\ln(1+x)$, NOT for $\ln(x)$.
- The logarithmic series is only convergent for values of x between -1 and 1 ; not including -1 but including 1 .

Example

Expand $\ln(1-4x)$ to three terms, giving the general term and the values of x for which the expansion is valid.

Answer

$$\begin{aligned} \ln(1-4x) &= \ln(1+(-4x)) \\ &= (-4x) - \frac{(-4x)^2}{2} + \frac{(-4x)^3}{3} - \dots \\ &= -4x - 8x^2 - \frac{64x^3}{3} - \dots \end{aligned}$$

$$\begin{aligned} \text{General term} &= \frac{(-1)^{n-1}(-4x)^n}{n} \\ &= \frac{(-1)^{n-1}(-1)^n 4^n x^n}{n} \\ &= \frac{(-1)^{2n-1} 4^n x^n}{n} \\ &= -\frac{4^n x^n}{n} \quad (\text{because } (-1)^{\text{odd}} = -1) \end{aligned}$$

Valid for: $-1 < -4x \leq 1$

$1 > 4x \geq -1$ (multiplying by -1 and reversing inequality)

$$-1 \leq 4x < 1$$

$$-\frac{1}{4} \leq x < \frac{1}{4}$$

Example

Expand $\ln\left(\frac{1+2x}{1-2x}\right)$ to three terms, giving the general term and region of validity for the expansion.

Answer

$$\ln\left(\frac{1+2x}{1-2x}\right) = \ln(1+2x) - \ln(1-2x)$$

$$\text{Now } \ln(1+2x) = 2x - \frac{(2x)^2}{2} + \frac{(2x)^3}{3} - \dots$$

$$= 2x - 2x^2 + \frac{8x^3}{3} - 4x^4 + \frac{32x^5}{5} - \dots$$

$$\text{and } \ln(1-2x) = -2x - \frac{(-2x)^2}{2} + \frac{(-2x)^3}{3} - \dots$$

$$= -2x - 2x^2 - \frac{8x^3}{3} - 4x^4 - \frac{32x^5}{5} - \dots$$

$$\text{So } \ln\left(\frac{1+2x}{1-2x}\right) = \ln(1+2x) - \ln(1-2x)$$

$$= 4x + \frac{16x^3}{3} + \frac{64x^5}{5} + \dots$$

$$\begin{aligned} \text{General term of } \ln(1+2x) &= \frac{(-1)^{n-1}(2x)^n}{n} \\ &= \frac{(-1)^{n-1}2^n x^n}{n} \end{aligned}$$

Appendix P

Practical lists for teachers:

**Six simple things teachers can do for ESOL students
in mainstream classes**

Teachers' questions

Selected reading list for classroom teachers

Six simple things teachers can do for ESOL students in mainstream classes.

- 1. Say less, and say it more slowly.**
- 2. Briefly outline the structure of the lesson on the board at the start.**

(This helps students see where they're going, and it helps them understand how what they're doing fits into the whole context.)

- 3. When you talk to the class, put the main points / key words on the board.**

(Is it legible? Do some words need defining?)

- 4. If you're reading something aloud, give ESOL students a written copy of the text to follow at the same time.**

(Of course it is worth considering whether the native English-speaking students in your class can cope with the listening demands of this too!)

- 5. Ask a native speaker to work alongside the ESOL student.**

(Students can provide more help with explaining than you have time for. The helpers also learn better, by reinforcing their learning through repetition and simplification.)

- 6. ESOL students need to spend lots of time speaking with native speakers.**

(And this tends not to happen nearly enough in class! Teachers need to facilitate these interactions. Talking with native-speakers for an interactive purpose, such as a curriculum task, really helps develop their language confidence and competence.)

Teachers' Questions

Questions for teachers to ask themselves about the quality of their questioning, to help students think and learn more effectively.

1. Are you requiring your pupils to think for themselves or mainly asking them to feed back information from a book or from an earlier lesson?
2. Are you eliciting the pupils' existing experience and understanding and working from that, or does the way you are planning lessons tend to make their present knowledge irrelevant?
3. Do your responses to pupils' contributions include replies which use and develop what they have said, or are you predominantly evaluating replies as right/wrong, or good/bad?
4. When you present information, or give a demonstration, or read a poem, or discuss a visit, are you requiring your pupils to explain and hypothesize, or are you telling them what it means?
5. Do you ask pupils to expand what they have said, to respond to one another, to ask questions, to offer evidence, or consider alternative explanations, to plan lines of action?
6. Are your pupils in fact contributing at some length to the lessons, or answering merely in brief phrases?
7. Are they raising questions of their own, offering experiences and opinions, joining in the formulating of knowledge?

(from Barnes, UK guru on communicative and cooperative learning)

Selected reading list for classroom teachers

These works are recommended for their particular interest to secondary school teachers. They are informative without being unduly long or time-consuming, with a practical rather than a theoretical emphasis.

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