

# **THE QUESTION OF LEGITIMATE ANSWERS**

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## HIGHER DEGREE THESIS (PhD)

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a major part of the prescribed program of study.

I hereby certify that this thesis has not been submitted for a higher degree to any other university or institution.

Linda L. Beret

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## SUMMARY

Classroom discourse has been analysed in a variety of ways for a variety of reasons. In this study a linguistically motivated methodology has been developed for the analysis of meaning features of classroom discourse. This was done by means of devising a semantic network. The semantic network provides an account of meaning choices available to teachers and students in the course of asking questions, answering them and evaluating the answers.

The semantic characteristics of questions, answers, evaluations and their nexus were analysed in particular as a way of exploring what count as legitimate answers in classroom discourse. The position taken is that the semantic features of a classroom question define what can count as a legitimate answer while the meaning features of the answer evaluation index or reflect what does count as the legitimate answer. By nexus is meant the contingency relation between the semantic features of the question, its answer and the answer evaluation.

The semantic network has been used to analyse the meaning features of questions, answers and evaluations in Year 7 and Year 11 History and Science lessons so as to:

- (1) make explicit teaching practices which have become implicit; this includes an account of the criteria teachers appear to use to evaluate students' answers in spoken classroom discourse.
- (2) locate differences in meaning patterns in the types of questions asked, answers and evaluations provided in Year 7 as opposed to Year 11, reflecting developmental variation, and History as opposed to Science, reflecting registrational variation.

That the semantic network has permitted these goals to be achieved demonstrates its efficacy as a tool for analysing classroom discourse and addressing issues of pedagogic concern.

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## **Chapter 1: The Question of Legitimate Answers: An Overview**

The research reported in this volume grew out of a practical need to know what students have to do to provide legitimate answers in classroom discourse. As a reading resource teacher, the author took as her responsibility the development of literacy across the curriculum programs for a large suburban Sydney high school. As a teacher interested in educational linguistics, the author had a good understanding of what students had to do to provide the desired answers to reading testing and reading teaching materials (Gerot, 1982). To make the literacy across the curriculum programs maximally relevant the author analysed a quantity of written teaching materials in the Sciences, History, Social Studies, Home Science and Industrial Arts in light of the kinds of tasks the students had to perform, that is, what kinds of answering they had to do. At all times the literacy programs were developed in consultation with staff, (i) as a means of keeping the programs relevant, but (ii) also as a means of helping teachers understand how to teach the language, reading and writing skills of their subjects.

As staff became increasingly aware of the role of language in learning, interest turned to spoken discourse in the classroom. The work reported here is the third phase in the continuum of asking 'what do students have to do to provide legitimate answers?'. The first phase was asking this question with reference to reading testing and teaching materials; the second was with reference to assignments, worksheets and questions set for homework across various school subjects; and this, the third phase, asks the question with reference to spoken classroom discourse.

The universe of spoken discourse in the classroom is very wide, so one small corner of this universe was selected for close study. The genre (Hasan, 1979; Martin, 1984) selected is called the 'oral revision lesson' in Australian schools. Oral revision lessons typically take place at or near the end of a unit of study in preparation for a subsequent written test or exam. During such a lesson, teachers ask aloud a series of questions relevant to the subject matter under review and/or to be tested. Students answer these questions, again aloud, and teachers evaluate these as a means of letting the students know whether or not their answer was sufficient. This type of lesson was chosen for study in particular because it was known that such lessons would provide a good base of questions, answers and evaluations for investigation. Other types of forty minute lessons, the standard length lesson period in the school in which the language data were collected, could not ensure the same quantity of question, answer and evaluation sequences per unit of time.

Why question - answer - evaluation sequences? To explore the issue of what count as legitimate answers in spoken classroom discourse, the nexus between these three pedagogic/linguistic events must be considered. The basic position taken in this research is that the semantic features of questions establish what **can** count as a legitimate answer; such features establish the inherent answer potential. The teacher's evaluation of an attempted answer, on the other hand, indexes what **does** count as the desired answer in any particular instance. Thus, answers are looked at from both ends of the question - answer - evaluation sequence.

Given that the semantic features of questions establish what can count as legitimate answers, and the semantic features of evaluations index or reflect what does count as the answer, a means of analysing the semantic features of questions, answers and evaluations was needed. While there is a considerable body of work concerned with the place of these sequences in classroom discourse and numerous empirical studies exploring the effects of certain questioning and evaluating practices in classrooms (see Chapter Two), no linguistically motivated methodology for analysing the semantic features of questions, answers and evaluations, and their nexus, existed. Hence, a primary concern of this research was to develop such a methodology. This was done by means of devising a semantic network (see Chapter Four). A semantic network is an account of the meaning choices available to speakers, in this case, teachers and students in the course of asking questions, answering them and evaluating the answers.

Just as this study is restricted to one type or genre of classroom discourse, so it is also restricted to one aspect of that discourse. The primary aim of oral revision lessons is the check and validation of transmitted knowledge (see page 52). The participants in this process are the teacher and his/her students; together these participants conduct the lesson. But lessons are conducted for the purpose of addressing content. Of primary concern in this study are those questions, answers and evaluations directly relevant to lesson content. While student questions like 'when are we having the test?' and teacher instructions such as 'sit on those chairs properly please' can be analysed using the semantic network, these are not included in the quantitative analyses of the patterning of meaning features in questions, answers and evaluations reported in Chapters Five and Six.

The language data which informed the development of the semantic network were recorded during History and Science lessons in the same high school where the author worked as a teacher. The school is located in an area of suburban Sydney considered comfortably middle class. Education is valued throughout the area and

parents take a keen interest in the school.

Lessons were audio-recorded using a National Panasonic Radio/cassette Recorder RX 1650/A placed in front of the classroom. As all classrooms in which recordings were done were carpeted and because the school is in a semi-rural area, the recording fidelity was very good. The author took field notes as the recordings were made.

Because the author, as reading resource teacher in the school, had at one time or another team-taught with all of the teachers and had worked with all of the students involved, permission to record lessons was readily granted and the presence of the author with tape recorder in the room seemed to cause little distress. Teachers involved in the recorded lessons had not less than nine years teaching experience, and all classes recorded were in the 'A' band, where 'A' band classes are considered average to above average, 'B' band a little below average and 'C' band to be remediable.

Twelve lessons, two each in Years 7, 9 and 11 History and two each in Years 7, 9 and 11 Science were recorded. The topic of discussion in all six Science lessons was 'the classification of living organisms'. In Year 7 and 9 History the topic was 'bushrangers' and in Year 11 History the topic of discussion was the French Revolution. The topics across History lessons and across Science lessons were matched as nearly as possible so as to make the referential domain (see page 52) of each bracket of lessons comparable. The place of these topics, as realisations of curricula, is provided in an outline of the curriculum documents relevant at the time the data were collected. This outline comprises Appendix Three, pages 322-337.

At the time of recording the author herself did not know which of the twelve lessons would ultimately be included in the research study. All twelve informed construction of the semantic network, but only four, one each in Year 7 and 11 History, and one each in Year 7 and 11 Science were then analysed in detail in the investigation of who took up which meaning options how often while asking questions, answering and evaluating (see Chapters Five and Six). The transcripts of the lessons included in the quantitative analyses can be found in Appendix One, pages 193-260.

The analyses of patterning of meaning features in these four lessons provide a case study:

1. For testing the efficacy of the semantic network.

2. For exploring and describing teaching practice, much of which the author believes is so taken for granted as to be 'invisible' to those engaged in it; thus the study seeks to provide a base-line description of aspects of teaching practice and to make explicit what has become implicit in this practice. As one aspect of this description, it was a goal of this research to identify the criteria teachers appear to use to evaluate student answers in spoken classroom discourse.

3. For locating differences in meaning patterning in the types of questions asked, answers and evaluations provided in Year 7 as opposed to Year 11, and Science as opposed to History. Variation of patternings in Years 7 and 11 could be taken as indication of difference on a developmental axis, and variation of patternings in Science and History could indicate registral differences, differences in the ways these two subjects are constructed. While a database of four lessons is too small to make any outstanding claims regarding differences of patterning of meaning features in History and Science, there proved to be some very consistent patternings within the two Science lessons and within the two History lessons, and between the History lessons and Science lessons. Moreover, these patterns corroborate to a remarkable degree the work of Christie (1988) and Eggins, Martin and Wignell (1987) which came to light after this study was well underway. The findings of this study and the above corroborative researches are discussed in detail in Chapters Five and Six.

It must be pointed out that the present study is not evaluative. Teaching practice is described and interpreted, but not evaluated. In this interpretation of teaching practices which came to light four sources were consulted: available pedagogic literature; classroom teachers, both those who did and others who did not participate in the recorded lessons; school students in Years 7 through 12; and the author's experience gained while developing and team-teaching curriculum based literacy programs. While the semantic network and its exegesis presented in Chapter Four assume a working knowledge of systemic-functional grammar (Halliday, 1985a), every attempt has been made to make this research study accessible and relevant to educators.

In this programmatic account the main concerns of this research have been raised. Most centrally, the study addresses the question of what count as legitimate answers in classroom discourse. To explore this issue, the nexus between questions, answers and their evaluations must be considered. This is because the semantic features of a question establish what can count as a legitimate answer and evaluation of the answer indexes what does count as the answer in classroom practice. Hence, a primary goal of this research was to develop a methodology

for the analysis of meaning features of questions, answers and evaluations. This was achieved by devising a semantic network, an account of the meaning options available to students and teachers in spoken classroom discourse.

The questions, answers and evaluations of four lessons were analysed using this network:

1. to test the efficacy of the semantic network;
2. to find out who took up which options how often, so as to
  - (a) provide a description of teaching practices, making explicit teaching behaviours taken for granted by practitioners;
  - (b) identify the criteria teachers appear to use to evaluate students' answers; and
  - (c) locate any differences in patterning of meaning options taken up, between Years 7 and 11, reflecting developmental variation; and Science and History, reflecting variation in the ways knowledge is constructed in these two subjects. These points are developed in detail in the remainder of this volume.

Having stated explicitly what is attempted in this research study, it is appropriate at this point also to state what is not attempted.

- (1) The study is not an exploration of the classroom or school as a social institution.
- (2) The study is not an analysis of co-construction of knowledge in the classroom.
- (3) Prosodic features of utterances are not analysed, though of course such features were used by the author, as a language user, to transcribe and analyse the spoken language data.

These issues quite rightly have and continue to attract research attention. But because they do not comprise the central concerns of the present research, these issues are not explored in this thesis, nor is the research addressing them reviewed.

However, in Chapter Two the concerns of the present research study are compared and contrasted with those of other studies of classroom questions, answers and evaluations. The present study in no way seeks to replace other accounts. Rather, to understand the nature of questions, answers and evaluations and their use in classrooms, a multiplicity of perspectives is needed. The present study provides one such perspective and so can be seen to complement other accounts.

The linguistic theory which underpins this research is the systemic-functional theory (Halliday, 1973, 1978, 1985a). Those aspects of this theory which make it a particularly suitable one for this study are outlined in Chapter Three. While this account seeks to make clear the central tenets of this theory, a full account of the theory (which includes the grammar) could not be presented in a single thesis. The reader is referred to the above works of Halliday for a fuller account. It should also be pointed out that no attempt has been made in the present study to provide a critique of the systemic-functional model nor its place amongst other linguistic theories. However, it was a goal of the present research to demonstrate the usefulness of this theory for the study of classroom discourse.

The semantic network developed for the analysis of meaning options available to speakers in classroom discourse is presented in Chapter Four. Patternings of meaning features taken up during questioning and answering are reported in Chapter Five. Interpretation of the differences which emerged, particularly between History and Science, is provided. In Chapter Six patterns of evaluation are reported and the criteria teachers appear to use to evaluate spoken answers are discussed.

The main findings of this research, their implications for what it is that appears to count as having knowledge in the lessons analysed and suggestions for further research conclude the study in Chapter Seven.

## Chapter Two: Literature Review

### 2.1 Introduction

Asking questions and answering them are integral parts of students' and teachers' linguistic repertoires. So commonplace is the asking and answering of questions in classroom practice that it comes to be taken for granted by those involved. But researchers have been asking questions about classroom questions for decades.

From the first major systematic study of classroom behaviour (Stevens, 1912, cited in Hoetker and Ahlbrand, 1969) to more contemporary studies (e.g. Lemke, 1982), a characteristic pattern of classroom interaction has been noted. This interaction occurs as a three part structure: a teacher asks a question, one or more students attempt an answer, and the teacher in turn evaluates that answer.

Research issues focusing on this triadic pattern have been of two general kinds:

- (1) those which focus on the characteristics of questions entering into this pattern, and
- (2) those which describe the place of this pattern in classroom discourse.

Many of the earliest studies of classroom discourse were concerned with counts of various types of questions occurring in classroom talk, and over the years there has been a proliferation of schemes for classifying classroom questions. Many of these schemes are, as Gall (1970:708) points out ... "composed almost entirely of categories based on the type of cognitive process required to answer the question". The notion 'cognitive process' is often taken as self-evident; it is not well-defined, but appears to refer to the kind of thinking required to answer a question. Inferring what kind of thinking processes someone uses is in itself problematic (see page 10). Nevertheless, concern for cognitive level of questions and their effects for the level of answering and/or student achievement dates back as far as the 1920's (Monroe and Carter, 1923, cited in Hoetker and Ahlbrand, 1969). These concerns continue to attract research interest today.

Other studies have explored the place of question-answer-evaluation sequences as elements of structure of classroom discourse. Still others have considered the role of classroom questions and their sequel in the construction of social relations and the management of classroom meanings.

Given the vast literature addressing the nature of classroom verbal interaction, it is not possible to cite each and every relevant study. Instead, from this body of literature have been selected well-regarded researches which can be taken as representative of certain mainstreams in the study of questions and their sequel in classroom discourse. Thus the studies reviewed should be taken as representative, not exhaustive, of (1) the kinds of issues addressed in the literature, and (2) the many excellent studies addressing the particular issues outlined above. Presenting a deliberately delimited review is not intended to devalue those issues or studies not included. Rather, it is intended to provide a succinct and relevant context for the present study.

Several recent studies, using the systemic-functional linguistic model, have analysed the language of science and history textbooks as a means of describing how that language is used to represent and teach these fields. The patterning of meaning features reported in Chapters Five and Six of this volume closely corroborate the findings of these recent studies. These researches are discussed as relevant in Chapters Five and Six.

## **2.2 'Effective' Questioning and Evaluating**

Studies reviewed in this section focus on the characteristics of classroom questions, questioning and evaluating behaviours abstracted out of the on-going flow of classroom discourse.

### **2.2.1 Questions: Classification and Cognitive Level**

Most early studies of classroom questions were concerned with finding out who asked how many questions of what kind. The latter consideration - of what kind - required that some kind of classification scheme for questions be employed. There has been a proliferation of schemes for classifying classroom questions. This proliferation is the result, at least in part, of the fact that question use, like all language use, is context sensitive. So classification schemes were developed for different curricula, for example reading (Guszak, 1967), art (Clements, 1964), and social science (Schreiber, 1967).

Several other systems consist of general categories which are used to classify classroom questions irrespective of their curricular context. Notable here are the schemes of Taba, Levine, and Elzey (1964); Aschner, Gallagher, Perry, Afsar, Jenne and Farr (1965); and Bloom (1956). These latter classification systems are composed of categories based on the type of cognitive process required to answer the question. Of the three general schemes mentioned here, that of Bloom has been by far the most influential. It is singled out for

discussion for that reason.

Bloom did not set out to develop a classification scheme for questions, but rather tried to develop a taxonomy of educational objectives. The taxonomy was described as a "purely descriptive scheme in which every type of educational goal is represented in a relatively neutral fashion" (Bloom, 1956:14). These goals or objectives were stated in cognitive behavioural terms, and were said to be ordered in complexity, with the more complex behaviours including the simpler ones.

Consumers of the taxonomy adopted it as a classification scheme for questions, accepting on faith that the categories were indeed ordered in difficulty. 'Accepted on faith' because the taxonomy was not shown either theoretically (Bloom 1956:17) or empirically (Krathwohl, Bloom and Masia, 1964:11) to form a hierarchy. To date the taxonomy so widely believed to be hierarchic has not been shown to be so (Gerot, 1982), perhaps in part because tests for hierarchy capable of measuring statistical significance have only relatively recently become available (Bailey, 1978). And the categories were not to remain 'neutral'. Bloom was at pains to distinguish between the category 'knowledge', which emphasised the psychological process of remembering from other, higher level skills and abilities. These latter are said to require more than remembering. They require that remembered knowledge be put to use in reaching more difficult outcomes through processes of organisation and reorganisation. Amongst users of the taxonomy this distinction served as the basis for positing 'low' and 'higher' levels of thinking, and hence 'low' and 'high' level questions which are said to elicit low or high level responses. Throughout the relevant pedagogic literature 'low-level' questions equate with those requiring 'factual recall' in supply of the answer.

As the notion 'low' and 'high' level questions became established, educators began exhorting teachers to ask more high-level questions in the belief that such questions elicit high level answers. Lamb (1976:22), for example, argued that "a higher-order question elicits a higher-order response". As a corollary of this, it was felt that 'higher order' questions/responses would positively affect student achievement. Influential proponents of this view include Sanders (1966) and Hyman (1979).

However, these beliefs are in doubt. Dillon (1982a) found in his own research and in a review of others' research that there was a correspondence between the cognitive level of question and answer only about fifty

percent of the time. So 'higher-order' questions elicit 'higher order' responses about half the time. So called low-level questions were answered with high-level answers and high-level questions with low-level answers the remaining fifty percent of instances.

The assumption that high-level questions positively affect student achievement is also in doubt. Two meta-analyses of studies testing this hypothesis came to opposite conclusions. Winne (1979), on the basis of studies included in the meta-analysis, concluded that predominant use of higher cognitive questions had little effect on student achievement. Redfield and Rousseau (1981), using many of the same studies, concluded that higher cognitive questions resulted in gains in student achievement. Thus, the findings of these two major researches into the matter are equivocal.

Even if the notion 'cognitive level' and its effects for student achievement are accepted - and it is commendable that teachers are encouraged to extend students' thinking - there is a problem for accurately assigning the imputed cognitive level to a question. To do so depends on knowing what text the answerer has been exposed to. A student might be unable to answer the question 'Why do you think reptiles bury their eggs in the ground?' if asked out of the blue. The student, however, might be able to infer the answer if the preceding statement was something like - 'Now, reptiles lay leathery shelled eggs. So why do you think they bury their eggs in the ground?'. The same question asked of the same student during a revision lesson could be supplied by 'factual recall'. The notion 'cognitive level' remains an attractive but unproved construct, and the difficulty of accurately imputing cognitive level of questions renders the notion problematic. Dillon (1982b:132), who offers carefully reasoned criticisms of the notion, suggests that questions make requests, not elicit responses, for information, not cognition. The semantic networks for questions, presented in Chapter Four of this work, are predicated on this argument. The task of the network is to specify what kinds of requests can be made for what kinds of information. The options displayed are those made available through the grammar of the English language. As such, the network has nothing to say about the 'cognitive levels' of questions or their effects on answering and student achievement.

### **2.2.2 Evaluation and Student Achievement**

Sinclair and Coulthard (1975:36-37) point out that ...

a special feature of the classroom situation is that a number of individuals have (been) gathered together for the specific purpose of learning something. They answer questions and follow instructions and they need to know whether they are performing adequately.

Evaluation serves the purpose of letting students know how they are performing; it lets them know whether their answers are 'right' or 'wrong'.

Compared with the number of studies concerned with classroom questions, there are few studies of evaluation and its effects. However, those few studies published are quite consistent (1) in their descriptions of the values and strategies of evaluation, and (2) in their findings for the effect positive evaluation has on student achievement.

Bellack, Kliebard, Hyman and Smith (1966), Zahorik (1968), Hughes (1973) and Lemke (1982) all provide descriptions of evaluations. In general, the values available are 'positive', 'negative' and 'reserved'. The strategies for signalling evaluation include the use of closed classes of items such as 'good', 'yes', 'no', 'well', 'close'; repetition of the answer being evaluated; giving supplementary information which accepts or rejects the answer by implication; silence; or putting the same or a variant question. These values and strategies are brought into relation to each other and the recognition criteria provided in the semantic network presented on page 99 of Chapter Four. Bellack, et al (1966:178) found that 80% of teachers' evaluations were positive and 20% negative. Interestingly, in the present case study, 82% (237/290) of evaluations were positive and 18% (53/290) negative (includes 'reservation' as does Bellack's) (see page 155). This suggests that this aspect of teaching practice has changed little over the past twenty years.

This is not discouraging in the light of the researches of Hughes (1973) and Clark, Gage, Marx, Peterson, Stayrook and Winne (1979) who found that explicitly positive evaluation enhances student achievement. Notable for its absence is any account of the criteria teachers use to evaluate answers in spoken classroom discourse. Mehan (1974) provides an instance-specific account of the criteria a teacher used to evaluate answers in one particular lesson, and French and MacLure (1979) provide an interesting account of how teachers systematically reformulate their questions in their attempts to lead students to the desired answers, but no where are the general criteria teachers use to evaluate spoken answers in classroom discourse articulated. One of the goals of the present research study was to deduce from the patterning of evaluation the criteria so used. These

criteria are discussed in Chapter Six (section 6.6, page 169).

In this section (2.2) studies concerned with classroom questions and evaluations considered as discrete entities, abstracted out of the flow of classroom discourse have been briefly reviewed. These linguistic/pedagogic events do not typically occur in isolation, however. In classroom discourse, questions, answers and evaluations usually occur as a three-part sequence. This three-part structure is a very prevalent feature of classroom discourse, as has been noted previously.

In Section 2.3, to follow, the place of this pattern in classroom discourse structure is discussed. In particular, studies by Bellack, et al (1966), Sinclair and Coulthard (1975), and Mehan (1979) are reviewed. Then in Section 2.4 the implications of this pattern for construction of (1) social relations in the classroom, and (2) school knowledge are discussed. Accounts of research conducted by Mishler (1975, 1978), Edwards and Furlong (1978), Stubbs (1976, 1983), Lemke (1982, 1985), Kress (1985), and Edwards and Mercer (1987) are included in this discussion. The work of Douglas Barnes (1976, 1986) is reflected in these latter accounts but is not reviewed at this point. Rather, Barnes' work is cited as relevant in the remainder of this study, particularly in Chapters Six and Seven.

## **2.3 Studies of the Structure of Classroom Discourse**

The studies of Bellack, et al (1966), Sinclair and Coulthard (1975) and Mehan (1979) were all concerned to discover the structure of classroom discourse.

The study of Bellack, et al was motivated by pedagogical concerns. They state that the main aim of their research was ...

to study the teaching process through the analysis of the linguistic behaviours of teachers and students in the classroom. ... Our major task was to describe the patterned processes of verbal interaction that characterise classrooms in action.

The research reported in Sinclair and Coulthard's (1975:8) work ...

set out to describe the structure of one form of spoken discourse - that is the way in which units above the rank of clause are related and patterned - and the way in which such language functions as statement, question and command are realised through grammatical structure and position in the discourse.

They focused on classroom discourse rather than casual conversation because it was felt that the former would have more overt structure. In classroom discourse one participant has responsibility for the direction and control of the discourse and for allocating turns for talk. Thus motivation for undertaking the study of classroom discourse and the kinds of research issues addressed were primarily linguistic, not pedagogic. Accordingly, much subsequent debate about the work has been amongst linguists, not educators.

Mehan's (1979) research was motivated by a concern for the effects of schooling. The latter, he points out, is a matter of political and public interest. Correlational studies of the effects of schooling have influenced both political and public opinion, but these studies, Mehan argues, do not reflect directly or reliably the effects of schooling. He suggests that because educational facts are constituted in interaction, we need to study interaction in educational contexts. Consequently, Mehan's study ...

is based on the premise that answers to questions about the role of schooling in society will not come from large-scale comparisons across schools, but will come from careful descriptions of what takes place inside schools. (Mehan, 1979:8)

To provide such a description, Mehan adopted as his methodology 'constitutive ethnography'. The goal of constitutive ethnography is two-fold: (1) to describe the systematic patterns of routine, social behaviour - in this case, classroom behaviour - and (2) to describe the interactional work that assemble those patterns. Hence, he is concerned with the structure and structuring of classroom events.

Thus, each of these three studies is concerned for its own reasons with the structure of classroom discourse. The ensuing discussion of these works is organised around three related considerations: the authors' treatment of meaning in discourse, their categories of analysis, and how the notion text structure is conceived and articulated.

### **2.3.1 Classroom Discourse as a Language Game**

Bellack, et al (1966) undertook as their major task a description of the patterned processes of verbal interaction that characterise classrooms in action for the purpose of studying teaching processes.

Bellack and his colleagues reasoned that the primary function of language is the communication of meaning and that describing linguistic events in terms of the meanings expressed by teachers and students was a fruitful direction for research. Bellack's concept of the nature of meaning was derived from Wittgenstein's view

that 'the meaning of a word is its use in the language' (Wittgenstein, 1958:20, cited in Bellack, et al, 1966:2).

Equation of meaning and use suggested that the problem here was that of identifying the distinctive functions language actually serves in the verbal interplay between students and teachers and hence what meanings are conveyed through the words they use. (Bellack, et al, 1966:2)

Bellack identified two dimensions of meaning:

- (1) 'what the speaker was saying', that is, doing pedagogically by saying, and
- (2) **what** he was saying, in systemic-functional terms, the experiential meaning of the utterance (see Chapter Three).

So Bellack was concerned to define what a saying was doing in the discourse and additionally with experiential meaning.

Concern with 'what the speaker was saying' influences Bellack's concept of structure. Wittgenstein's metaphor of the language game served as the model for discourse structure in Bellack's study.

A game has a definite structure, and there are certain moves that a player is bound to make in so far as he is playing the game at all.  
(Bellack, et al, 1966:3)

Hence, in Bellack's study the basic unit of discourse was defined as the pedagogical move, with the latter being classified in terms of the pedagogical functioning it performs in classroom discourse. Bellack, et al identified four basic types of moves:

**Structuring** moves serve the function of setting the context for subsequent behaviour by (1) launching or halting-excluding interactions between teacher and pupils, and (2) indicating the nature of the interaction in terms of the dimensions of time, agent, activity, topic and cognitive process, regulations, reasons and instructional aids.

Moves in the **soliciting** category are intended to elicit (a) an active verbal response on the part of the persons addressed; (b) a cognitive response, e.g. encouraging persons addressed to attend to something; or (c) a physical response. Although these moves may take all grammatical forms - declarative, interrogative and imperative - Bellack suggests that the interrogative occurs most frequently.

**Responding** moves bear a reciprocal relationship to soliciting moves and occur only in relation to them. Their pedagogical function is to fulfill the expectations of soliciting moves and is, therefore, reflexive in nature.

**Reacting** moves are occasioned by a structuring, soliciting, responding or a prior reacting move, but are not directly elicited by them. Pedagogically, these moves serve to modify (by clarifying, synthesising, or

expanding) and/or rate (positively or negatively) what was said in the move(s) that occasioned them (Bellack, et al, 1966:18-19).

These four moves occur in classroom discourse in certain cyclical patterns or combinations Bellack designated as 'teaching cycles'. These may comprise a single Structuring or Soliciting move, or may involve longer, more complex sequences:

STR  
STR SOL  
STR REA ...  
STR SOL RES ...  
STR SOL REA ...  
STR SOL RES REA ...  
STR SOL RES REA RES ... REA ...

SOL  
SOL RES ...  
SOL REA ...  
SOL RES REA ...  
SOL RES REA RES ...  
SOL RES REA RES ... REA ...

STR = Structuring  
SOL = Soliciting

RES = Responding  
REA = Reacting

... = optional recursion of designated move (Bellack, et al, 1966:20)

Thus, in Bellack's study discourse structure is conceptualised in terms of constituent moves which combine to form a unit at a higher rank, the teaching cycle. Teaching cycles combine to comprise a lesson.

Using the concepts of pedagogical moves and teaching cycles, we are able to describe classroom discourse in terms of one of the dimensions of meaning with which this research was concerned - meaning from the viewpoint of the pedagogical significance of what teachers and students communicate. (Bellack, et al, 1966:5)

While this description is intuitively appealing, it is only definitional; lexicogrammatical criteria for recognising these moves are not provided. This problem is one shared by all three of the studies being reviewed in this section.

Bellack, et al were concerned not only with meaning from the viewpoint of the pedagogical significance of what was said, but also ... "in the dimension of meaning represented by the content of the messages communicated" (Bellack, et al, 1966:5). Bellack proposed four types of meaning for the latter:

- (1) substantive, having to do with subject matter; this was analysed by means of 'content analysis' of the trade relations pamphlet used in the study;
- (2) substantive-logical refers to the cognitive processes involved in dealing with the subject matter; whether the task involved defining, interpreting, fact-stating, explaining, opining or justifying;
- (3) instructional, which concerns matters relating to the instructional process; and
- (4) instructional-logical concerning the cognitive processes involved in giving instructions, explaining

procedures and rating.

Having codified their data by the categories established, Bellack, et al subjected the data to frequency analysis. Using the resulting frequency tables, Bellack discusses discursively the 'rules for the language game called teaching'. Overall it was found that the teacher is the most active player in this game, and that the game is played within the teacher's structure. The teacher's primary role is solicitor and reactor while the pupil's is respondent. Teachers' rating reactions were heavily weighted in a positive direction with clear-cut negative reactions to pupil responses being rare. Fact-stating and explaining were much more common than defining, interpreting, opining, and justifying.

When the patterning of meaning features in the present case study, reported in Chapters Five and Six, is considered, it appears that the 'rules of the language game called teaching' have changed little in the past twenty years.

### **2.3.2 Acts and the Teaching Exchange**

One of the two main aims of Sinclair and Coulthard's (1975) research was to describe the structure of discourse, "to describe the way in which units above the rank of clause are related and patterned" (Sinclair and Coulthard, 1975:8). This of course presented them with two major tasks: (1) to determine what the units above the rank of clause were, and (2) to explain how these units are related and patterned.

To handle units above the rank of clause, Sinclair and Coulthard proposed a new level above grammar, namely 'discourse'. And reasoning from the qualitative shift between phonology and syntax, they suggested that discourse is qualitatively different to syntax. In other words, just as phonology cannot be extended to explain grammatical patterning, neither can grammar be extended to explain discourse patterning. Thus they argue that their minimal unit of discourse, the 'act', is qualitatively different to grammatical units.

The units at the lowest rank of discourse are acts and correspond most nearly to the grammatical unit clause, but when we describe an item as an act we are doing something very different from when we describe it as a clause. Grammar is concerned with the formal properties of an item, discourse with the functional properties, with what the speaker is using the item for. (Sinclair and Coulthard, 1975:27-28)

Acts are defined according to their function in the discourse and thereby provide for Sinclair and Coulthard an account of meaning of an utterance; but further, acts combine in predictable structures to form higher

units. Each of these points shall be developed in turn.

The account of meaning Sinclair and Coulthard provide was influenced by Firth. They quote Firth (1935) on the matter:

*the principal components of ... meaning are phonetic function, which I call a 'minor' function, the major functions - lexical, morphological, and syntactical ..., and the function of a complete locution in the context of situation, or typical context of situation, the province of semantics.*  
(Sinclair and Coulthard, 1975:1-2)

Sinclair and Coulthard conceive of meaning as pertaining to utterances as wholes, with the 'discourse value' of utterances. For an account of meaning of this kind, they drew on the work of Hymes (1972, cited in Sinclair and Coulthard, 1975:10). Like Hymes, they reached the conclusion that discourse was a level distinct from grammar and that the speech act is the minimal unit of discourse. They suggest that speech acts are defined according to their function in the discourse and combine in predictable structures to form higher units. Thus, Sinclair and Coulthard's statements of meaning are of the order 'this saying/utterance is an instance of X class of doing'.

Sinclair and Coulthard's account represented a considerable advance in speech act theory. Firstly, they extended the theory into the analysis of **actual spoken text**. Before this speech act theory restricted itself to the examination of single, analyst constructed sentences. Secondly, they recognised that utterances have speech act status in co(n)text, not in isolation.

*... grammatical structure is not sufficient to determine which discourse act a particular grammatical unit realises - one needs to take account of both relevant situational information and position in the discourse.*  
(Sinclair and Coulthard, 1975:23)

Unfortunately, however, Sinclair and Coulthard do not present an analysis of context and its relation to text and so their remarks relating to 'situation' and 'position in discourse' remain programmatic.

In Sinclair and Coulthard's account, an act is a functional unit which specifies what a speaker is using language for. These acts are said to combine in predictable structures to form higher units. For the analysis of discourse patterning, Sinclair and Coulthard use the notion of a rank-scale (Halliday, 1961).

The basic assumption of a rank-scale is that a unit at a given rank is made up of one or more units of the rank below, and combines with other units at the same rank to make up one unit at the rank above. The unit at the

lowest rank has no structure. So in the rank-scale of grammar, morphemes have no structure but combine to form the unit at the next rank above - words. Likewise in the discourse rank-scale acts have no structure but combine with other acts to form the unit next above - moves. Moves, in turn, combine to form exchanges, exchanges combine to form transactions, and transactions combine to form the unit lesson.

Thus the units in the discourse rank-scale Sinclair and Coulthard posit are: act, move, exchange, transaction, lesson. There is sequential patterning of units within ranks, and a 'consists of' relation of units between ranks. The unit which has attracted the most attention subsequent to the publication of the 1975 work is the exchange. Two classes of exchange - Boundary and Teaching - are proposed for classroom discourse. The elements of structure in Teaching Exchanges are: Initiation (I), Response (R) and Feedback (F). These combine to form a textual syntagm consisting of an obligatory Initiation, followed optionally by a Response and/or a Feedback: I(R)(F). Initiations are comprised of Opening Moves, which in turn select (at head) an elicitation, directive, informative or check act. Responses are comprised of Answering Moves, which in their turn select (at head) a reply, react or acknowledge act. Feed-back is comprised of Follow-up Moves, which select from the acts accept, evaluate and comment. We meet here again the familiar question - answer - evaluation pattern in classroom discourse.

Sinclair and Coulthard's work was/is important in its attempt to address the analysis of spoken discourse, rather than single, isolated analyst-constructed sentences. In this work the 'act' is a central concept, in their treatment of meaning, as a category of analysis and as a unit of structure. There are, however, several shortcomings in their account of 'acts'.

Firstly, the acts they describe are presented as an inventory of items; as such the question of how these items are related to one another is not addressed, so the reader has no way of knowing to what extent the items may enter into a system. Secondly, while definitions of all acts are given, the lexicogrammatical realisations are provided for only the closed classes.

Moreover, in their concern to describe the linear and hierarchical structure of textual syntagms, Sinclair and Coulthard provide no means for analysing the semantic properties of the constituent elements comprising those syntagms. So while we can label an utterance 'elicitation', 'reply' or 'evaluate' and suggest that these

comprise 'teaching exchanges', the account provides no way of analysing the internal meaning features of each of these 'acts'. In short, while Sinclair and Coulthard provide an interesting account of the syntagmatic patterning in discourse, they have little to say about its paradigmatic aspects. The semantic network presented in Chapter Four of this volume can be seen, in part, as a means of overcoming criticisms of these kinds.

2.3.3    **Structure and Structuring in Classroom Discourse**

Mehan (1979), in his concern for the effects of schooling, was interested in exploring the structure and structuring of classroom events. To this end, he provides an account of both the hierarchical and sequential organisation of classroom discourse. Though he denies that his hierarchy of constituent elements is a rank-scale, his account looks remarkably like one:

Looked at from the bottom to top, lessons are organised into interactional units of increasing size. Initiation, reply and evaluation acts are assembled into elicitation, informative or directive interactional sequences. Interactional sequences are arranged into topical sets. Topical sets in turn make up the instructional phase of lessons, and a sequence of phases composes the classroom event called a lesson. (Mehan, 1979:74)

All utterances made by any one speaker during his turn at talk are classified as initiation, reply or evaluation. Mehan states that during the exploratory analysis of his data these basic sequences - initiation, reply and evaluation - were 'located'. But the criteria for assignment of an utterance to one, rather than another category remain unclear. Consider the following two examples, taken from pages 38-39 and 40-41 of Mehan's book:

Example 1:

Initiation	Reply	Evaluation
T: Um, now let me ask you ... walking to the cafeteria and back without cutting.	Prenda: Uh huh, and .... Others: Yes	
T: That part's been ok, right, Prenda.		

---

Example 2:

Initiation	Reply	Evaluation
T: (shuffles cards on lap) Okay.		
Carolyn: Namecards		T: Namecards, right, Carolyn.

Comparing these two examples of analysis it could be asked why the teacher's 'That part's been ok, right Prenda' is initiation, while 'Name cards, right Carolyn' is evaluation. Similarly, it is unclear why Carolyn's 'Name cards' is initiation while Prenda's 'uh huh, and ...' is reply.

Leaving these problems aside, it is said that initiation, reply and evaluation acts are assembled in elicitation, informative or directive interactional sequences. The three terms 'elicitation', 'informative' and 'directive' carry the burden of meaning in Mehan's account. These sequences are defined by the pedagogic function in the discourse and refer to whole turns at talk. Directives call for respondents to take procedural action; informatives pass on information, ideas and opinions; and elicitation exchange academic information.

Interactional sequences are arranged into topical sets.

A topically related set is composed of a basic sequence which establishes the topic for discussion. Basic sequences are often followed by one or more conditional sequences, which build on the topic introduced in the basic sequence. (Mehan, 1979:65)

Topical sets combine to make up the instructional phase of a lesson. Lessons consist of three phases: an opening phase, an instructional phase and a closing phase. In the opening phase the teacher and students inform each other that they are going to have a lesson. The opening phase is said to be assembled through directive and informative sequences. In the instructional phase academic information is exchanged between the teacher and students. This phase is composed primarily of elicitation sequences. In the closing phase the teacher and students formulate what they've done and prepare to move on to other classroom activities. This phase, like the opening phase, is assembled through informative and directive sequences.

Mehan was concerned not only to discover this structure, but also to explore the structuring of classroom interaction. He was interested in how the organisation he described came about. He pursued this issue by

examining what teachers and students did that produces the organised character of classrooms. Organisation is seen here as an act of assembly, jointly achieved by the teacher and students in interaction.

Applying this conception to the organisation of classroom lessons, the structuring of classroom lessons becomes the topic of enquiry. This inquiry shows that the teacher and students engage in a turn allocation machinery that achieves the orderly progression of interaction in lessons. (Mehan, 1979:83)

In other words, Mehan claims that the organisation of classroom lessons is achieved through the operation of a turn-allocation machinery, which he goes on to describe in some detail.

Attributing the organisation of classroom lessons to the operation of a turn-allocation machinery becomes problematic in light of the fact that in my own data is one lesson in which there is no turn allocation machinery (see Transcript 1.4, Appendix One, page 242). As the following excerpt from this lesson transcript shows, there is turn taking, but not once does the teacher or any students nominate/appoint another to speak. But this does not result in chaos. The lesson is well organised, the interaction orderly.

Excerpt from Year 11 Science lesson transcript:

Tchr: Ah, what's the main difference between plants and animals?

Neil: Food - one eats food and the other makes it.

Tchr: Yes, what are the correct terms?

John: Autotroph and heterotroph. [teacher writes this on board]

This suggests that turn-allocation or turn taking is only one possible interpretation of how the structuring of lessons is achieved. Hasan's work (1979, 1982, 1985a) has shown that the structure of a type or genre of discourse is motivated by context, by particular values of field, tenor and mode (see Chapter Three, page 46). It seems reasonable to suggest that the structuring of a social event may also be motivated by the context of that event. In this interpretation, structuring is seen as being achieved through participants acting in certain roles, within particular kinds of social activity in an attempt to achieve certain goals.

To conclude, I will return to Mehan's main concern, the influence of schooling. He suggests that

a systematic description of what goes on in lessons will tell us about how the process of learning unfolds in naturally occurring school situations, knowledge that, in turn, will inform us about the influence of schooling. (Mehan, 1979:33)

It could be argued that Mehan's work is not so much an account of 'how the process of learning unfolds' as a portrait of socialisation into lesson conduct, and personal conduct with reference to lesson conduct. In this sense his work does inform us about the influence of schooling.

The above three researches provide interesting and insightful accounts of the structure of classroom discourse. In these accounts the language used by teachers and students is analysed as constituent elements of discourse structure. These descriptions are usefully supplemented by accounts of how social relations and classroom meanings are constructed through the language of the classroom. It is to accounts of these latter kind that we now turn.

## **2.4 Social Relations and the Construction of Meaning**

In this section are reviewed studies which are concerned with the role of questions, answers and evaluations in the expression/construction of social relations in the classroom and the means whereby classroom interaction and meaning construction are managed.

### **2.4.1 The Realisation of Authority in Question-Initiated Conversations**

Mishler's researches (1975, 1978) are expressly concerned with the ways differential power and authority relations are realised through patterns of questioning and answering in first-grade classrooms. Mishler starts with the assumption that questioning is one important way through which one speaker attempts to exert control over another. It is said to be a realisation or expression of authority relationships.

Through the act of questioning, one speaker defines the way in which the other is to continue with a conversation and thus defines their relationship to each other along a dimension of power and authority. (Mishler, 1975:105)

In the 1975 study Mishler found that when adults initiate an adult-child conversation with a question, they retain control of that conversation by asking successive questions after the child responds. When the child initiates a child-adult conversation with a question, the adult gains control of the conversation by responding to the child's question with a question of his own. Mishler (1975:117) suggests that these patterns realise a differential in the

authority between the speakers involved, adults being the more powerful.

In an extension of the above study Mishler (1978) found that:

- (1) compared with children, adults asked proportionately more closed/constraining, that is yes/no, questions than open [wh-] type questions;
- (2) children's responses to adults' yes/no questions were shorter than their responses to adults' wh-questions.
- (3) children's responses to other children's yes/no questions were longer than their responses to adults' yes/no questions.

Mishler interprets these patterns as reflecting differences in the relative power of adults and children in classroom settings.

I should like to raise two points concerning this research. Firstly, the analyses of who takes up which meaning options how often in the case study comprising this thesis directly contradict the first two of the above findings. Teachers in the present study asked many more wh-questions than yes/no questions. Moreover, students' answers to teachers' yes/no questions were elaborated proportionately more often than those to wh-questions. Hence, the assumption that yes/no questions are necessarily 'closed' or 'constraining' is in doubt. These points, because they contradict received pedagogic wisdom, are developed at length in Section 5.4 below.

The differences in findings in Mishler's and the present study may indicate that questions and answers are used differentially in first grade and high school classrooms. Mishler provides very little of the original language data upon which his findings are based, so this remains speculative.

Secondly, although Mishler is concerned with status relations, his account of these is incomplete. Status relations vary by dimensions of age, knowledge, production and distribution (Hasan, 1988a). Mishler (implicitly) defines status in terms of age alone - the speakers are 'adults' and 'children'. This ignores the influence of 'knowledge' and the fact that the agent roles (see page 50) relevant to his studies are teacher and taught. In his concern to demonstrate the realisation or expression of authority relationships, Mishler fails to take into account one of the main sources of that authority in the classroom.

In the studies reviewed below (section 2.4.2) the researchers discuss the source(s) of teachers' authority

and the implications of this authority for the management of meaning construction in the classroom.

#### 2.4.2 The Management of Classroom Meanings

Kress (1985:1) suggests that education is an institution particularly focused on the reproduction of culture. Edwards and Mercer (1987) echo this view, stating the schools' *raison d'être* is their function of passing on a part of the accumulated knowledge of a society and evaluating children's success in acquiring this knowledge. The teacher is a key agent in this process. Charged with such a responsibility, the teacher must in turn have authority to carry out his or her function. This authority has two aspects, which Russell (1983:30) succinctly summarises when he says that ... "a teacher is an authority in authority". Being *an* authority refers to a teacher's knowledge; the teacher is an authority in some aspect of the culture of the community. Being *in* authority refers to a teacher's position; in his/her role *as* teacher, the teacher is vested with the authority to do a certain job. Through the authority vested in her, the teacher manages the construction of classroom meanings. Stubbs (1976, 1983), Edwards and Furlong (1978) and Lemke (1982, 1985) discuss this phenomenon at some length. Lemke, for example, was concerned with analysing the regular patterns of interaction that occurred and with the verbal and non-verbal strategies by which the science content of lessons is communicated. He calls the patterns of social interaction 'activity structures' and the shared systems of meaning constructed in lessons 'thematic systems'. Though they are separable for purposes of analysis, Lemke demonstrates that they are aspects of the same flow of behaviour:

... every act is assigned a meaning both in the interaction and thematic development. (Lemke, *Prolegomena*, 1982:12)

In other words, verbal and non-verbal acts in classrooms have a dual function: they construct and maintain/change the interactional pattern or activity structure, and they also simultaneously construct meanings or 'thematic systems'. This position is similar to that of Stubbs (1976:95); Edwards and Furlong (1978:24), and Bernstein (1986) who suggests that 'instructional discourse' is embedded in 'regulative discourse'.

It is in the above sense that teachers 'manage' classroom meanings. They are responsible for establishing and maintaining the interaction through which classroom meanings are made. The primary technology for achieving this is talk. In this the above researchers are in complete agreement. Social interaction takes place through talk and the systems of meaning shared by teachers and students are constructed through talk.

Through this talk teachers and students attempt to develop a shared understanding, some mutuality of perspectives (Edwards and Mercer, 1987:1, 155; Edwards and Furlong, 1978:107; Kress, 1985:90; Lemke, 1985:8). Lemke (1985:8) characterises what goes on in classrooms as 'teachers and students sharing and negotiating ways of talking and doing', that is, ways of meaning. Because of his position as *an* authority, the teacher's meanings may prevail. Nevertheless, students are active participants in the enactment of classroom interaction and meaning construction.

Thus, all lessons have a Thematic aspect and an Interactive aspect (to use Lemke's terms), created and sustained in and through talk. Usually this talk takes the form of dialogue, and dialogue of a particular kind. Research has been almost unanimous in revealing the most prevalent form of dialogue in classroom discourse - the familiar Teacher Question - Student Answer - Teacher Evaluation sequence. This pattern, it is suggested, gives the teacher many opportunities to control the interaction while at the same time shaping the meanings being constructed. As Stubbs (1976:99) points out, in this pattern ...

it is the teacher who initiates and then evaluates the responses, before asking another ... question. This conversational structure gives the teacher almost complete control over initiating the topic, and over evaluating, accepting or rejecting the pupil's contribution ....

Through use of this pattern, the teacher exercises both interactional control and control of the thematic development. This is done primarily through series of teacher questions and through evaluation. By means of the Teacher question - Student answer - Teacher evaluation pattern, the teacher provides the framework into which student talk is fitted, ... "and that talk is assessed according to its closeness of fit" (Edwards and Furlong, 1978:101).

This 'closeness of fit' is at the heart of the notion 'legitimate answers'. While the meaning features of a question establish a potential within which to provide an answer, in classroom discourse there is typically one, most desirable answer, known by the teacher.

Teachers typically ask questions to which they already know the answer. And so ... "children respond, not in order to inform the teacher, but in order to demonstrate certain kinds of knowledge" (Kress, 1985:40). Because teachers know what they want to hear, they offer assessments rather than replies to children's responses. That is, students' answers are assessed according to their 'closeness of fit' to what the teacher wants to hear. The most 'legitimate' answer to a teacher's question is the one the teacher has in mind.

To analyse what counted as legitimate answers in the present case study, a means for exploring the nexus between meaning features of questions, answers and their evaluations was needed. For this purpose, a semantic network was devised as an analytical tool. A semantic network is an account of meaning options or choices available to speakers.

In the following chapter, Chapter Three, the meanings of 'semantic', 'network' and 'options' are explained in a brief account of the theory of which these notions are a part - the systemic-functional theory of language.

## Chapter 3: Theoretical Foundations

### 3.1 Introduction

Research addressing the prevalence and place of question - answer - evaluation sequences in classroom discourse as elements of structure in this discourse and their role in student achievement, and the construction of social relations and school knowledge has been briefly outlined. The research reported here is also concerned with the question - answer - evaluation sequence in classroom discourse.

The research reported in this study addresses the issue: what count as legitimate answers. To explore this issue it was necessary to find a way of establishing the nexus between questions, answers and evaluation of these answers. What answer(s) can be provided to a question is constrained by the semantic features of that question. The semantic features of questions determine their inherent answer potential. The evaluation of an answer reflects the extent to which that answer was considered legitimate. Thus my research is concerned with the epistemology of answers; answers are looked at from both ends of the question - answer - evaluation sequence, for while the question defines what **can** count as a legitimate answer, the evaluation indexes what **does** count as a legitimate answer to a classroom question. By 'nexus' is meant this contingency relation between the semantic features of the question, its answer, and the answer evaluation.

What, then, is meant by 'semantic feature'? A semantic feature is a component of meaning of a message - a question, answer, or answer evaluation - and it is a meaning that distinguishes it significantly from other members of that same category. Consider the following pairs of questions, for example, which systematically vary in semantic features.

#### Example 3.1:

- a) Why did Kelly shoot Fuller?
- b) Where did Kelly shoot Fuller?

There is in this pair of questions a basic thesis: Kelly did shoot Fuller. The two questions vary, however, in their point of enquiry. The first requires an explanation of reason (why?) and the second a specification of place (where?). The different points of enquiry in this pair are captured by the semantic descriptions of the two questions.

The first question of Example 3.2 below has the semantic feature 'multi-faceted' while the second has the feature 'uni-faceted' (see Chapter Four, page 82).

Example 3.2:

- a) What were the main causes of the French Revolution?
- b) What was the main cause of the French Revolution?

This difference is a significant one for the kind of answer that can be supplied. In 3.2a the several causes of the French Revolution are to be enumerated, while in 3.2b one particular cause is to be highlighted as the most significant.

These examples illustrate what it means to say, for example, that 'what answer(s) can be provided to a question is constrained by the semantic features of that question'.

As these two pairs of examples (3.1 and 3.2) show, semantic features are realised by lexicogrammatical patterns. Therefore the analysis of the nexus between questions, their answers and answer evaluation requires focus on both semantic features of language and lexicogrammar. A linguistic theory of a particular kind is required to provide a justified and not merely notional analysis.

- 1) Because the analysis is concerned with **semantic** features, the theory has to be one in which meaning is central;
- 2) because the meanings of questions, answers and evaluations are accessible through their wordings, the theory has to be one in which a coding relation between meaning (semantics) and wording (lexicogrammar) is axiomatically posited;
- 3) because 'features' in the locution 'semantic features' refers to options or choices, the selection of which vary the meaning of the utterances of concern, the theory has to be one of 'choice'; and
- 4) because social context defines the limits of the meaning options (choices) available, the theory needs to be one in which the relationship between extra-linguistic context and the language system is made clear.

A linguistic theory meeting all of these requirements is the systemic-functional theory (Halliday 1973, 1978, 1985a).

In the remainder of this chapter I shall briefly outline those aspects of the systemic-functional model which make it a particularly suitable one for the task of analysing the meanings of questions, answers and their

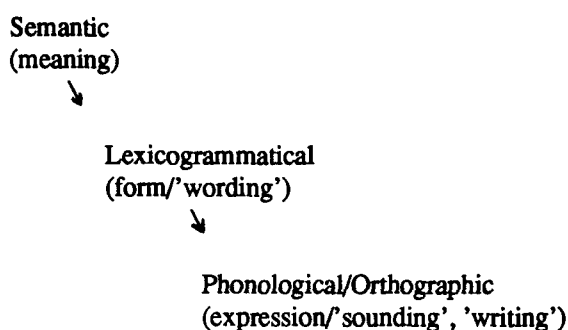
evaluations in classroom discourse. The theoretical issues to be specifically addressed are:

- 1) the relation between linguistic meaning and linguistic form;
- 2) the question of the form of grammar;
- 3) the relation of linguistic meaning and context.

### 3.2 The Relation Between Linguistic Meaning and Linguistic Form: Levels and Realisation

A fundamental tenet of the systemic-functional model is that language is a resource for meaning. Unlike many models which have to build in the level of meaning at a later stage, in the systemic-functional model meaning has always been built in, having equal prominence with other levels.

In the systemic-functional model, a natural language is seen as having three levels:



The semantic level is the level of meaning; the lexicogrammatical level is the level of form (vocabulary and grammar), or in folk terminology, of 'wording'. And the phonological/orthographic level is that of expression, in sound or in print.

The relationship linking these three levels, one to another, is not one of constituency, but is one of **realisation**. Meanings are realised by (coded in) lexicogrammatical structures (forms), and the latter in turn are recoded in - or realised by - orthographic or phonological structures.

Consider the following illustration of what this means. Suppose someone has incurred the displeasure of the local Mafia branch. Under the door is slid an envelope containing the message 'We're gonna get you'. The letters of this message have been cut from the newspaper and pasted onto a sheet of paper.

The message would be interpreted as sorely threatening. The meaning of the message as a threat is constituted by the wording - 'are gonna get' as Process, the use of future tense, 'we' as Actor and 'you' as Goal. These lexicogrammatical structures (forms), in turn, are realised by orthographic structures (letters cut from the newspaper).

The relation between the meaning of the message as a threat and its wording is a constitutive one. The writer chose the particular lexicogrammatical elements and structure s/he did with a view to threatening. The meaning of this message, in turn, is accessible to the addressee through the wording.

In this instance, and on all occasions of language use, meaning is both expressed and constructed by wording. This is why, in the analysis of the semantic features of classroom questions, answers and answer evaluations, lexicogrammar has a central place. The meanings of these messages are realised by lexicogrammatical patterns. Through lexicogrammatical patterning we have access to meaning. Through provision of the lexicogrammatical patternings of various messages, we have the criteria for distinguishing one message type from another. The provision of recognition criteria in the present study represents a significant advance in the analysis of classroom discourse (see Chapter Two, page 15).

While the systemic-functional model posits a coding relation between meaning, wording and sounding, it must be pointed out that there is no necessarily one-to-one correspondence between one level and the next. When one organisational system is represented in terms of another, there will be mismatches of various kinds. So

... in addition to one-to-one relations in the coding system, where one element on one level is realised by one element on another level, you may also have many-to-one and one-to-many. (Halliday 1974:91)

Halliday is referring here to diversification and neutralisation. The phenomenon wherein the same meaning is expressed as two or more lexicogrammatical forms (i.e. one-to-many) is called diversification. The phenomenon of the same lexicogrammatical form realising more than one meaning (many-to-one) is called neutralisation. Both Halliday (1974:91) and Hasan (Mss) argue that diversification and neutralisation, while natural linguistic phenomena, may be products of delicacy. That is to say, if one makes subtle enough distinctions it may be found that one-to-one correspondence between meaning and form is the rule, not the exception.

The work presented here is essentially exploratory; the semantic network presented in Chapter Four is not a highly delicate one, so diversification in particular is observed.

In this section it has been stated that in the systemic-functional model, language is seen as having three levels: semantic, lexicogrammatical and phonological/orthographic. The relation between these levels is one of realisation (coding). Meanings are realised by (coded in) wordings are realised by (recoded in) sounding/writing. It is through this coding relation that we have access to meaning; we know meanings by their wordings.

We turn now to the matter of how the level of wording, that is, lexicogrammar, is represented in the systemic-functional model.

### 3.3 The Level of Form: Grammar as System

In the systemic-functional model, language is represented as systems. Systems are sets of choices which are available in the grammar of a language. In English, for example, there is a system of gender with the choice between masculine, feminine and neuter. There is also a system of polarity, with a choice between positive and negative. These sets of choices (options) are meanings between which the grammar of a language is able to distinguish; thus the options in a system are distinct and distinguishable meanings.

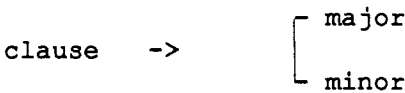
Although distinct, the options of a particular system belong to the same area of meaning. Negative and positive are distinct but they both have to do with polarity; masculine, feminine and neuter are distinct but all three have to do with gender. It is on the grounds of their common area of meaning that options are grouped together in a system.

The options **within** a system, however, are mutually exclusive. The selection of one of the options precludes the selection of another. For example, the selection of indicative from the MOOD system precludes the selection of imperative (see Figure 3.4 below). Or if something is singular, it cannot at the same time be plural. These two terms of the system of number are mutually exclusive.

Mutual exclusion of options within a system is an essential characteristic of systems. Another essential characteristic of systems is that the meaning of each option in a system depends on the meaning of the other

options in the system. If the meaning of one of the options in a system is changed, the meaning of the other options will also change. If an option is added to or subtracted from a system, the meaning of the other options in the system will change. Berry (1975:145) points out, for example, that in Old English there were three options in the number system - singular, dual and plural - unlike the modern-day English number system which has two - singular and plural. The option [plural] had a different meaning in the Old English number system from the meaning it has in the present two-option number system. In the two-option system [plural] means 'more than one'. In the three-option number system, it meant 'more than two'.

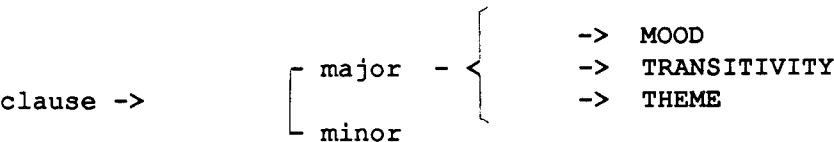
Each system has an **entry condition**, that is, a set of circumstances which must apply before a selection can be made between options in a system. For purposes of discussion in the remainder of this chapter, the primary entry condition will be 'clause'. Clauses may be either major or minor. Using systemic notation, this is represented as follows:



**Figure 3.1 System Network of Clause Types**

This is to be read as: there is a system comprised of two options [major] and [minor]. The entry condition for this system is 'clause'. Thus, if the feature 'clause' is selected, either the option [major] or [minor] must then be selected.

The option [major] in turn serves as an entry condition for the systems known as TRANSITIVITY, MOOD and THEME. This state of affairs is represented in Figure 3.2 below.



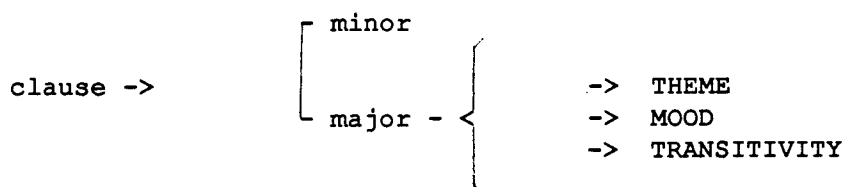
**Figure 3.2 Major Clause as Entry Condition**

The left facing bracket { indicates simultaneity. A system is simultaneous with another system or systems if it is independent of the other system(s) but has the same entry condition(s) as the other system(s). When two or

more systems are simultaneous their options can combine freely; any option from one system can combine with any option from the other system(s).

Hence Figure 3.2 should be read as follows: major clauses select for MOOD, TRANSITIVITY and THEME. The major clause is the locus for the selection of options from all three of these grammatical systems simultaneously, a point to which I shall return below. The options of the MOOD system can combine freely with those of the TRANSITIVITY system and options from both can combine freely with options of the system of THEME. Halliday (1974:93) suggests that these systems - TRANSITIVITY, MOOD and THEME - have strong internal constraints but weak external constraints. By strong internal constraints is meant that there is strong environmental conditioning on choice: if you make a certain selection in one system within that set of options, this will determine up to a point the selection you make in other systems within the same set. On the other hand, the external constraints are weak; the selection does not affect the choices that you make in the other sets of options.

It should be noted in passing that the order of systems and of terms within the systems on the vertical axis has no significance. So Figure 3.2, for example, could be redrawn as Figure 3.3 without changing its meaning in any way.

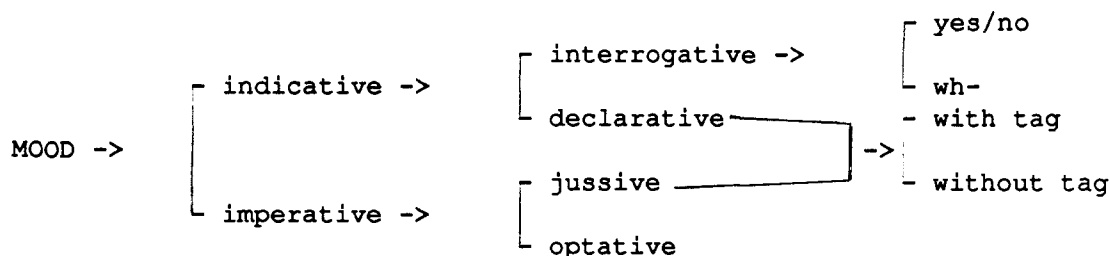


**Figure 3.3 Alternative Representation of Clause as Entry Condition**

As implied above MOOD, TRANSITIVITY and THEME are themselves entry conditions to further sets of choices, that is, systems. The choices available between different types of process; between different types, roles and numbers of participants and circumstances incumbent upon the process; and between different ways of combining processes, participants and circumstances are collectively called Transitivity choices. Together these choices comprise the system of TRANSITIVITY.

The system of THEME offers choices between different ways of arranging the elements of a message in an order of prominence. In English, the first place in the clause is significant for giving prominence to an element of a message, and speakers have a choice of making process, participant or circumstance Thematic.

MOOD systems are choices between different roles which a speaker can select for himself and for his addressee. For example, the speaker can select for himself the role of questioner which then puts the addressee in the role of answerer or one who disclaims ability to answer. This is explained more fully on page 40. A simplified MOOD system for English is presented in Figure 3.4 for illustrative purposes.



**Figure 3.4 A Simplified MOOD System of English (Kress, 1976:93)**

The systems illustrated in Figure 3.4 together comprise a **system network**. A system network is a configuration of systems which are closely related from a semantic point of view. Thus, the MOOD systems form a network since they are all concerned with attitudes adopted by the speaker. The TRANSITIVITY systems form a separate network since they are all concerned with processes, participants and circumstances. And the THEME systems form yet another network since they are all concerned with giving prominence.

Figure 3.4 illustrates a number of other significant points about system networks and the notational conventions used for their representation. Firstly, it illustrates the related notions **dependency** and **delicacy**. The options [yes/no] and [wh-] depend on (have as their entry condition) the feature 'interrogative'. The options [interrogative] and [declarative] in turn depend on the feature 'indicative'. So one cannot select between [yes/no] and [wh-] without first selecting 'interrogative', and one cannot select [interrogative] without first selecting 'indicative'. The options [yes/no] and [wh-] are more delicate than 'interrogative' both because they represent a greater degree of fineness of distinction and because they are dependent on the feature 'interrogative'.

A system network, such as that shown in Figure 3.4, specifies a limited number of **selection expressions**. These are the bundles of options or features that are selected on different passes through the network. A selection expression is made up by moving through the network from left to right, selecting one option from each system that one encounters, until one can go no further.

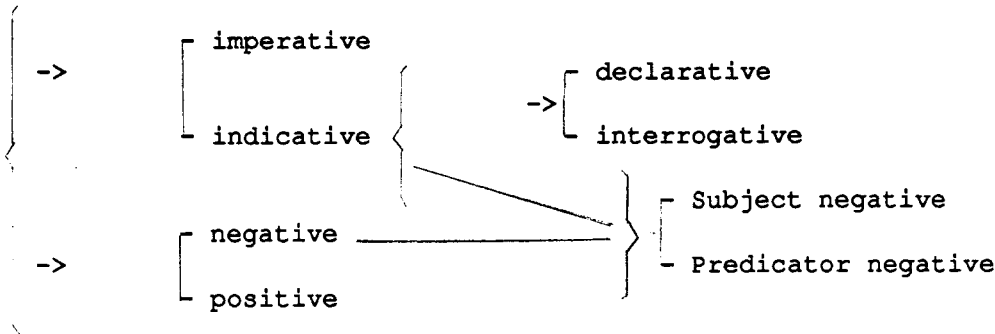
The MOOD network in Figure 3.4 specifies the selection expressions provided in Table 3.1 below as acceptable but rules out for example: imperative:interrogative:yes/no. This is because imperative is not an entry condition for the sub-system [declarative] and [interrogative].

Before presenting Table 3.1 it is necessary to point out the **disjunctive** entry condition present in the MOOD network presented in Figure 3.4. This disjunctive entry condition, signalled by the notation  $\sqcup$  indicates that if either [declarative] from the [declarative] versus [interrogative] sub-system, or [jussive] from the [jussive] versus [optative] sub-system is selected, then a further selection between the options [with tag] versus [without tag] must be made. This system network, then, permits all and only the following selection expressions:

Selection Expression	Example
indicative:interrogative:yes/no	Did Jerry come?
indicative:interrogative:wh-	Who was that?
indicative:declarative:with tag	Marie hasn't quit, has she?
indicative:declarative:without tag	Marie hasn't quit.
imperative:jussive:with tag	Stop that, will you?
imperative:jussive:without tag	Stop that.
imperative:optative	Let's go.

**Table 3.1: Selection Expressions for MOOD Network**

While still on the subject of notational conventions and selection expressions, there is one further kind of entry condition to be mentioned, the **compound** entry condition. This is illustrated in Henrici's (1981:76) example network, reproduced in Figure 3.5 below.



**Figure 3.5 A Sample Network Illustrating the Compound Entry Condition**

The compound entry condition is notated as  $\rightarrow$  and in the case above, indicates that when both [indicative] and [negative] are selected (and this is possible because of the simultaneity of the two sub-systems) a

further choice between [Subject-negative] and [Predicator-negative] must be made.

All of the notational conventions used in the representation of networks have now been presented; these are summarised in Table 3.2 below.

$a \rightarrow \begin{bmatrix} x \\ y \end{bmatrix}$	<p>There is a system x/y with entry condition a [if a, then either x or y].</p>
$a < \begin{cases} \rightarrow \begin{bmatrix} x \\ y \end{bmatrix} \\ \rightarrow \begin{bmatrix} m \\ n \end{bmatrix} \end{cases}$	<p>There are two systems x/y and m/n, both having entry condition a [if a, then both either x or y and, independently, either m or n].</p>
$a \rightarrow \begin{bmatrix} x \rightarrow \begin{bmatrix} m \\ n \end{bmatrix} \\ y \end{bmatrix}$	<p>There are two systems x/y and m/n ordered in dependence such that m/n has entry condition x and x/y has entry condition a [if a then either x or y, and if x, then either m or n].</p>
$\begin{matrix} a \\ b \end{matrix} \rightarrow \begin{bmatrix} x \\ y \end{bmatrix}$	<p>There is a system x/y with compound entry condition, conjunction of a and b [if both a and b, then either x or y].</p>
$\begin{bmatrix} a \\ c \end{bmatrix} \rightarrow \begin{bmatrix} m \\ n \end{bmatrix}$	<p>There is a system m/n with two possible entry conditions, disjunction of a and c [if either a or c, then either m or n].</p>

**Table 3.2: Key for System Network Notation**

The selection expressions for the network in Figure 3.5 are different from those of the network presented in Figure 3.4. This is to be expected since the options included in the two networks vary. The selection expressions for the network presented in Figure 3.5 are given below.

Selection expression	Example
imperative:negative	Don't wait.
imperative:positive	Wait.
indicative:declar:neg:Subj neg	No impatient people wait.
indicative:declar:neg:Pred neg	Impatient people don't wait.
indicative:declar:positive	Patient people wait.
indicative:interr:neg:Subj neg	Do no impatient people wait?
indicative:interr:neg:Pred neg	Don't impatient people wait?
indicative:interr:positive	Do impatient people wait?

Selection expressions should not be taken to represent structures, that is, syntagms. Instead, they provide the input to **realisation statements**, and through the realisation process structures are formed. This requires some explanation.

In as much as language is interpreted as essentially the organisation of alternatives or choices in systemic-functional grammar, the underlying mode of representation is the paradigmatic one. In this model ... "the grammar of a language is viewed as a network of paradigmatic relations" (Hasan, 1987a:185). The paradigmatic options are represented simply as features in a system network; they have no structural shape. And a selection expression is simply the accumulation of a list of such features.

Realisation is the process of making manifest the options that have been selected; it is the process of expressing the choices made.

Each set of features in the network specifies some aspect of the realisation; whatever feature is selected makes some contribution to the syntagmatic shape. As a result of this process, the selection expression is realised as a structure, which is realised in turn as a syntagm of the level in question. (Halliday, 1981a:15)

Thus in systemic-functional linguistics, structure (syntagmatic relations) is said to be derived from system (paradigmatic relationships) (Kress, 1976:94; Halliday, 1981a:14).

Referring once again to the MOOD network presented in Figure 3.4, we can now add the realisation statements which contribute to the syntagmatic shape of clauses.

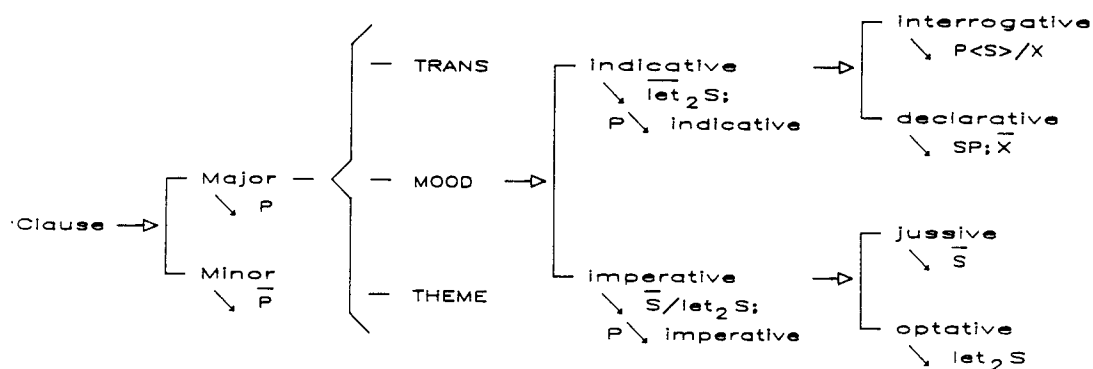


Figure 3.6 MOOD Network with Realisation Statements  
(Based on Kress, 1976:104)

This can be read as follows:

- 1) The presence of the function Predicator ( $\downarrow P$ ) in the clause realises the option [major]. The absence of Predicator ( $\downarrow \bar{P}$ ) realises the option [minor].
- 2) The presence of the function Subject, other than 'let' ( $\downarrow \overline{\text{let}_2 S}$ ) together with Predicator realise the option [indicative].
  - 2a) The presence of the function Predicator with enclosed Subject ( $\downarrow P<S>$ ) or presence of Wh-element (X) realise the option [interrogative].
  - 2b) The presence of the functions Subject and Predicator, in that order, together with the absence of a Wh-element ( $\downarrow SP; \bar{X}$ ) realise the option [declarative].
- 3) The absence of the function Subject other than 'let' together with Predicator ( $\downarrow \bar{S}/\text{let}_2 S$ ) realise the option [imperative].
  - 3a) The absence of the function Subject ( $\downarrow \bar{S}$ ) together with the presence of the function Predicator realise the option [jussive].
  - 3b) The presence of 'let' as Subject ( $\downarrow \text{let}_2 S$ ) together with the presence of the function Predicator realise the option [optative].

MOOD alone, of course, does not exhaust the determination of English clause structure. It was stated on page 33 that the major clause is the locus for the selection of options from MOOD, TRANSITIVITY and THEME. All three together specify the structure of a clause, each one determining a different set of structural functions.

Functions such as Actor and Goal derive from options in TRANSITIVITY; Subject and Predicator from MOOD; and functions such as Theme and Rheme from THEMATIC options.

The same item occupies simultaneously a number of distinct roles in the structure, so that the element of structure is a conflation of functions from different sources ... (Halliday, 1981b:139).

Thus in the clause - 'Kelly shot Fuller' - for example, structurally the TRANSITIVITY functions are Actor (Kelly), Material Process (shot) and Goal (Fuller). The MOOD functions are Subject (Kelly), Predicator (shot) and Complement (Fuller). The THEMATIC functions are Theme (Kelly) and Rheme (shot Fuller). These structural functions are the realisation of options in the three system networks TRANSITIVITY, MOOD and THEME. Each option taken up from MOOD, TRANSITIVITY and THEME, in other words, makes an input to structure. Because the clause is the point of origin for all three systems, it has a number of different but simultaneous constituent structures according to which set of options is being considered.

In this discussion of the nature of grammatical systems, I hope two major points have now become clear: firstly, each option in a system derives its value from other choices in the system, and secondly, each option makes an input into structure. A third major point has been alluded to, but will now be explicitly discussed: each option looks up to the semantic level. That is to say, each option in the MOOD, TRANSITIVITY and THEME systems realises a distinction in meaning. Let us consider this assertion by comparing the following three clauses for MOOD and TRANSITIVITY.

Example 3.3:

- a) Did Harry tell another corny joke?
- b) Harry loves corny jokes.
- c) Don't even listen to Harry's corny old jokes.

To make this comparison reference is made to the system network presented in Figure 3.7 below.

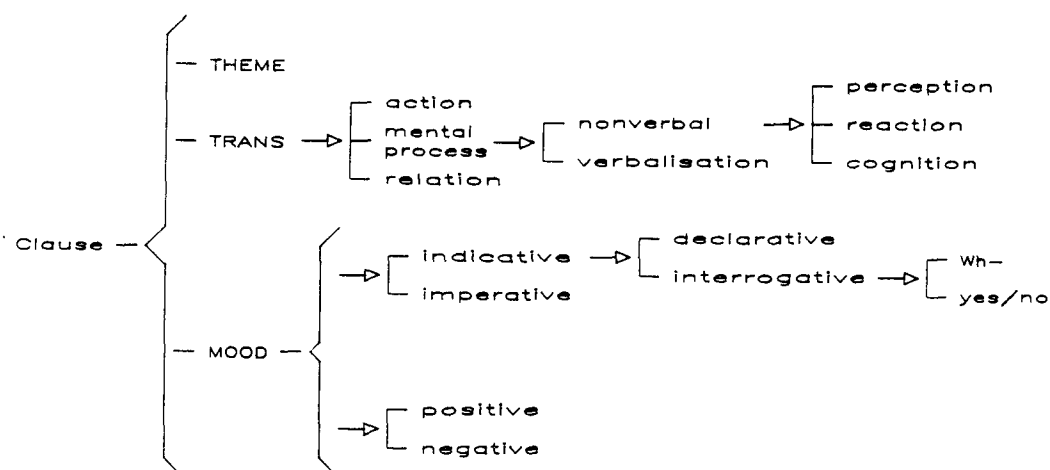


Figure 3.7 A System Network for MOOD and TRANSITIVITY  
(Based on Kress, 1976:14)

To take MOOD first: the selection expressions for these three clauses are:

- a) Did Harry tell another corny joke?  
indicative:positive:interrogative:yes/no
- b) Harry loves corny jokes.  
indicative:positive:declarative
- c) Don't even listen to Harry's corny old jokes.  
imperative:negative

These realise the semantic categories Question, Statement and Command respectively. These three are different orders of meaning. In the first the speaker is demanding information; the addressee is put in a position of being expected to supply the information or disclaim ability to do so. In the second the speaker is giving information which the addressee can acknowledge or contradict. And in the third the speaker is demanding goods and services, and the addressee can either undertake this demand or refuse to do so. This is what it means to say that options in the grammatical system MOOD look up to the semantic level.

But this phenomenon is not restricted to MOOD; it applies equally to TRANSITIVITY and THEME (the latter will not be considered here). In clause 3.3a - Did Harry tell another corny joke - the process selected is mental process:verbalisation. In clause 3.3c - Don't even listen to Harry's corny old jokes - the process selected is action (Behavioural). The distinction between verbalisation, that is telling/saying, and listening is a meaningful

action (Behavioural). The distinction between verbalisation, that is telling/saying, and listening is a meaningful one. It could not be suggested that telling corny jokes and listening to them are one and the same activity. Likewise we could not suggest that telling corny jokes and loving them are semantically isomorphic. Clause 3.3b selects mental process: non-verbal:reaction. Experiencing an emotional reaction to (loving) corny jokes, telling and listening to them are distinctive, meaningfully different activities, a fact captured by the grammatical system of TRANSITIVITY. Like options from the MOOD and THEMATIC systems, options from the TRANSITIVITY system look up to the semantic level. Options from each of these three lexicogrammatical systems construct/realise meanings of a particular kind, a point to which we now turn.

### 3.4 Types of Meaning: the Semantic Stratum

It was stated in section 3.3 (page 33) that the clause is the point of origin for selections from TRANSITIVITY, MOOD and THEME. Hence, any clause in English will have a number of different but simultaneous structures. This can be seen in the following example.

Did	Harry	tell	another corny joke
Finite	Subject	Predicator	Complement
Mood		Residue	
Process:	Sayer	Verbal	Range:Verbiage
Theme (1)	Theme (2)	Rheme	

**Figure 3.8     Structural Configuration of Sample Clause**

In the above presentation the top two lines display the structure of the clause derived from the system of MOOD; the element Mood (consisting of Subject plus the Finite element of the verb) and the element Residue (consisting of Predicator and Complement) are the output of options from the MOOD system. The third line displays the clause structure as derived from the TRANSITIVITY system. The elements Sayer, Process:Verbal and Range:Verbiage are the outputs of options from this system. And the fourth line shows the structure of the clause derived from the THEMATIC system. The elements Theme and Rheme are the output of options of this system.

Each of these three different structural configurations corresponds to a particular type of meaning: meaning in the active mode, meaning in the reflective mode, and meaning as relevance respectively. These types of meaning, in turn, relate to the most general functions that language has evolved to serve.

- \* Language has to express our participation, as speakers, in the speech situation; the roles we take on ourselves and impose on others; our wishes, feelings, attitudes and judgments.
- \* Language has to interpret the whole of our experience, reducing the indefinitely varied phenomena of the world around us, and also the world inside us, the processes of our own consciousness, to a manageable number of classes of phenomena: types of processes, events and actions, classes of objects, people and institutions, and the like.
- \* Language has to express certain elementary logical relations like 'and' and 'or' and 'if', as well as those created by language itself such as 'namely', 'says' and 'means'.
- \* Language has to do all these things simultaneously, in a way which relates what is being said to the context in which it is being said, both to what has been said before and to the 'context of situation'; in other words, it has to be capable of being organised as relevant discourse, not just as words and sentences in a grammar-book or dictionary. (Halliday, 1978:21-22)

The semantic system of language is organised into three components directly reflecting these four functions.

The **Interpersonal** component is language as interaction; it is meaning in the active mode.

Here the semantic system expresses the speaker's intrusion in the speech event: his attitudes, evaluations and judgments; his expectations and demands; and the nature of the exchange as he is setting it up - the role that he is taking on himself in the communication process, and the role, or rather the role choice that he is assigning to the hearer. This component is therefore both speaker and hearer oriented; it is interpersonal... and represents the speaker's own intrusion into the speech situation. (Halliday, 1979:59-60)

The **Ideational** component is concerned with the expression of experience, experience of what is round about us in the outside world and experience of the world of consciousness that is inside us. There are two subcategories: an experiential and a logical. In the experiential, experience is represented directly in terms of happenings, entities that participate in these happenings and circumstantial features. In the logical, experience is represented indirectly in terms of certain fundamental logical relations in natural language - for example, 'and', 'namely' and 'says'. The logical and experiential together make up the Ideational component in the semantic system: that of meaning in the reflective mode.

All discourse involves an ongoing simultaneous selection of meanings from both the Ideational and Interpersonal components. There is additionally a third component: the Textual, whereby the meanings of the other two kinds take on relevance to some real context.

Here the semantic system enables the speaker to structure the meaning as text, organising each element as a piece of information and relating it significantly to what has gone before. (Halliday, 1979:60)

These three components of the semantic system - the Interpersonal, Ideational and Textual - can be used as a means for characterising meanings that are present in every use of language in every social context.

### **3.5 The Functional Origins of the Language System**

In Section 3.4 it was shown that in the systemic-functional model the grid imposed on meaning is a functional one. The three components of the semantic system - the Ideational, Interpersonal and Textual - correspond to the abstract functions that language has evolved to serve. Thus the semantic system of language is functional in origin and orientation. So also is the grammar, since the task of grammar is to encode the meanings deriving from these various functions into articulated structures.

Consider again the clause - Did Harry tell another corny joke - illustrated in Figure 3.8. This clause consists of a Mood element plus a Residual element. The Mood element expresses the particular role that the speaker has chosen to adopt in the situation and the role options that he has chosen to assign to the addressee. This structure, derived from the MOOD system of grammar, represents the Interpersonal function of language, language as expressing relations among participants in the situation, and the speaker's own intrusion into it.

Simultaneously, the clause has a structure derived from TRANSITIVITY: Process:Verbal + Sayer + Range:Verbiage. This configuration represents the Ideational function: language as expressing the speaker's experience of the external world and his own consciousness.

The clause also has a structural configuration in terms of Theme and Rheme, derived from the THEMATIC system, representing the Textual function of language: language as the expression of operational relevance.

The organisation of the language system described here is not accidental. Language is as it is because of

the functions it has evolved to serve in the life of social man (Halliday, 1978:4). Halliday (1978:22) suggests that it is the demands posed by the service of the functions enumerated above which have moulded the shape of language: these functions are built into the semantic system of language and they form the basis of the grammatical organisation. In this sense the whole language system is functional in origin and orientation and for this reason, the nature of the linguistic system has to be explained in functional terms.

Within this explanation, the term 'function' is used in three distinct but related ways. The Ideational, Interpersonal and Textual aspects of language have been referred to as meta-functions. 'Meta-functions' are to be distinguished from 'grammatical functions'. The elements 'Actor', 'Process', 'Phenomenon', 'Subject', 'Predicator', 'Theme' and so on are grammatical functions. These are called grammatical 'functions' to distinguish them from grammatical classes. A linguistic structure is thus described as a configuration of grammatical functions, as illustrated for example in Figure 3.8.

'Grammatical function' - referring to an element of structure considered as a role in the total structural configuration - is related to the more abstract, generalised sense of meta-function discussed earlier. The grammatical functions are derivable from the meta-functions of language. For example, the grammatical functions Actor, Goal, Range, etc. are derivable from the Ideational meta-function: the general function language has of transmitting information between people. And the grammatical functions Mood and Residue are derivable from the Interpersonal meta-function, the function of establishing, maintaining and specifying social relations between people.

The term 'function' is also used in its folk sense, referring to how we use language - to make appointments, chat over coffee and write stories for example. When language is used in these ways, meanings are being exchanged. But obviously, this is not done in isolation from the context in which the language is functioning. 'Function' in this third sense is synonymous with *use in context*.

The notion 'context' has a central place in the functional perspective for context is the environment in which language functions, in which it comes to life.

Having briefly discussed the nature of the language system - its tri-stratal nature, its representation as systems, and its functional origins - we shall turn now to the discussion of context and the constitutive relation

between context and language.

### 3.6 Social Context and the Language System

All language use is situated. This is a fundamental principle of the systemic-functional model. Malinowski has had a considerable influence on this model, being the originator of what might be called the theory of context. Malinowski, in his anthropological work, argued that...

A statement, spoken in real life, is never detached from the situation in which it is uttered. For each verbal statement by a human being has the aim and function of expressing some thought or feeling actual at that moment and in that situation, ... Without some imperative stimulus of the moment, there can be no spoken statement.

From this fundamental principle follows a second:

In each case, therefore, utterance and situation are bound up inextricably with each other and the context of situation is indispensable for the understanding of the words. Exactly as in the reality of spoken or written languages, a word without *linguistic context* is a mere figment and stands for nothing by itself, so in the reality of a spoken, living tongue, the utterance has no meaning except in the *context of situation*. (Malinowski, 1923:307)

Up to Malinowski's time the word 'context' had been used to mean the words and sentences before and after some particular textual item that was in focus - i.e. to the accompanying text. Through Malinowski, however, 'context' came to have a wider meaning. By 'context' Malinowski meant the total environment of the text, including the verbal environment, but also the situation in which the text was uttered. In the course of his field work with the Trobriand Islanders, Malinowski realised that if translations of native texts were to be made intelligible to English speaking readers, information about the goings on - the sights and sounds - in which the utterances were made had to be included. Furthermore, information about the cultural beliefs and background had to be included if the texts were to be adequately understood. Malinowski introduced the notion of **context of situation** to refer to the total environment - verbal and non-verbal - of the language event, and the notion **context of culture** to refer to the cultural environment of which the language event was a part.

Halliday points out that the general notions of context of situation and context of culture are as necessary for the understanding of English or any other major language as it is for the understanding of the language of the Trobriand Islanders.

It is simply that the specific contexts of the culture are different. The activities that people are engaging in may differ from one place or one time to another; but the general principle that all language must be understood in its context of situation is just as valid for every community in every stage of development. (Halliday, 1985b:8)

J.R. Firth (1950) subsequently systematised the notion 'context of situation' by specifying what aspects needed to be considered in an account of context. He set up a framework for the description of the context of situation that could be used for the study of texts as part of a general linguistic theory.

He characterised the context of situation in terms of:

- 1) the Participants in the situation, including categories corresponding to statuses and roles of the Participants;
- 2) the Actions of the participants, including both their verbal and non-verbal doings;
- 3) Other Relevant Features of the Situation: the surrounding objects and events in the physical environment which impinge on what is going on;
- 4) the Effects of the verbal action: the changes wrought by what the participants in the situation have to say.

Since the publication of Firth's account, there have been a number of other outlines attempting to characterise situation. That of American anthropologist Dell Hymes is probably the best known. In his work in the ethnography of communication, Hymes (1967) proposed the following set of concepts for characterising the context of situation: the form and content of the message, the setting, the participants, the intent and effect of the communication, the key, the medium, the genre, and the norms of interaction.

Halliday, extending the Firthian tradition, interprets the context of situation as a semiotic structure relating on the one hand to the social system and on the other to the linguistic system. The situation is said to consist of three features: the **field**, the **tenor** and the **mode**. Field of discourse refers to the nature of the social activity that is taking place. Tenor of discourse refers to who are taking part, to the statuses and roles of the participants. Mode of discourse refers to what part the language is playing, what it is that the participants are expecting the language to do for them in that situation (Halliday, 1985b:12).

Each of the components of the situation - field, tenor and mode - tends to determine the selection of options in a corresponding component of the semantics. Typically the field determines the selection of

experiential meanings, the tenor determines the selection of interpersonal meanings, and the mode determines the selection of textual meanings.

From the viewpoint of grammar the selection of options in experiential systems - that is, in Transitivity, in the classes of processes, participants and circumstances - tends to be determined by the nature of the activity. The selection of interpersonal options, those in the system of Mood and modality, tends to be determined by the role relationships in the situation. The selection of options in the textual systems, such as those of Theme and Information, tends to be determined by the symbolic forms taken by the interaction, in particular the place that is assigned to the text in the total situation.

Thus there is a systematic relationship between context, function (meaning) and form (wording). This relationship is illustrated in summary form in Figure 3.9 below.

Context of Situation		Functional Component of Semantic System		Lexicogrammatical Systems
Field of discourse		Ideational		Transitivity
Tenor of discourse		Interpersonal		Mood Modality
Mode of discourse		Textual		Theme, Cohesion Information

Figure 3.9 The Relationship between Context, Function and Form at Clause Rank (Based on Halliday, 1985b:26)

This systematic relationship between context and the language system enables us to infer from text to situation and from situation to text. The following text illustrates this point.

#### Text 3.1a

C: Hi.

A: Hi, how's it going?

C: Good, but I've brought it back in. The first valve is still making too much noise.

A: That's no good. We'll have to get Frank to have a look at it.

- C: Well, he adjusted it last week - Hans was here - but it's still clanking. The C-major scale goes C - clank - E - clank - G - clank - B - C.
- A: [laughing] Sounds good.
- C: Yeah, what's happening this doover has too much play in it [shows operation of valve mechanism to attendant]. It jumps and that's where the clank is coming in.
- A: Oh yeah, I see.
- C: My teacher thought maybe something - maybe some fine string - could be wound around the spindle to stop it.
- A: Don't you go trying that yourself; you could wreck it.
- C: Yeah, I know; that's why I brought it back in.
- A: Well, I'll just go get Frank to come and have a look at it.
- C: OK, thanks.

Given this bit of text we can reconstruct the context of situation in something like the following terms:

- Field: customer complaint, seeking repair of defective valve mechanism of musical instrument
- Tenor: customer and shop attendant, known to each other through previous interaction
- Mode: channel used is phonic; participants are in visual contact; language is playing a constitutive role;  
medium is spoken.

Alternatively, had we started with these parameters provided for the field, tenor and mode, we could have predicted, generally, what meanings would be expressed within the verbal exchange. We would expect that the nature of the complaint would be spelled out by the customer, and that some offer of attempt for repair would be made by the attendant. Because the interactants have interacted previously and are on friendly terms, a greeting of 'Hi' is appropriate. Were the interactants strangers to each other, the customer is more likely to have said something like: "Good morning. I've brought my French horn in. The first valve clanks and I was wondering if someone could have a look at it for me". This is what it means to say that we are able to infer from situation to text.

This ability to predict from situation to text arises because context plays a part in determining what is said. But it is important also to keep in mind that what we say plays a part in determining the context. Meanings not only construct the situation for us as readers after the fact, but meanings, what is being said, also construct the

situation for the first order interactants in the course of the interaction.

To illustrate this principle the following variation of Text 3.1 is provided.

Text 3.1b

C: Hi.

A: Hi, how's it going?

C: Good, but I've brought it back in. The first valve is still making too much noise.

A: That's no good. We'll have to get Frank to have another look at it.

C: OK. [attendant takes instrument upstairs to Frank]

A: [returning to service counter] Er, um, uh, I have tickets to the Sydney Symphony concert on Saturday night and I uh, well, uh was wondering if you'd like to go.

C: Well, um, you mean you and me?

A: Yeah.

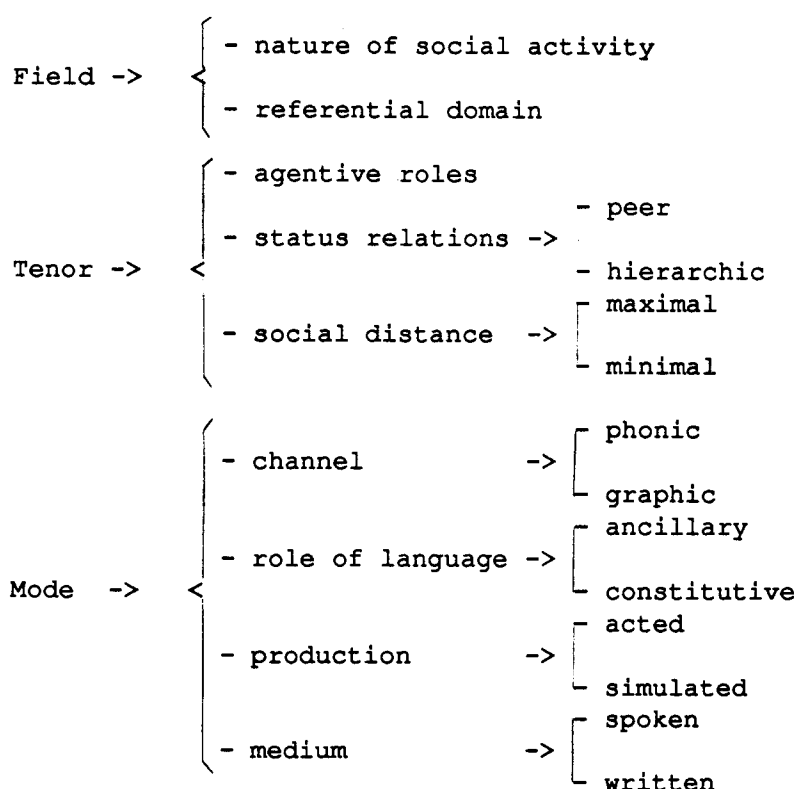
C: Well, yeah, OK, that'd be nice.

[the two of them make arrangements to attend the concert together]

The nature of the social activity and the role relationships change markedly after the attendant [become suitor] returns to the service counter. The material situational setting (Hasan:1980) is still the music store, but the context of situation has changed. The first order participants are well aware of this, as are we as readers, because of the meanings being exchanged. The situation has changed from one of negotiating the repair of a musical instrument to negotiating a social date.

In principle the constitutive relation which exists between wordings and meanings (see page 30) exists between meanings and the context of situation. Meanings aren't 'out there'; we know them by their wordings. Likewise, context of situation isn't 'out there'; we know it by its meanings.

The contexts, meanings and wordings of concern to this thesis are those of the high school classroom. As argued above, these three are related. The context puts certain meanings at risk. Hasan (1985a; 1988a) calls a particular calibration of values of the context variables field, tenor and mode a **contextual configuration**. In the specification of a contextual configuration selections for each of the values in Figure 3.10 must be made:



**Figure 3.10 Contextual Configuration**

**Actional structure** refers to the nature of social activity apropos of which language is being used. **Referential domain** specifies the domain of experience under focus. Whereas actional structure can be glossed as 'what the participants are doing', referential domain supplies the complementary 'with reference to what'.

The participants in the social activity stand in some social relationship to each other. The values assigned to **agents**, **status roles** and **social distance** specify the nature of social relationship between participants. Agent roles are always dyadic, e.g. parent-child, playmate-playmate. **Peer** refers to that relation in which each agent has equal standing in the interaction. **Hierarchic** refers to the relation in which one agent has more discretion, or is superordinate to the other. **Social distance** refers to the degree to which the participants know each other. On the most minimal end of social distance are, for example, long-time lovers; on the maximal end would be for example a blood donor who is tended by a different sister with each donation.

The language used to constitute or accompany a social activity must become accessible to another. The values of mode - channel, role, production and medium - provide a way in toto of characterising how the language

becomes accessible. In phonic channel language is realised phonologically; that is, the manifestation is vocal. In the production of text, process sharing is possible. The essential meaning of phonic channel is that text production is dialogic. The option **phonic** carries with it a further, more delicate set of options:  $\pm$  visual contact.

In graphic channel, text production is by means of graphic units. Text production through graphic channel is monologic; process sharing in text construction is denied.

Revision lessons are constituted through language; hence the language is said to be constitutive. This contrasts, for example, with the language used by players during a football match, where the social activity is not constituted in language but rather is accompanied by language.

Production refers to the deployment of channel resources. In **acted** instances, the language producer respects the limitations of the channel used; in instances of **simulation**, the producer uses language as if the limitations do not exist. Face to face and telephone dialogue would both be **acted**. An entry in an encyclopedia is an instance of **graphic:acted**. **Medium** refers to the lexicogrammatical characteristics of the language used. Spoken medium is characterised by grammatical complexity whereas written medium is characterised by lexical density (Halliday, 1985c). A formal lecture would thus be assigned the Mode values: phonic simulating:written. An ear bashing on the other hand has the values: phonic:simulating:spoken (simulating because the speaker holds forth to the exclusion of process sharing).

The discourse of interest in this research is commonly known as the 'oral revision lesson'. Teachers and students know implicitly what such lessons entail. The contextual configuration for such lessons make explicit what such lessons involve:

Mode:

channel: phonic, + visual contact  
role of language: constitutive  
production: acted  
medium: spoken

Tenor:

agents: teacher - pupils  
status relations: hierarchic  
social distance: near maximal

Field:

actional structure: check and validation of transmitted  
knowledge  
referential domain: science - classification of living things  
history - bushrangers (Years 7 and 9)  
- French Revolution (Year 11)

**Figure 3.11 Contextual Configuration of Lessons Analysed  
in Case Study**

The above contextual configuration typifies lessons in which the teaching is didactic; such lessons are conducted by means of asking questions about material previously presented, answering these, and evaluating the answers. Given this contextual configuration, it will be argued that the patternings of meaning features reported in Chapters Five and Six are non-arbitrary; that is, they make sense.

In this chapter those aspects of the systemic-functional linguistic model relevant to the study of legitimate answers in the classroom have been outlined. Highlighted are: the centrality of meaning in the theory; the coding relation between meaning and wording; the representation of language in system networks; and the systematic relationship between extra-linguistic context and the language system.

While all three strata of language - phonology, lexicogrammar and semantic - can be represented in networks, all examples in this chapter are relevant to the lexicogrammatical stratum. The research concerns of this thesis required the construction of a semantic network. In the next chapter, Chapter Four, a general discussion of semantic networks is provided, and the semantic network constructed for the research reported in this volume is presented.

## Chapter 4: The Semantic Network

### 4.1 Introduction

The systemic-functional theory of language is a theory of meaning as choice, by which language is interpreted as networks of options. These options are at various levels - phonological, lexicogrammatical and semantic. All of the networks presented in Chapter Three are lexicogrammatical networks relevant at the rank of clause.

Talking about the lexicogrammatical networks of English is a rather easier job than talking about the semantic networks of English. This is because, as Halliday (1988:46) points out, ... "there is such a thing as 'the grammar of English' ", but at present we do not have such a thing as 'the semantics of English'. To date semantic descriptions have tended to operate with semantic sub-systems, each relevant to a specific universe of discourse (register). Thus, for example, Turner's (1973) semantic networks were developed to explore mother-child control patterns in specific experimental situation types, and those of Wells and Montgomery (1981) were developed as a means of identifying styles of linguistic interaction and the consequences of this style for children's learning. These Hasan (1988b:62) calls 'context-specific' semantic networks.

While we do not at present have such a thing as 'the semantics of English', such is not inconceivable. Martin's (1983) conjunction networks are set up for the English language as a whole, as are Hasan's (Mss) networks relevant to Offers. Moreover, Hasan's (1983, 1988b) 'message function' network, while developed to describe spontaneous interaction between children and parents for the purpose of investigating the development of children's learning patterns, is relatively 'context-independent' (Hasan, 1988b:62). It displays, up to a certain degree of delicacy, the possible semantic choices in the English language.

The criteria for theoretical validity of 'context-specific' and 'context-independent' semantic networks vary slightly. To be valid a 'context-specific' network must (i) indicate not only the options that are available but, equally, must show how they are systematically related to each other (Halliday, 1973:76). Moreover, these options must (ii) relate upward to the extra-linguistic context of which the options are a realisation, and (iii) downward to the lexicogrammar which in turn realises the options of the semantic system (Halliday, 1973:96).

Such networks are hypotheses about what the speaker can do, linguistically, in a given context; they describe the range of alternative meanings available to the speaker in that context. Thus, in context-specific networks, it is the social context that defines the limits of the options available.

By contrast, a context-independent network, such as that of Hasan (1983) is one which up to a certain degree of delicacy displays all the semantic choices in the language. Such a network provides an account of the meaning potential of a language (Hasan, 1988b:62). To be valid, the options available to speakers and their relations to other options must be indicated. Displaying options in networks meets this criterion. Moreover, to be viable, such a network should permit the identification of interpersonal, textual and ideational meanings, since a message is a configuration of all three of these. (For a formal definition of 'message' see page 55.) Hasan's 'message function' network marks an advance in the development of semantic networks in that it does permit the identification of meanings of all three kinds. Thirdly, the inclusion of an option in a semantic network is justified only if the conditions for its realisation can be explicitly stated in terms of some lexicogrammatical pattern(s).

While Hasan (1988b:62) suggests that her 'message function' network is context-independent, and does up to a point display the meaning potential of English, she makes no claims that it represents "... all or even nearly all that needs to be known about the meaning potential of English" (Hasan, 1988b:62).

The semantic network developed for the case study reported in this research is a context-specific one. No attempt is made to display 'all possible semantic choices in English', nor even all semantic choices available to the discourse of classroom history and science. The network is restricted to question-answer-evaluation sequences in oral secondary school science and history lessons. However, as a network, both the options and their systematic relations to each other are indicated. This represents an advance on the work, for example of Sinclair and Coulthard (1975) and Bellack, et al (1966). Furthermore, the network permits the identification of interpersonal, ideational and textual meanings relevant to question-answer-evaluation sequences. The semantic networks developed by Wells and Montgomery (1981) and Walker (1986) for the analysis of classroom discourse are orientated primarily to interpersonal meanings. And in accord with the third criterion for validity lexicogrammatical realisation statements for the options comprising the semantic network are provided. These serve as the recognition criteria for those options.

Before introducing the network devised for the present case study it must be acknowledged that this network represents at one and the same time an extension of and a partial abstraction from Hasan's 'message function' network. As an apprentice developing a semantic network relevant to the study of question-answer-evaluation sequences in classroom discourse, the author was allowed the freedom to 'reinvent the wheel'. The first drafts of the networks devised for this case study bore little resemblance to Hasan's network, but neither did they work! - they did not effectively display the meaning features relevant to the sequences of interest. As work on the network progressed it became apparent that a number of options included in Hasan's more general, context-independent 'message function' network of necessity needed to be included in the more restricted, context-specific network developed for this case study. The context-independent network, as an account of the meaning potential of English, ultimately served as a 'parent' to the present network.

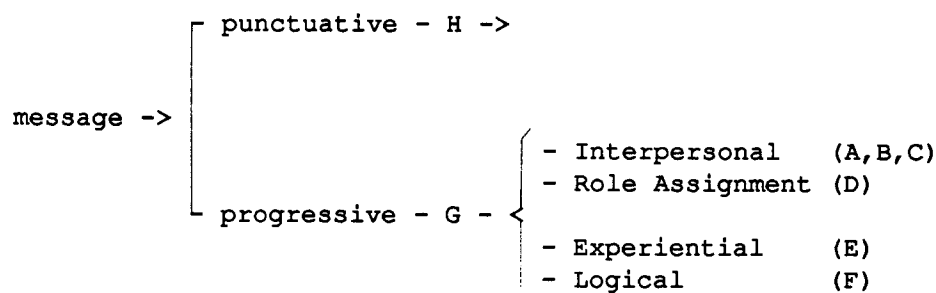
The network presented in the remainder of this chapter evolved out of close examination of transcripts of twelve 40 minute lessons, two each from Years 7, 9 and 11 History, and Years 7, 9 and 11 Science. This network was then used to analyse the patterning of meaning features of questions, answers and evaluations in four of these lesson transcripts. The results of this analysis are presented in Chapters Five and Six.

## **4.2 The Semantic Network for Classroom Questions, Answers and Evaluations**

The networks discussed in Chapter Three display lexicogrammatical options relevant at the rank of clause. The semantic network discussed in the remainder of this chapter displays options relevant to the category 'message'; 'message' is the basic unit of analysis in this research study. A message is the smallest unit in a verbal interaction and is defined as that configuration of meanings - Ideational, Interpersonal and Textual - realised by a clause. As a configuration of meanings, a message plays a part in initiating, maintaining and/or terminating an interaction.

Messages are of two basic kinds, 'punctuative' and 'progressive'. Punctuative messages are typically realised by minor clauses (those having no Predicator). These messages occur in aid of classroom etiquette. Progressive messages are realised by major clauses (those having a Predicator) and initiate, maintain or terminate the verbal interaction whereby the lesson content is constructed. Options of the punctuative system are realised by closed classes of lexicogrammatical items while those of the progressive system are realised by simultaneous

selections from the Ideational (Experiential and Logical), Interpersonal and Role Assignment systems (see page 62). The Role Assignment system replaces a Textual system in this network, and is needed for dialogic discourse. The over-all shape of the semantic network used for this study is presented below.



**Figure 4.1 The Message Network: Primary Options**

System H, the 'punctuative' network, will be discussed first, then the 'progressive', which is comprised of the Logical, Experiential, Role Assignment and Interpersonal systems. It must be stressed that this discussion assumes a knowledge of systemic-functional grammar as presented in Halliday (1985a). The discussion also draws on the work of Huddleston (1984), Hasan (1985b) and Halliday and Hasan (1976) at specific points. While an attempt has been made to make the grammar as accessible as possible in this presentation, no attempt has been made to present an account of the grammar itself. Such would entail writing an additional volume, one already provided by Halliday.

Before presenting the 'punctuative' system network, comment should be made on the address conventions used. In the course of the work reported here the network underwent numerous revisions. Along the way small sub-systems were added, or more often, deleted. Hence the alphabetic reference to sub-systems is not always as elegant as it might be. For example, the Experiential system (see page 68) has no sub-systems 'f', 'g', 'h', 'i' or 'l'. This is because sub-systems 'f', 'g' and 'h' were incorporated elsewhere or were dropped out as non-viable. And the letters 'i' and 'l' are avoided because of possible confusion with the numeral 1 (one). The letters and numbers in the networks are included solely to facilitate reference to the networks in discussion. Whether a sub-system is referenced as 'System H' or 'System Z' makes no difference whatsoever to the meaning of that system.

4.2.1 System H: the Punctuative Message System

As stated above, the punctuative messages are concerned with classroom etiquette. The options of this system are realised for the most part by minor clauses. In the following account of the punctuative network first the options, then their glosses, realisations and examples are presented. In the examples provided, the relevant elements are underlined.

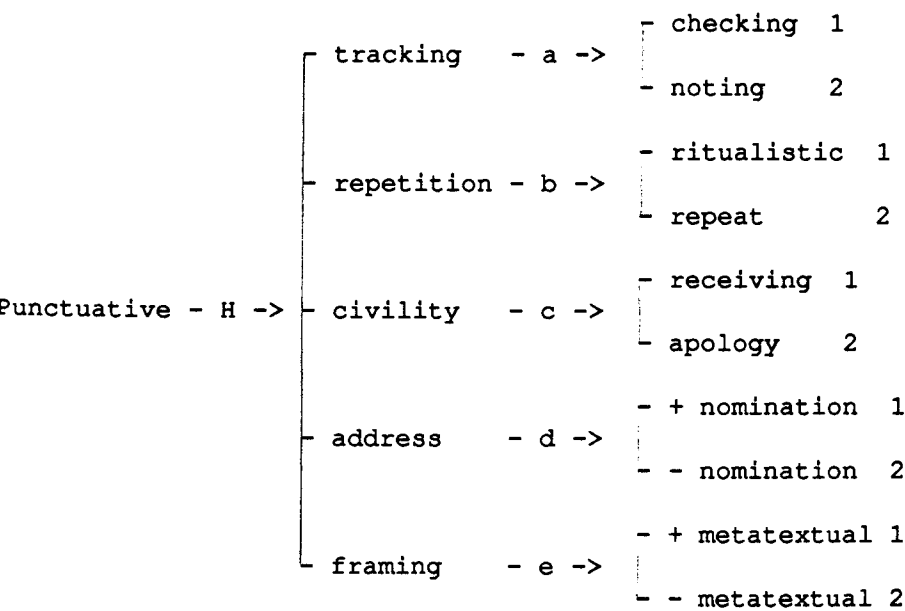


Figure 4.2 The Punctuative Message System

note: The Tones referred to below and in the rest of this chapter are based on Halliday’s accounts (Halliday, 1967; 1985a:281-285), and should be interpreted as follows:

Tone 1:	falling tone,	'unreserved'
Tone 2:	rising tone,	'questioning'
Tone 3:	level tone,	'neutral'
Tone 4:	fall-rise,	'reserved'

a1 checking 'Are you with me?'  
    \ right? OK? Tone 2

Example 4.1:

OK, now, what did Joseph Handle see in the cave that indicated to him, right, that they had certainly got the right person?

a2 noting 'I've noted that you've spoken'

↘ Right, Ok, Well Tone 3

Example 4.2:

Tchr: What are arthropods?

Phil: Uh, all animals that have a skeleton sort of formed.

Tchr: Right, where is that skeleton though?

b1 ritualistic 'I didn't hear. Could you repeat?'

↘ Sorry? Pardon? Tone 2

Example 4.3:

Tchr: Who got a reasonable answer for why we bother to classify things?

Sara: To put them in a pattern.

Tchr: Sorry?

b2 repeat 'Did you say ....?'

↘ Repetition of previous speaker's message Tone 2

Example 4.4:

Tchr: Where do you think he would have shot him || if he was meaning to kill him?

Matt: If he wanted to kill him? || In the head.

c1 receiving 'Thank you'

↘ Thank you, thanks, tah

Example 4.5:

Tchr: Now, with the classification system ||  
thanks a lot ||

Lisa: Sure. [Lisa has just returned from being sent  
to fetch a load of textbooks from  
the staffroom]

c2 apology 'I'm sorry'  
↘ sorry Tone 1

Example 4.6:

Tchr: Right, now going on with the National Constituent  
Assembly: probably one of the most important  
achievements of that [stops talking]

Rob: Sorry. [had been talking quietly to another  
student in adjacent desk]

d1 +nomination 'You may speak'  
↘ vocative; insert command/permission to speak

Example 4.7:

Tchr: Right, now, where is the cave? Adrian.

d2 -nomination 'I'm referring to/addressing you'  
↘ vocative; outclassify insert command/  
permission to speak

Example 4.8:

Tchr: OK, settle down quickly 7W. Adrian. OK, now ...

e1 +metatextual announces next item of business  
↘ first, next question

Example 4.9:

Tchr: Right, first question: why did Kelly go ...

e2 -metatextual announces next item of business

↘ now, right, OK Tone 1

Example 4.10:

Tchr: Now, what was the name of the police officer?

Mid-way through the research process it was decided not to code punctuative messages. In the lesson transcripts punctuative messages are not therefore given their own numbers.

Example 4.11:

Tchr: (023) Right, first question: why did Kelly go ..

The exception to this is when a nomination of an answerer serves to reinstate a question as in (125) and (128) below:

Example 4.12:

Tchr: (124) Now, straight after the shooting, where did Kelly go? Helen.

[no response]

Tchr: (125) Renae.

Rene: (126) Best's Inn.

Tchr: (127) No. (128) Rebecca.

Though not used for analysis of the data, the 'punctuative' network is presented here for three reasons:

- (i) it provides an introduction to the exegesis of the semantic network;
- (ii) others may find the options useful for analysing aspects of classroom discourse not included in the present case study;
- (iii) teachers in this study used 'right' both evaluatively and non-evaluatively. 'Right' used punctuatively is considered non-evaluative for purposes of this study. 'Right' used progressively is considered evaluative (see

page 100). This distinction is important in a study of legitimate answers, wherein evaluation is considered to signal or index legitimacy.

### **4.3 System G: the Progressive Message System**

'Progressive' messages are those which initiate, advance and/or terminate the verbal interaction whereby curricular meanings are made. These are realised by major clauses so simultaneously encode Ideational, Textual and Interpersonal meanings. Thus each progressive message selects options from the Logical, Experiential, Role Assignment and Interpersonal networks. These networks, which comprise System G, are presented over-leaf as two fold-out pages. (A second, lift-out copy is inserted in a pocket affixed to the inside back cover of this volume.) There then follows an account of each network in turn. In each instance the network of concern is presented, followed by the realisation statements for the options comprising the network and instances from the data which exemplify these options.

In the final section of this chapter several sub-texts from the database are analysed in their entirety as a means of (i) illustrating decisions made in segmenting the data into messages, and (ii) decisions made while using the options of System G to code the Interpersonal, Ideational and Textual meanings of those messages.

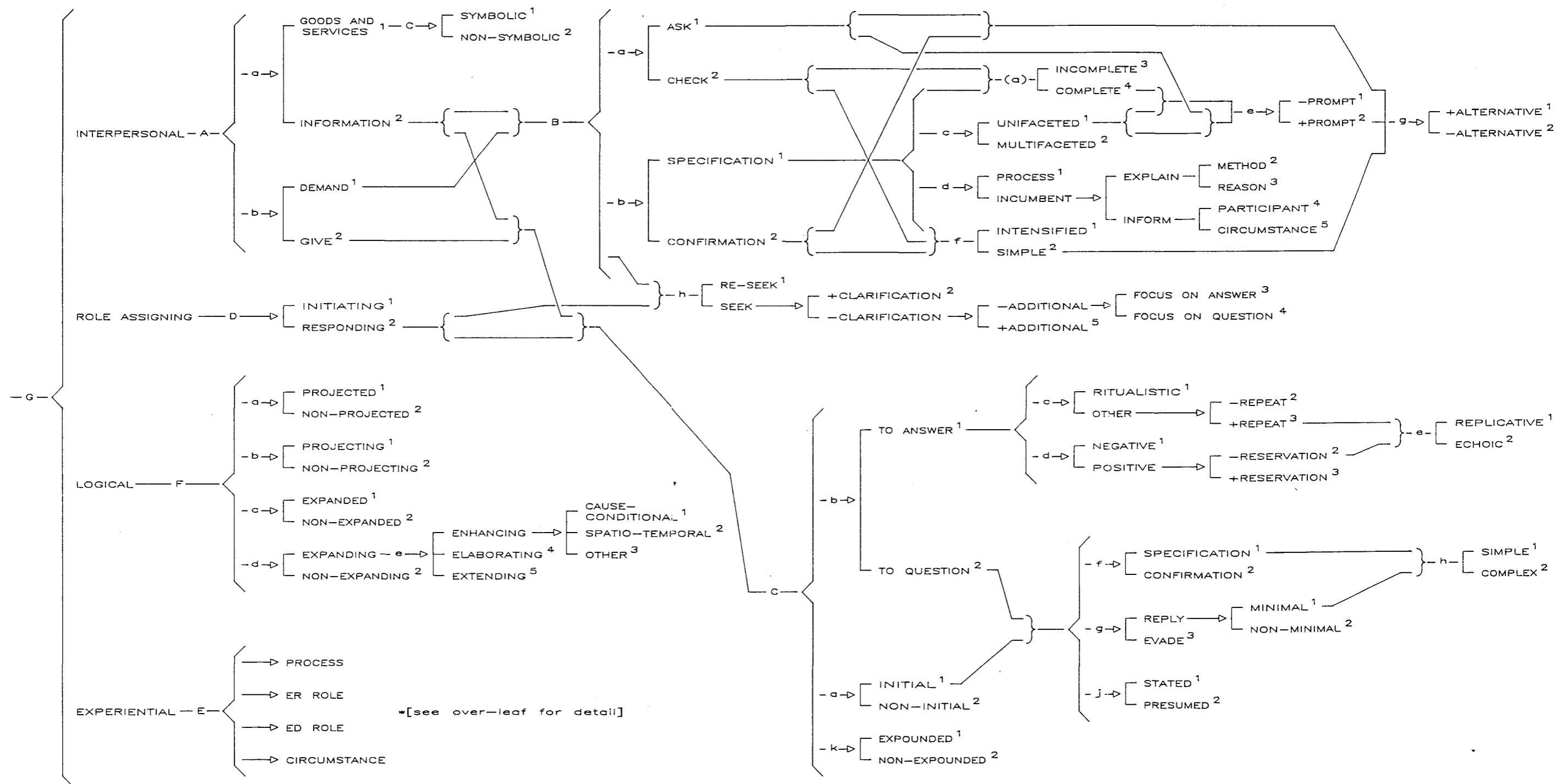


Figure 4.3 The Semantic Network

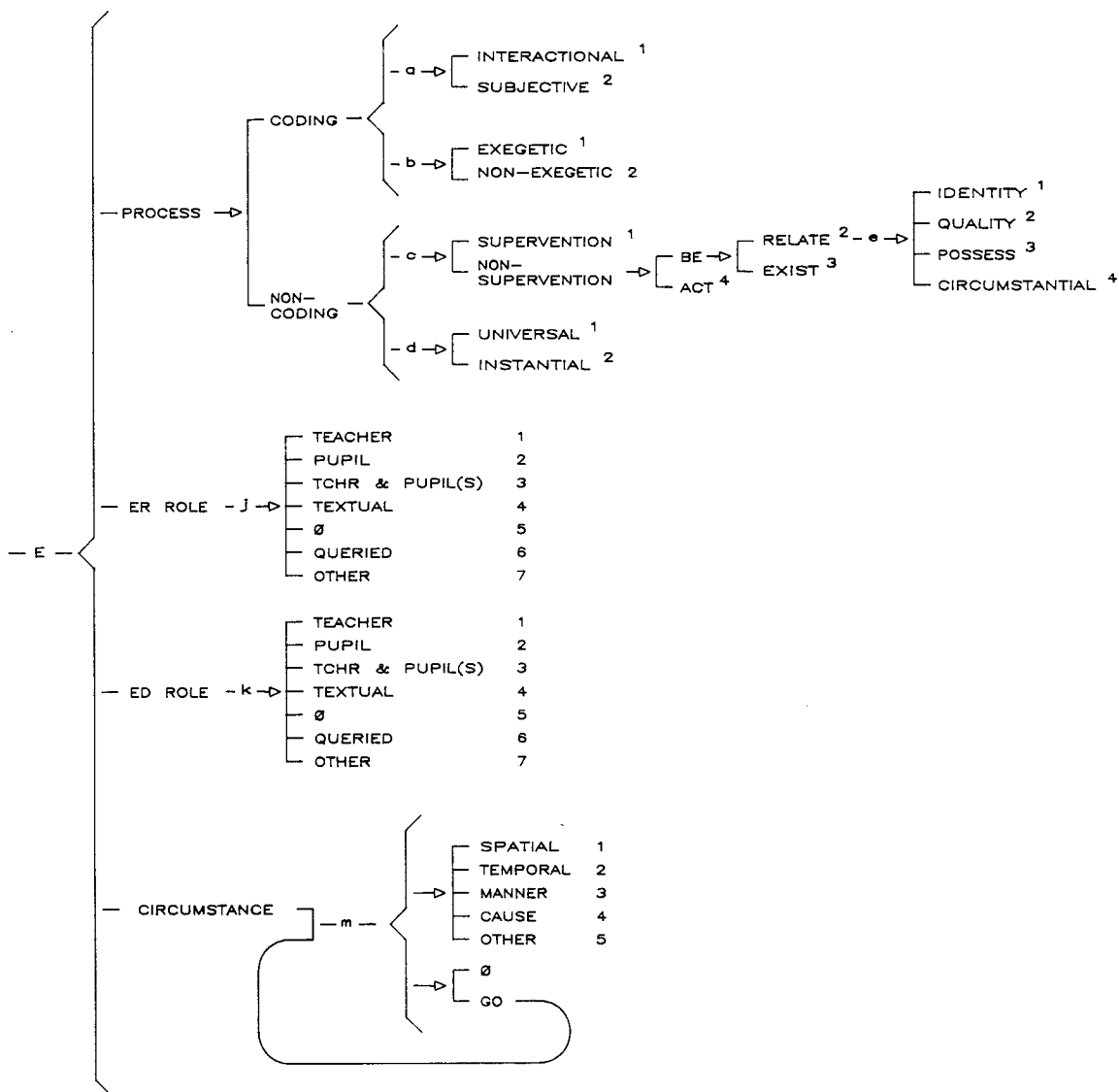


Figure 4.3 cnt. The Semantic Network Continued

#### 4.4 System F: the Logical System

A clause may be modified by one or more other clauses. Clauses entering into such a relation are said to comprise a clause complex (Halliday, 1985a:192). The Logical System presented below is concerned with the logico-semantic relations which may hold between members of a clause complex. The options of this system are derived from Halliday’s (1985a) account and the meaning of the options in the system are taken directly from that source.

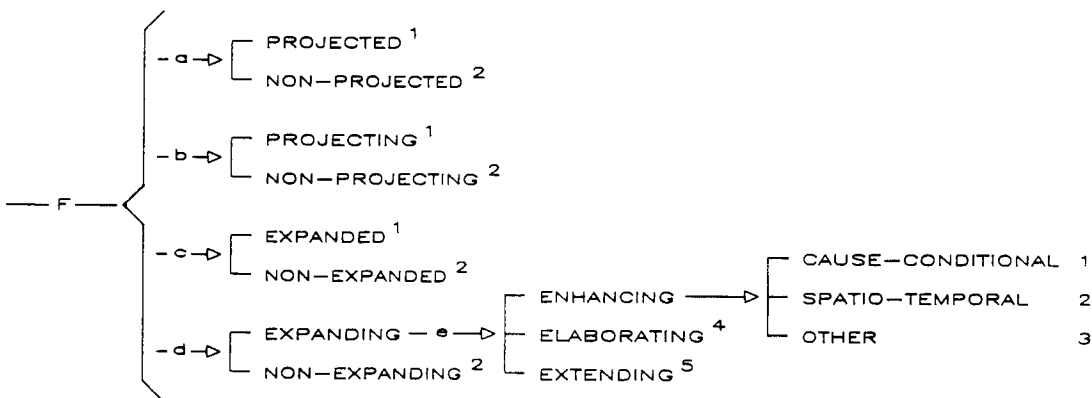


Figure 4.4 The Logical System Network

#### Realisation Statements for Options Comprising System F:

- a1 projected            ↘ clause under scrutiny is projected by another clause
- a2 non-projected       ↘ clause under scrutiny is not projected by another clause
- b1 projecting           ↘ clause under scrutiny projects another clause
- b2 non-projecting      ↘ clause under scrutiny does not project another clause
- c1 expanded            ↘ clause under scrutiny is expanded by another clause
- c2 non-expanded       ↘ clause under scrutiny is not expanded by another clause

- d1 expanding      ↘ clause under scrutiny is an expansion of another clause
- d2 non-expanding      ↘ clause under scrutiny is not an expansion of another clause
- e1 enhancing:cause-conditional
  - ↘ clause under scrutiny is a causal-conditional enhancement of another clause
  - \* the enhancing clause qualifies or embellishes another clause with some circumstantial feature of cause or condition
- e2 enhancing:spatio-temporal
  - ↘ clause under scrutiny is a spatial or temporal enhancement of another clause
  - \* the enhancing clause qualifies or embellishes another clause with some circumstantial feature of place or time.
- e3 enhancing:other
  - ↘ clause under scrutiny is an enhancement not involving cause-condition, time or place.
  - \* the enhancing clause qualifies or embellishes another clause with some circumstantial feature other than place, time or cause-condition.
- e4 elaborating
  - ↘ clause under scrutiny is an elaboration on another clause
  - \* the elaborating clause elaborates on another clause, restating it in other words, specifying in greater detail, commenting or exemplifying
- e5 extending
  - ↘ clause under scrutiny is an extension on another clause
  - \* the extending clause expands another by adding some new element, giving an exception to it, or offering an alternative

The following examples of questions, answers and evaluations from the database used in this study exemplify use of the Logical System.

Example 4.13:

	F:abcde
147 Now, what did Constable Moore do	2212
148 after Kelly had told him	212 2
149 what he had done?	1222

The coding indicates that:

- clause 147 is expanded (by clause 148)
- clause 148 enhances (147) with a temporal element;
- clause 148 also projects (clause 149)
- clause 149 is projected (by 148)

Example 4.14:

	F:abcde
What did Fuller say to Constable Moore?	2222
169 He said	2122
170 that the villain hadn't done the trick	1212
171 and that he'd get even.	122 5

The coding indicates that:

- clause 169 projects (both 170 and 171)
- clause 170 is projected (by 169)
- clause 170 is expanded (by 171)
- clause 171 is projected (by 169)
- clause 171 extends (clause 170)

Example 4.15:

	F:abcde
Can someone suggest some adaptations that an animal might have for an Arctic situation?	2222
706 They might have plenty of fur	2212
707 to keep them warm.	222 1

The coding indicates that:

- clause 706 is expanded (by 707)
- clause 707 is enhancing (cause) (clause 706)

Just as questions and answers can involve expansion and projection, so too can evaluations, as Example 4.16 shows:

Example 4.16:

	F:abcde
What do they (vacuoles) do?	2222
They're just empty.	2222

156	Right, they're just empty spaces;	2212
157	they really don't know	212 5
158	what they do;	1212
159	they think	212 5
160	water and air get transmitted there.	1222

The coding indicates that:

- clause 156 is expanded (by 157)
- clause 157 is extending (extends 156)
- clause 157 is projecting (projects 158)
- clause 158 is projected (by 157)
- clause 158 is expanded (by 159)
- clause 159 is extending (extends 158)
- clause 159 is projecting (projects 160)
- clause 160 is projected (by 159)

As these examples show, it is possible and indeed very common for options F:a2 b2 c2 d2 to be taken up. This is the realisation of a simple, major clause. It is also possible for options F:a1 b1 c1 e to be taken up, as clause four in the constructed example below shows. Hence showing the options of System F as occurring concurrently is justified.

#### Example 4.17:

		F:abcde
What did Constable Moore tell the court?		2222
1 He said		2122
2 that Kelly had told him		1122
3 he wouldn't have shot Fuller		1212
4 if Fuller had said		111 1
5 "I surrender"		1222
6 when he came out of the cave.		122 2

Clause four in this example:

- is projected (by clause 2)
- is projecting (projects clause 5)
- is expanding (conditional:enhancement of clause 3)
- is expanded (temporal:enhancement) (by clause 6)

## **4.5 System E: the Experiential System Network**

This system is concerned with the experiential function of messages - with Processes, Participants and Circumstances. Major clauses select simultaneously for Process, and the Participant(s) and Circumstances incumbent on it. The Experiential System, System E, is presented in its entirety below, and then the various sub-systems are discussed and options exemplified.

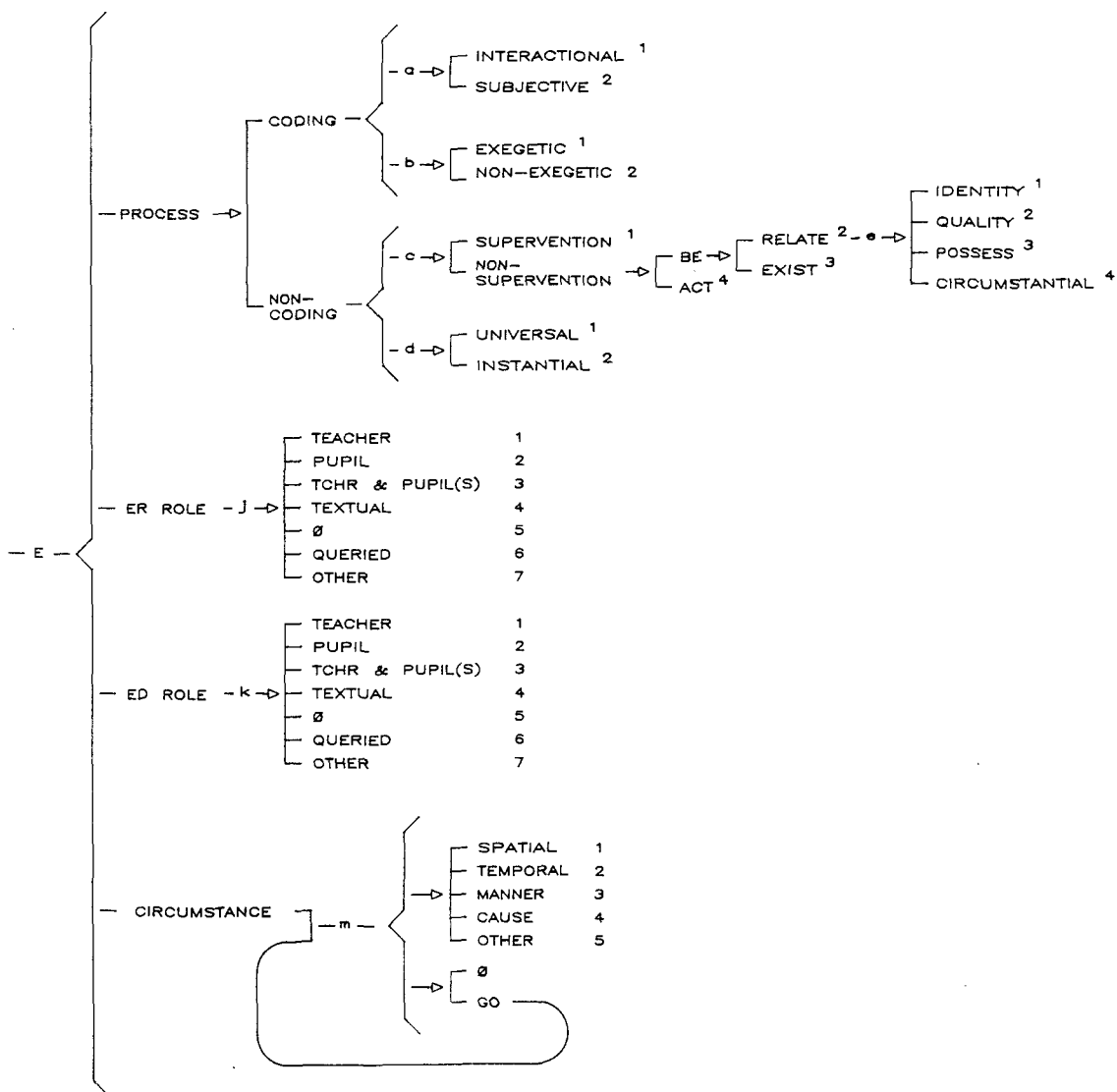
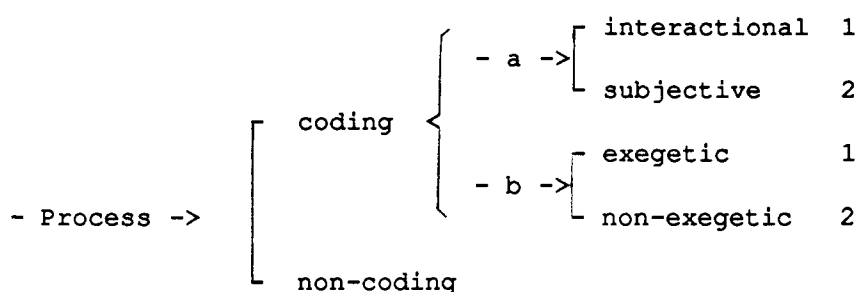


Figure 4.5 The Experiential System Network

### 4.5.1 The Process Subsystem

The Process subsystem has two primary options: 'coding' and 'non-coding'. The options of the 'coding' system are concerned with processes involving saying and sensing, while options of the 'non-coding' system are concerned with processes other than saying and sensing. The option 'Process' is realised (N) by verbal group.



**Figure 4.6 Process:Coding System Network**

Realisation Statements for Options Comprising the Coding System

a1	<u>interactional</u>	\	verbal process
a2	<u>subjective</u>	\	mental process
b1	<u>exegetic</u>	\	Sayer or Senser preselects third person personal pronoun, where relevant
b2	<u>non-exegetic</u>	\	Sayer or Senser preselects first or second person personal pronoun, where relevant

Options b1 and b2 distinguish who is to say, know, like and so on. There is a considerable semantic difference, for instance, between:

Example 4.18:

Do you know || where Fuller was hiding out?

which selects a2 b2, and

Example 4.19:

Did he (Kelly) know || where Fuller was hiding out?

which selects a2 b1.

Despite appearances, Example 4.18 is not an enquiry about ability to answer, but a demand for information - 'where?'. Example 4.19, on the other hand, is an enquiry about the state of someone else's knowledge, and is an instruction to answer 'yes or no'. It was primarily for cases like these that the options 'exegetic' and 'non-exegetic' were included in the network.

As the examples in this section show, many clauses with the feature 'interactional' or 'subjective' are projecting (see Logical System, page 64). In the examples which follow, the functions relevant to the selection expressions are underlined.

a1 b1 interactional:exegetic

Example 4.20:

What did he say?

a1 b2 interactional:non-exegetic

Example 4.21:

So what are you saying?

a2 b1: subjective:exegetic

Example 4.22:

They really don't know || what they do;

a2 b1: subjective:non-exegetic

Example 4.23:

You need to remember || what osmosis does.

The Non-Coding:Process subsystem is presented below. This subsystem is concerned with Processes other than those of saying and sensing.

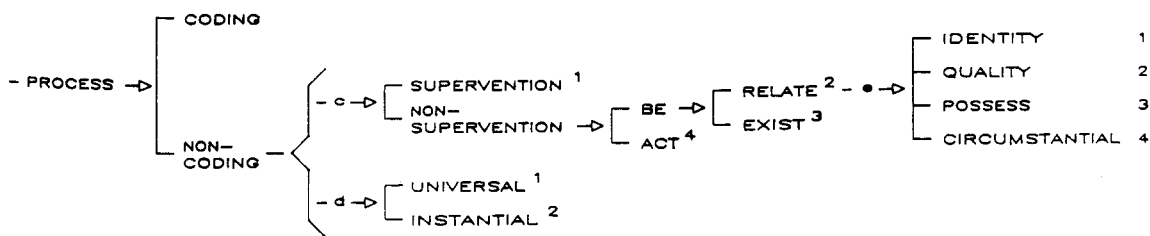


Figure 4.7 The Non-Coding Process System Network

Realisation Statements Comprising the Non-Coding:Process Network:

c1	<u>supervention</u>	↘	happen, go on, occur
c2	<u>relate</u>	↘	relational process
c3	<u>exist</u>	↘	existential process
c4	<u>act</u>	↘	material (outclassify 'happen'), behavioural process
d1	<u>universal</u>	↘	simple present tense
d2	<u>instantial</u>	↘	simple past tense

The realisation statements for the options 'universal' and 'instantial' represent tendencies, not hard and fast rules. There is a high probability that processes with the feature 'universal' will be realised by verbal groups wherein the primary tense is simple present. And there is a high probability that processes with the feature 'instantial' will be realised by verbal groups wherein the primary tense is simple past. But there are exceptions because the features 'universal' and 'instantial' refer less to tense than to a sense of *habitual* in the case of 'universal' and *single-occasion* in the case of 'instantial'. As Huddleston (1984:155) points out ... "this latter distinction is not grammatically encoded in the structure of the VP in English". (Huddleston's 'VP' can be read 'verbal group'.) The distinction between 'universal' and 'instantial' is illustrated in the following pair of constructed examples:

Example 4.24: Universal

The platypus lays eggs.

Example 4.25: Instantial

The platypus laid an egg.

In Example 4.24 the meaning conveyed is that platypi as a generic class lay eggs, habitually or characteristically. As a class they have done so before, do it now, and will presumably continue to do so. On the other hand, the meaning conveyed in Example 4.25 is that some one particular platypus laid some one particular egg on some one particular occasion, as a one-off event (which isn't to suggest that the same platypus can't lay another egg on some other occasion!).

In the following examples, the functions relevant to the selection expressions are underlined.

c1 d1 supervention:universal

Example 4.26:

What sorts of things happen in cytoplasm?

c1 d2 supervention:instantial

Example 4.27:

Now, what happens to Fuller in Hospital?

note: Although 'happen' is here present tense, the question is not asking what on-goingly or continues to happen or even continued to happen at the hospital, for in fact Fuller died the day after his admission! (See Appendix 1.1, page 199).

c3 d1 exist:universal

Example 4.28:

There are two [types of blood cells]: white ones and red.

c3 d2 exist:instantial

Example 4.29:

There was an imbalance in taxation.

c4 d1 act:universal

Example 4.30:

When they [reptiles] lay their eggs || they bury them in the ground, usually.

c4 d2 act:instantial

Example 4.31:

Cause Constable Moore walked to where Fuller lay

Subsystem 'e' is concerned with relational processes:

e1 identity    ↘    intensive:identifying process

e2 quality     ↘    intensive:attributive process

e3 possess     ↘     possessive process  
                              (both attributive and identifying)

e4 circumstantial     ↘     circumstantial process  
                              (both attributive and identifying)

These options also co-select 'universal' and 'instantial'.

c2 d1 e1 relate:universal:identity

Example 4.32:

It [the nucleus] is the brain of the cell.

c2 d2 e1 relate:instantial:identity

Example 4.33:

The Jacobins were the most powerful of the clubs.

c2 d1 e2 relate:universal:quality

Example 4.34:

They [reptiles] are all cold-blooded.

c2 d2 e2 relate:instantial:quality

Example 4.35:

He [Fuller] seemed to be just wounded.

c2 d1 e3 relate:universal:possess

Example 4.36:

Why do plants need cell walls on their cells?

c2 d2 e3 relate:instantial:possess

Example 4.37:

Why did the French have so many debts to pay?

c2 d1 e4 relate:universal:circumstantial

Example 4.38:

They [the seeds] are in little hollows in the cone.

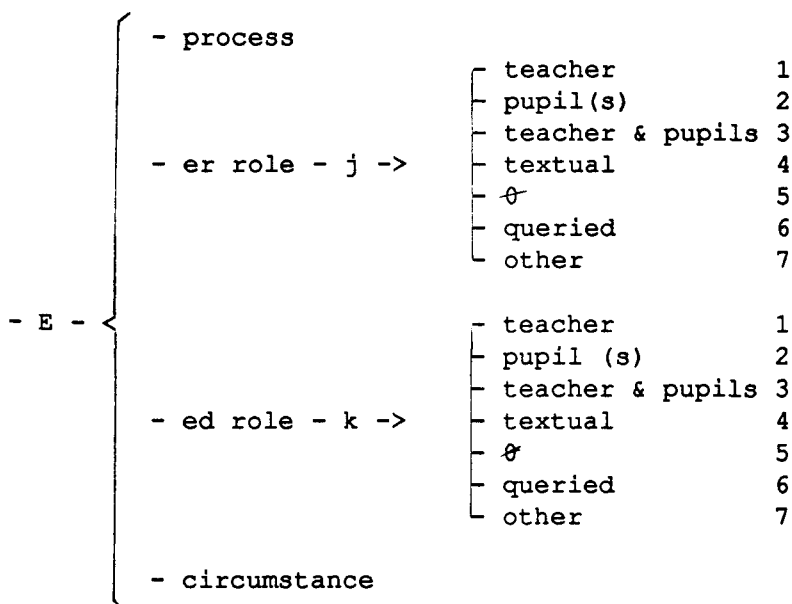
c2 d2 e4 relate:instantial:circumstantial

Example 4.39:

He attended the hospital.

#### 4.5.2 The Participant Subsystem

Subsystems 'j' and 'k' are concerned with Participant functions. The notions 'er role' and 'ed role' used below are from Hasan (1985b:37).



**Figure 4.8 The Participant Subsystem Network**

Realisation Statements for Options Comprising Subsystems 'j' and 'k', the Participant functions:

- j: er role    ↘    Actor, Sayer, Carrier, Behaver,  
                                 Existent, Identified, as relevant to  
                                 Process type
- k: ed role    ↘    Goal, Range, Attribute, Identifier,  
                                 Receiver (if no Verbiage/Range), as  
                                 relevant to Process type

In either case, the Participants involved can be: (1) the teacher, (2) one or more pupils, (3) the teacher and pupils together, (4) an exegetic or textual referent, (6) the point of enquiry (queried), or (7) other (usually generic 'you').

In the first bracket of examples below, the er roles are underlined.

Example 4.40:

Who went with Kelly? j6 Actor:queried

Example 4.41:

I didn't say || it was junk! j1 Sayer:teacher

Example 4.42:

So what are you saying? j2 Sayer: pupil

Example 4.43:

What did Handle see in the cave? j4 Senser:textual

Example 4.44:

The monarchy was corrupt. j4 Carrier:textual

Example 4.45:

We heard you already! j3 Behavior: teacher  
& pupils

Example 4.46:

There was an imbalance in taxation. j4 Existent:textual

Example 4.47:

What's a census? j4 Identified:textual

Example 4.48:

You have a constant body temperature j7 Carrier:other  
(generic 'you': warm-blooded  
animals generally)

In the bracket of examples following, the ed roles are underlined:

Example 4.49:

Moore carried Fuller to hospital. k4 Goal:textual

Example 4.50:

What did he say?

k6 Range:queried

Example 4.51:

What are the correct terms?

k6 Identifier:queried

Example 4.52:

He saw the smoke signals.

k4 Phenom:textual

Example 4.53:

We're told || that ...

k3 Receiver:teacher  
&pupils

Example 4.54:

Who can tell me || why...

k1 Receiver:teacher

Example 4.55:

What then tells you || that...

k2 Receiver:pupils

Example 4.56:

Oh, to show you || that...

k7 Receiver:other

Example 4.57:

He was a surgeon.

k4 Attribute:textual

### 4.5.3 The Circumstance Subsystem

The Circumstance network is concerned with the circumstances incumbent upon the Process - with the how's, where's, when's and why's.

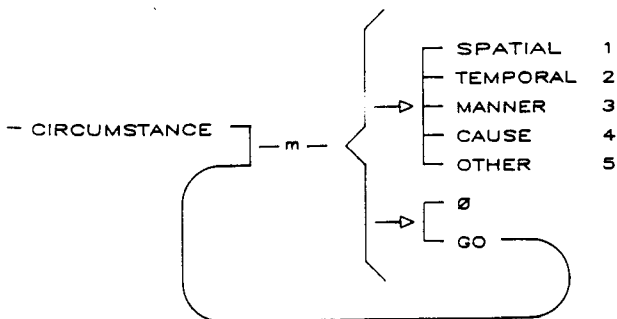


Figure 4.9 The Circumstance System Network

Realisation Statements for Options Comprising the Circumstance System  
Network:

m1	<u>spatial</u>	↘	spatial circumstance (distance, place)
m2	<u>temporal</u>	↘	temporal circumstance (duration, frequency, time)
m3	<u>manner</u>	↘	circumstance of manner (means, quality, comparison)
m4	<u>cause</u>	↘	circumstance of cause (reason, purpose, behalf)
m5	<u>other</u>	↘	accompaniment, matter, role

Strictly speaking the use of the recursion arrow in Figure 4.9 above is inaccurate because it implies that the same type of circumstance can recur repeatedly in the same clause. However, clauses can select for more than one type of circumstance or for none at all. For these latter reasons it was decided to leave this system as it is, noting the technical imperfection of doing so.

In the following examples, the circumstantial elements are underlined:

Example 4.58:

How far did they travel || before they got to the cave?  
m1:spatial                      m2:temporal              m1:spatial

Example 4.59:

How did Fuller react || as soon as he saw Kelly?  
m3:manner                      m2:temporal

He said || "I give up" in a surrendering kind of way.  
m3:manner

Example 4.60:

Fuller died of two small bullet wounds.  
m4:cause

Example 4.61:

The removal of the King would bring the Revolution into  
dispute with who?  
m5:other (accompaniment)

Example 4.62:

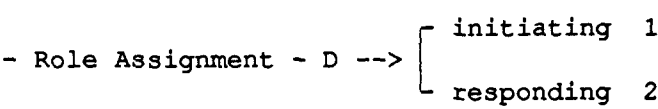
You have to think about living things as well.  
m5:other (matter)

Example 4.63:

Well, um white are usually used as antibodies.  
m5:other (role)

**4.6 System D: Role Assignment**

In the network devised for this research System D replaces a textual network. The entry condition 'Role Assignment' is modeled on Halliday (1984:12) and is useful when dealing with dialogic discourse. The system is comprised of just two options:



**Figure 4.10 The Role Assignment System Network**

The realisation statements for these two options are:

- D1 initiating    ↘    outclassify Rejoinder
- D2 responding    ↘    Rejoinder

The term Rejoinder is being used here as a technical term, following Halliday and Hasan (1976:206-213).

They define Rejoinder as follows:

Any observation by one speaker, whether it is a question or not, may be followed by an observation by another speaker that is related to it by some cohesive tie. We shall refer to this very general category of sequel as a REJOINDER. A rejoinder is any utterance which immediately follows an utterance by a different speaker and is cohesively related to it.  
(Halliday and Hasan:1976:206)

In the database of interest in this research, most questions are 'initiating', though there are exceptions. The latter are discussed briefly below and in detail on page 89. Answers and evaluations are all 'responding', being types of rejoinders.

The relevant sub-types of rejoinders will be identified and defined here. These are used as realisation statements subsequently in Systems h, Cb1 and Cb2.

Subsystem h, shown on page 90, is concerned with what Halliday and Hasan (1976:214) call **Question Rejoinders**. These have the function of querying a preceding utterance or eliciting supplementary information about it. In the language data used in this research, the 'preceding utterance' is typically, though not exclusively, a student answer attempt.

A Rejoinder that directly answers a question is called by Halliday and Hasan an **Answer**. One that gives information other than that asked for but answers a question by implication is called a **Supplementary Response**. Both of these are relevant to the 'Answering' system, System Cb2 (see page 95). Other rejoinders, not following a question, include **Assent** and **Contradiction**. These rejoinders are relevant to the 'Evaluation' system, System Cb1 (see page 99).

When they occur as realisation statements, the terms underlined above are used in their technical senses as developed by Halliday and Hasan.

#### 4.7 System A: the Interpersonal System

The options of the Logical, Experiential and Role Assignment systems apply to messages of all kinds - questions, statements, commands and offers. It is options selected within the Interpersonal system network that distinguish these four, and further distinguish for example, one kind of question from another.

The four primary options of the Interpersonal system encode fundamental distinctions (a) in the commodity being exchanged, and (b) in the speech role:

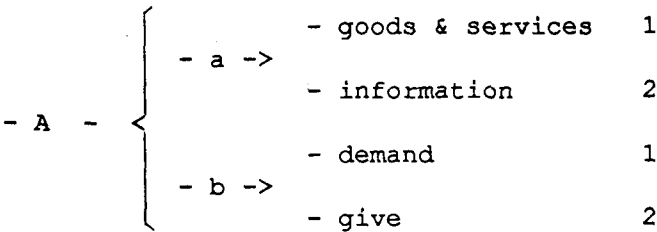


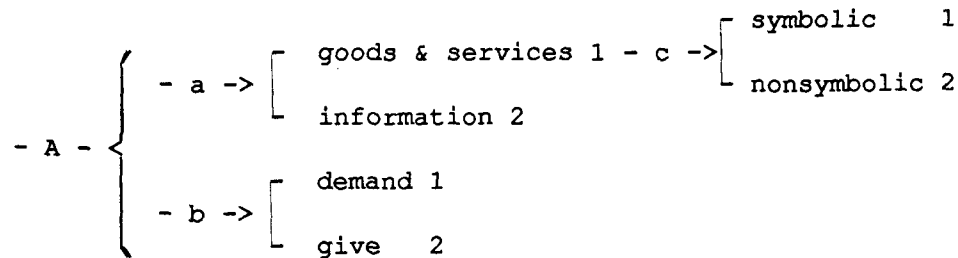
Figure 4.11 Primary Options of the Interpersonal System Network

Subsystems 'a' and 'b' taken together define the four primary speech functions of command, offer, question and statement:

a1	b1	<u>demand:goods &amp; services</u> (orders, requests, etc. irrespective of whether imperative, declarative, or interrogative)	= command
a1	b2	<u>give:goods &amp; services</u>	= offer
a2	b1	<u>demand:information</u>	= question
a2	b2	<u>give:information</u>	= statement

Of particular interest in this research is the nexus between questions, answers and the evaluation of answers. Hence, systems relevant to these three pedagogic speech events are developed in some detail while others, for example, giving and demanding goods & services are only minimally developed. In the following section the network relevant to goods & services is dealt with briefly, then the networks relevant to questions, answers and evaluations are presented in turn.

Giving and Demanding Goods & Services



**Figure 4.12 The System Network for Goods & Services**

Realisation Statements for Options Relevant to Goods & Services:

c1	<u>symbolic</u>	↘	Process:verbal G & S subcategorised as /linguistic/
c2	<u>non-symbolic</u>	↘	Process:other than verbal G & S subcategorised as /non-linguistic/

a1 b1 c1 demand: g & s :symbolic

\* demand is for a linguistic act

Example 4.64:

Comment on the significance of the Tennis Court Oath.

a1 b1 c2 demand: g & s :non-symbolic

\* demand is for a non-linguistic act

Example 4.65:

Could you open your books to page thirty six please.

a1 b2 c1 give: g & s :symbolic

\* offer is for a linguistic act

Example 4.66:

I'll just read to you again from this little book what the situation was like.

a1 b2 c2 give: g & s :non-symbolic

\* offer is for a non-linguistic act

Example 4.67:

I'll move this up || so you can all see it.

For purposes of quantitative analysis only instances of the a1 b1 c1 : demand: g & s :symbolic are considered. Responses to (compliance with) these are considered 'answers', and so are handled through System Cb2, the system relevant to answers.

## **4.8 System B: Demands for Information**

It was stated in the last section that 'demand' together with 'information' yielded what we know as questions. System B has as its entry conditions 'demand' together with 'information', and so is relevant to what shall be called as a short-hand, questions. This system network is presented overleaf.

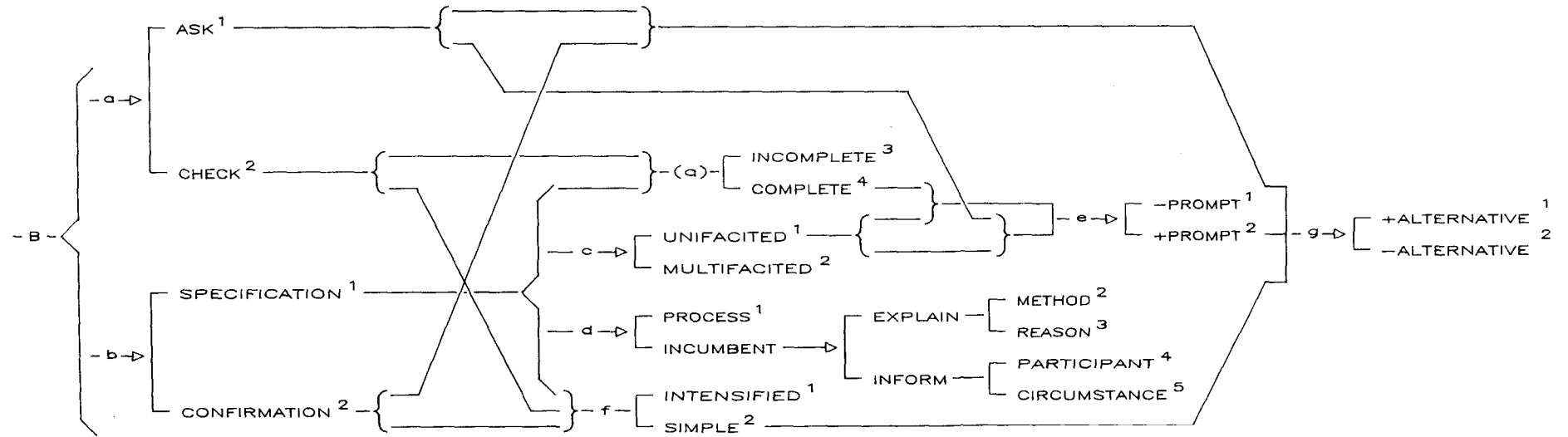


Figure 4.13 System B: The Question System Network

In the account of this network which follows, the Tones referred to are again those of Halliday (see page 57). A key to the symbols used is provided below.

S	Subject	A/Wh	Adjunct is conflated with Wh- element
F	Finite		
C	Complement		
A	Adjunct		
Wh-	Wh element	S, C or Awh	Wh-element is Subject, Complement or Adjunct
Lvb	Lexical Verb		

Realisation Statements for Options Comprising System B:

demand:information \ Mood indicative = S F

a1 ask \ interrogative = F ^ S; S,C or A/Wh

a2 check \ declarative = S ^ F

b1 specification \ insert Wh-

\* point of enquiry is information; is an instruction to supply information

b2 confirmation \

- (i) Mood interrogative:polar = F ^ S
- (ii) Mood declarative Tone 2 = S ^ F
- (iii) Mood declarative + Tag = S ^ F ... F ^ S

\* point of enquiry is confirmation; is an instruction to confirm or deny proposition

a3 incomplete \ declarative; ellipsis of clause final element, Tone 2

\* is in instruction to 'fill in the blank'

a4 complete \ declarative; conflate clause final element with Wh-

\* Wh- element is non-thematic, being transposed to clause final position

c1 uni-faceted \ feature singular is pre-selected in group conflated with Wh-

\* one point of information is demanded

- c2 multi-faceted \ feature plural is pre-selected  
in group conflated with Wh-
- \* more than one point of information is demanded;  
'what else?' serves as a prompt for demanding  
next point of information
- d1 process \ interrogative:Wh Cwh/Medium = what  
Lvb = do, happen
- d2 explain:method \ interrogative:Wh Awh = how
- \* is an instruction to explain the method or  
principle for doing
- d3 explain:reason \ interrogative:Wh Awh = why
- \* is an instruction to explain the reason or purpose  
for doing
- d4 inform:participant \ interrogative:Wh
- Subj<sup>wh</sup> = who, what, which  
Comp<sup>wh</sup> = what
- \* is an instruction to specify who or what is  
involved in the goings on
- d5 inform:circumstance \ interrogative:Wh
- Awh/Circumstance =  
where, when, how far, how long, how often, with whom,  
with what, as what, what like, what about, how (means)
- e1 +prompt \ cl:indic, elliptical Tone 2 to follow  
Wh-clause (complex)
- \* is an instruction to verify or reject answer  
proposed in the prompt
- e2 -prompt \ outclassify cl:indic; elliptical Tone 2  
to follow
- f1 intensified \ declarative + Tag
- f2 simple \ declarative Tone 2
- \* carries the nuance 'are you sure about that?'
- g1 +alternative \ disjunctive 'or' coordinate complex  
(cf Huddleston:1984:366-368)
- \* is an instruction to select one of the named possible  
answers as the better one



Example 4.72:

He went to Parramatta or Hornsby first?

a1 b1 c1 e1 ask:specification:uni-faceted:-prompt

↘ interrogative:Wh

Example 4.73:

Which group was more radical?

a1 b1 c1 e2 g2 ask:spec:uni-faceted:+prompt:-alternative

↘ as for 4.73, followed by c1:indic, elliptical Tone 2

Example 4.74:

Which group was more radical, the Girondists?

a1 b1 c1 e2 g1 ask:spec:uni-faceted:+prompt:+alternative

↘ interrogative:disjunctive:Wh-

Example 4.75:

Where did Kelly go then: Parramatta or Castle Hill?

The codings are again presented here as a means of highlighting the paradigm:

a1 b2 g2	Did the chicken come first?
a1 b2 g1	Did the chicken or the egg come first?
a2 b2 f1	The egg came first, didn't it?
a2 b2 f2 g2	The egg came first?
a2 b2 f2 g1	<i>The chicken came first or the egg?</i>
a1 b1 c1 e1	Which one would have come first?
a1 b1 c1 e2 g2	Which came first, the egg?
a1 b1 c1 e2 g1	Which came first, the chicken or the egg?

note: The disjunctive type is to be distinguished from examples like the following which are coded as clause complexes (with the structure 1 +2 where the extending logical relation = 'or', and the extending clause is non-elliptical): Did they [plants] first evolve tubes || or did they move onto land (and then develop tubes)?

The following selection expressions, and examples contrast those questions which enter into a paradigm of a different kind. Of importance in this paradigm are the contrasts between the features 'incomplete' and

'complete', and the pair: 'uni-faceted' and 'multi-faceted'. Presentation follows the conventions used above.

a1 b1 c1 e1 ask:spec:uni-faceted:-prompt

Example 4.76:

What does 'putrid' mean?

a1 b1 c2 ask:spec:multi-faceted

Example 4.77:

What are some examples of habitats?

a4 c1 (e1) complete:uni-faceted:(-prompt)

Example 4.78:

They [the National Assembly] met where?

note: Prompting (e2,g2) and choosing between proposed alternatives (e2,g1) are available to this type of question:

e.g. They met where, in the gardens?  
They met where, in the gardens or on the tennis court?

a4 c2 complete:multi-faceted

Example 4.79:

Some examples of arthropods would be what?

a3 c1 incomplete:uni-faceted

Example 4.80:

So the Revolution became more ... ?

a3 c2 incomplete:multi-faceted

Example 4.81:

The five vertebrate groups are ... ?

note: Though the (transposed) Wh- element is ellipsed, it is still systemically present; these questions are information and not confirmation seeking. Because the Wh-element is systemically present the realisation statements for 'specification' (↘ insert wh-) and for 'uni-faceted' and 'multi-faceted' (↘ feature singular or

plural respectively is pre-selected in group conflated with wh-) remain valid when these features are co-selected with 'incomplete'.

Just what information is being demanded is not always obvious from the 'incomplete' type question clause itself. However, the co-text makes clear the point of enquiry. Consider the following for example: 'Fertilisation is ...?'. When preceded by: 'Fertilisation is inside the female's body' it becomes apparent that what is wanted is a qualitative attribute that will provide a succinct paraphrase, i.e. 'fertilisation is internal'.

As a means of highlighting the paradigm relevant to the above options, the codings along with the question 'How do non-flowering plants reproduce?' are presented here:

a1 b1 c1 (e1)

How do non-flowering plants reproduce?

a1 b1 c2

What are some ways that non-flowering plants reproduce?

a4 c1 (e1)

One way that non-flowering plants reproduce is what?

a4 c2

Some ways that non-flowering plants reproduce are what?

a3 c1

One way that non-flowering plants reproduce is ... ?

a3 c2

The three ways that non-flowering plants reproduce are ...?

Subsystem 'd' serves several useful functions. Firstly it provides a ready means of knowing what the point of enquiry of a question is without having to consider the finer details provided by the experiential network. This facilitates preliminary quantitative analysis of the data. Also the system distinguishes between those circumstances for which an explanation is required, and those for which provision of some one bit of information is sufficient. Further, it seemed expedient to include within the section addressing questions an account of how questions of varying points of enquiry were to be recognised.

In the examples below, the functions relevant to the selection expressions are underlined.

d1 process

Example 4.82:

What does the nucleus do?

Example 4.83:

What happens to Fuller in Parramatta Hospital?

d2 explain:method

Example 4.84:

How do frogs and other amphibians reproduce?

d3 explain:reason

Example 4.85:

Why do plants need cell walls on their cells?

Example 4.86:

In plants that have flowers, what are those flowers for?

d4 inform:participant

Example 4.87:

Who went with Kelly on his search?

Example 4.88:

What are the correct terms?

d5 inform:circumstance

Example 4.89:

Now, straight after the shooting, where did Kelly go?

#### 4.8.1 Subsystem h: Question Rejoinders

Question rejoinders have the function of querying a preceding utterance or eliciting supplementary information about it (see page 79). The entry conditions for system h, the system of question rejoinders are: System B and option D2 (responding) from the Role Assignment system network.

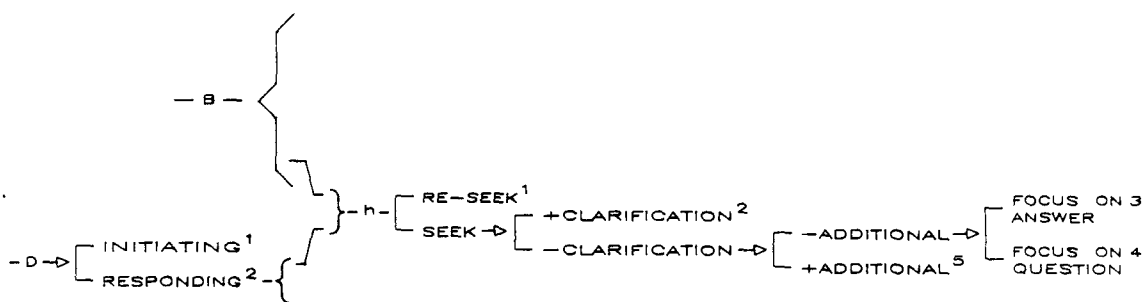


Figure 4.14 Subsystem h: Question Rejoinder

Several features of Subsystem h are, in a strict technical sense, problematic. However, there is good reason to group the options included in this network into a single subsystem. In the decision to leave the network as it is pragmatic considerations sometimes took priority over strictly technical ones. The considerations concerning the formation and use of Subsystem h accompany presentation of the network.

All of the options in Subsystem h combine with questions that are 'responding'; they presuppose some 'parent' question or some pre-occurring phenomenon. For example, one cannot ask for clarification of the meaning of an utterance or situation prior to the saying of that utterance or constitution of that situation. Moreover, one cannot initiate a question sequence by asking 'What else?'. - Hi Susanna. Haven't seen you for ages. What else? -. For each option in Subsystem h some parent question is presupposed.

Options Relevant to Subsystem h:

h1 reseek ↘ as for System B

- \* self-same question is put again following a failed answer attempt

Example 4.90:

Tchr: Of those, the simplest is which one?  
 Kyli: Mammals.  
 Tchr: The simplest, Krista?

note: Instances in which teachers ask the same question two or more times before allowing time to answer are not coded as h1 types.

Example 4.91:

Tchr: What do we know about the Philosophes?  
What did they do? Darren.

Both of these are considered 'initiating' (Option D1).

h2 +clarification ↘ as for System B

\* 'What do you mean?'

This option might have been appropriately put in the punctuative network. However, clarification seeking questions are always 'in response to' some phenomenon that has already taken place, so 'responding' as an entry condition is appropriate. The entire System B as the other member of the compound entry condition is less defensible. The most usual realisation of '+clarification' is 'what?' (do you mean), which takes up options a1 b1 c1 d4 e1 from System B. But this is not the only possible realisation. As the following paradigm shows, the only options unlikely to be taken up from System B are 'multi-faceted (c2); and options d2, d3 and d5.

Original (parent) question:

How do we divide up eucaryotes?

Possible sequent clarification seeking questions:

What do you mean?

a1 b1 c1 d4 e1

What do you mean, the major groups?

a1 b1 c1 d4 e2 g2

What do you mean, the major groups or the criteria for grouping?

a1 b1 c1 d4 e2 g1

Do you want the major groups?

a2 b2 g2

Do you want the major groups or the criteria for grouping?

a1 b2 g1

So, what you're asking for is ... ?

a3 c1

So, what you're asking for is what?

a4 c1 e1

So, what you're asking for is what, the major groups?

a4 c1 e2 g2

So, what you're asking for is what, the major groups or the criteria for grouping?

a4 c1 e2 g1

What you want is the criteria, isn't it?

a2 b2 f1

You're asking for the major groups?

a2 b2 f2 g2

You're asking for the major groups or the criteria for grouping?

a2 b2 f2 g1

What do we do now, Mr D, just summarise?

a1 b1 c1 d1 e2 g2

Because the majority of options from System B are relevant to clarification seeking questions, it was decided to leave the option '+clarification' in the subsystem with the whole of System B as one member of the compound entry condition, but to add a note acknowledging the technical imperfection of doing so.

h3 focus on answer \ as for System B

- \* follows an inadequate answer attempt; turns that answer or some part of it into a new, further question; typically used to draw out more detail or highlight the source of error in the answer attempt

Example 4.92:

Tchr: What can we say about the Revolution from the beginning of 1789 through the next decade?

Lind: It got out of hand.

Tchr: It got out of hand in what way?

Example 4.93:

Tchr: Why are the strapweeds you find in lakes so important?

Mari: Feed the fish.

Tchr: Well, firstly, it doesn't feed the fish.

Tchr: What would it feed?

h4 focus on question \ as for System B

- \* follows a failed answer attempt; original (parent) question is revised so that the point of enquiry is changed or made less ambiguous; such revisions are a kind of implicit admission by the teacher that the point of enquiry of the parent question was not self-evident.

Example 4.94:

Tchr: How would you divide up eucaryotes?  
ufs: Phylum.  
Tchr: OK, what are the two main groups or kingdoms?

Example 4.95:

Tchr: When you get up to the vertebrates  
how do we divide them up?  
Sara: Types, levels.  
Tchr: No, not what do we divide them into.  
How's the main differences [distinguished]?

These two examples are from the same lesson. In the first half of the lesson the question 'how do we divide?' meant 'into what two groups do we divide some superordinate group?'. Then, when it came to vertebrates the meaning of 'how do we divide?' became 'what criteria are used to divide?'. The ambiguity of the teacher's question is highlighted by these two examples.

h5 +additional    ↘    what else?    what is another x?

The question 'what else?' is typically used to re-instate a multi-faceted parent question:

Example 4.96:

Tchr: What are some features of living things?  
Gavn: Something that breathes air.  
Tchr: Alright, living things sometimes breathe air.  
Tchr: Chris, what else?

The parent question is multi-faceted; more than one point of information is required in answer. 'What else?' re-instates this parent question, letting the students know that the next bit of the list-like answer is now to be provided.

The option '+additional' obviously does not combine freely with all options from System B, since multi-faceted questions are relevant to the option 'specification' but not to 'confirmation'. But because a 'what else?' question copies the features of its parent question (see coding below) and because such questions inherently cannot be initiating, it was decided to leave '+additional' in Subsystem h, again acknowledging the strictly technical imperfection of doing so.

The convention adopted for coding 'what else?' type questions for purposes of quantitative analysis is illustrated below:

What are some features of living things?
B a1 b1 c2 d4

D1

What else?
B a1 b1 c2 d4 h5

D2

This is what it means to say that a question with the option '+additional' copies the features of its parent question.

The 'what else?', sequent question is distinguished from the parent question by the options h5 and D2.

### 4.9 System C: Answers and Evaluations

The entry conditions for System C are: give:information:responding (see Figure 4.15 below). Within System C, subsystem b2 is concerned with answering/answers - 'give:information:responding:to question' and subsystem b1 with evaluating/evaluations - 'give:information:responding:to answer'. Subsystems 'a' and 'k' are needed to indicate the boundaries (beginning, middle and end) of any one particular occasion of answering or evaluating an answer.

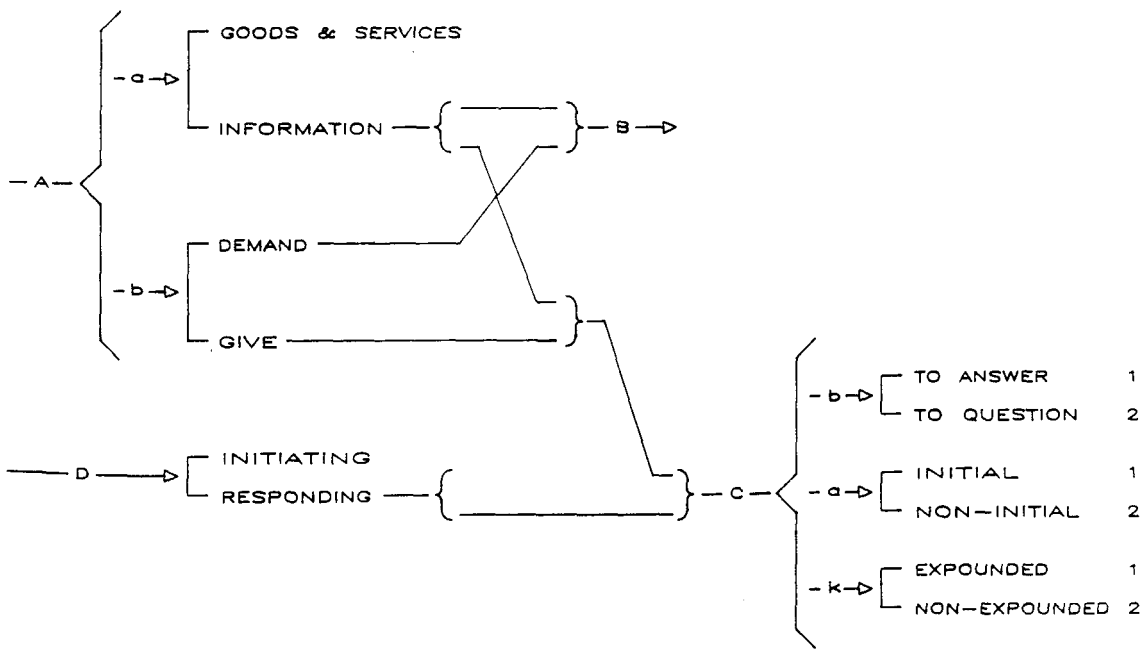


Figure 4.15 Entry Conditions and Primary Options of System C

The subsystems comprising System C are now presented in turn.

#### 4.9.1 System Cb2: Answers

System Cb2 is concerned with rejoinders to questions, that is, with answers. The entry conditions and options of this system are presented in Figure 4.16 below.

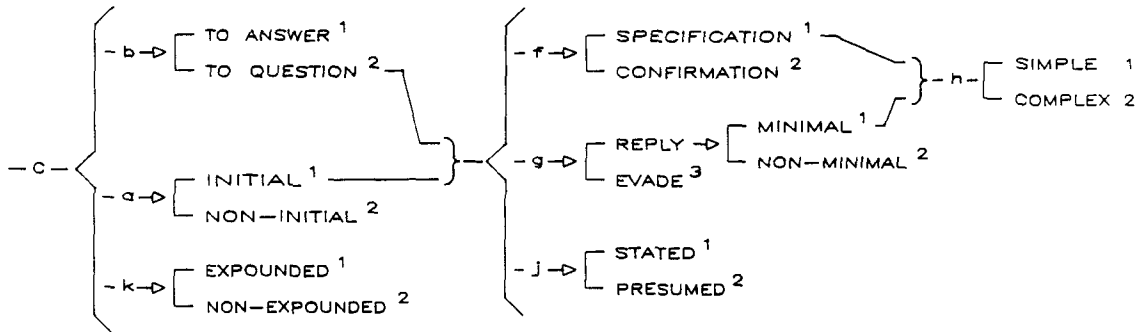


Figure 4.16 System Cb2: The Answer System Network

Subsystems f, g, h, and j will be discussed first. Discussion of subsystems 'a' and 'k' will be deferred until both subsystems b2 (answers) and b1 (evaluations) have been presented since they are relevant to both answers and evaluations.

Realisation Statements for Options Comprising System Cb2:

- f1 specification \ Response:wh-type  
 \* indicates that answer is to an information seeking question; includes all +alternative types
- f2 confirmation \ Response:yes/no type  
 \* indicates that answer is to a confirmation seeking question; includes all +prompt types
- reply \ Answer
- g3 evade \ outclassify Answer
- g1 minimal reply \ clausal ellipsis

g2 non-minimal reply \ outclassify clausal ellipsis

h1 simple \ group (complex)

h2 complex \ major clause

j1 stated \ Response to explicit Question

j2 presumed \ Response to implicit Question

The terms Response and Answer are being used here in the technical sense as developed by Halliday and Hasan (1976:206-213). See also page 79. These options are exemplified below.

Cabcdefghj

12 111 specification:minimal:simple

- \* the speaker makes explicit just one thing - the information that the question calls for, leaving all the rest to be presupposed by ellipsis

Example 4.97:

Q: How far did they travel?

A: Eight miles.

Cabcdefghj

12 112 specification:minimal:complex

- \* the response takes the form of a clause; nevertheless the question clause itself is presupposed

Example 4.98:

Now, he shot him on the right-hand side.

Q: What does that imply?

A: That he's not going to die.

Example 4.99:

Q: What's the complication?

A: Uh bacteria and fungus have those little tiny doovers that photosynthesise and eat things.

Example 4.100:

Q: Why did James Kelly go to James Grady's house?  
A: to borrow the rifle

Cabdefghj

12 12 specification:non-minimal

\* response is a major clause incorporating  
the question clause

Example 4.101:

Q: What did they see that indicated to them that  
somebody was there?  
A: He saw the smoke signals.

Cabdefghj

12 21 confirmation:minimal

\* the answer specifies the polarity and  
presupposes all else

Example 4.102:

Q: Did it look || as though he was going to die?  
A: No.

Cabdefghj

12 22 confirmation:non-minimal

\* includes Supplementary Responses

Example 4.103:

Q: Do we need to know all the evidence names?  
A: You needn't know their names.

Example 4.104:

Q: Shouldn't he be punished in some way?  
A: Maybe he could get just one year or something.

g3 evade

\* answerer (i) disclaims ability to answer  
(ii) aborts attempt to answer  
or (iii) disputes the relevance of the question

Example 4.105:

Q: What were the Three Estates, Jane?  
A: Um, ... I can't think.

Example 4.106:

Q: How do we divide them up? [How do we group x?]  
A: Um, by ...

Example 4.107:

Q: But what's an example of a terrestrial or aquatic fish?  
A: No, what I want to do is divide all of the hard bone things into either completely aquatic which will include fish or the rest so that ..... etc.

j2 presumed

- \* the pupil/answerer offers a piece of factual information immediately relevant to the topic at hand, anticipating a possible next question

Example 4.108:

Q: What is an invertebrate animal?  
A: An animal without a backbone.  
E: Right, an animal with no backbone.  
\*A: And a vertebrate is one that does have a backbone.  
E: Alright, one that has a backbone.

In the data base used in this study there are no examples of evasion (g3) of a presumed question (j2), though such is not impossible as the following adapted example shows:

Example 4.109:

Q: Can anybody remember something that is special about blood cells?  
A: There are two - white ones and red.  
E: Right, two different sorts, white and red. Morgan?  
Ev: Well, white ones carry the oxy .. oh no, .. never mind

#### 4.9.2 System Cb1: Evaluation of Answers

System Cb2 is concerned with options relevant to evaluation of answers. The options of this system are presented in Figure 4.17.

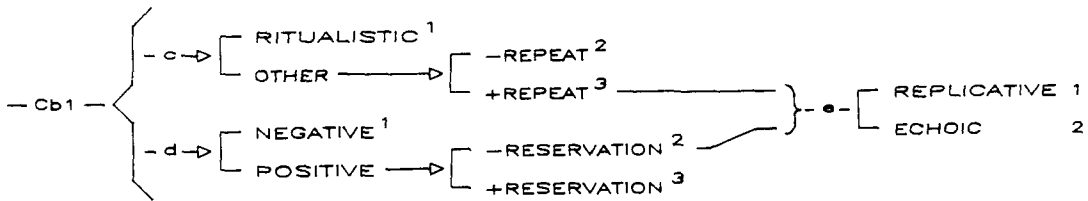


Figure 4.17 System Cb1: Evaluation of Answers

#### Realisation Statements for Options Comprising System Cb1:

- c1 ritualistic ↘ minor clause (not coded for logical or experiential)
- c2 -repeat ↘ extension or enhancement of Answer Statement
- c3 +repeat ↘ elaboration of Answer Statement
- d1 negative \* concerned with denial or contradiction; indicates rejection of Answer Statement
- d2 positive \* concerned with confirmation or verification; indicates acceptance of Answer Statement
- d3 +reservation \* concerned with tentativeness or provisional acceptance of Answer Statement; indicates concession of point made in Answer Statement but ....

c1 d1 ritualistic:negative ↘ no, not exactly

#### Example 4.110:

Q: Now, straight after the shooting, where did Kelly go?  
 A: Best's Inn.  
 E: No.

#### Example 4.111:

Q: Trenton, what is a vertebrate animal?  
 A: An animal that has no bones.  
 E: Not exactly. [said sarcastically]

c2 d1 -repeat:negative \ Rejoinder:Contradiction

Example 4.112:

Q: Who can think of a single-cell group of algae?

A: Green algae.

E: Uh, green algae includes multi-cellular ones.

c3 d1 +repeat:negative \ elaboration:restate with  
reversed polarity

Example 4.113:

Q: Why are the strapweeds you find in lakes so important?

A: Feed the fish.

E: Well, firstly, it doesn't feed the fish.

c1 d2 ritualistic:positive \ yes, right, good,  
that's right Tone 1

Example 4.114:

Q: What does moderate conduct mean?

A: He's good mannered.

E: Right.

note: 'Right', 'alright', 'OK', 'well', etc. are considered punctuative unless they occur alone as an evaluative indicator. So, 'right' and 'alright' are coded as punctuative in all of the immediately preceding examples except Example 4.114 where 'right' is the sole indicator of answer acceptance and so is coded in System Cb1. As the above examples show, 'right', 'alright', 'OK' and 'well' often serve not so much an evaluative function as an indication that the teacher is attending to the student. Handling 'right', 'alright', 'well' etc. within either the punctuative or progressive systems as relevant seemed a sensible solution to the problem of how to demarcate the various uses to which these items are put.

dc2 d2 -repeat:positive: \ Rejoinder:Assent

Example 4.115:

Q: What's the complication?

A: Uh, bacteria and fungus have those little tiny doovers and photosynthesis and eat things.

E: OK, obviously there's some groups that are hard to classify as plants or animals.

c3 d2 e1 +repeat:positive:replicative

↘ elaboration:restate (word for word) Tone 1

Example 4.116:

Q: Now, what was the name of the police officer?

A: Constable Moore.

E: Constable Moore, right.

c3 d2 e2 +repeat:positive:echoic

↘ elaboration:exposition (paraphrase) Tone 1

Example 4.117:

Q: What are some others [stimuli]?

A: Touch.

E: Right, they can respond to feel.

c1 d3 ritualistic:+reservation

↘ (i) close, almost, nearly  
(ii) well, yes on Tone 4

Example 4.118:

Q: Alright, what sorts of things are cells made of?

A: Citroplasm.

E: Righto, citroplasm's close.

c2 d3 -repeat:+reservation

↘ clause complex: 1 x2 where primary clause  
may be presupposed and enhancing logical  
relation = condition:positive 'if', or  
condition:concessive 'but'

Example 4.119:

Q: What are some features of living things?

A: They respond to what sort of material or substance  
they're planted in.

E: Alright, if a plant, something that's planted.

c3 d3 +repeat:+reservation

↘ (i) elaboration:restate (word for word) Tone 3  
(ii) elaboration:restate; insert Mood Adjunct of  
probability or usuality

Example 4.120:

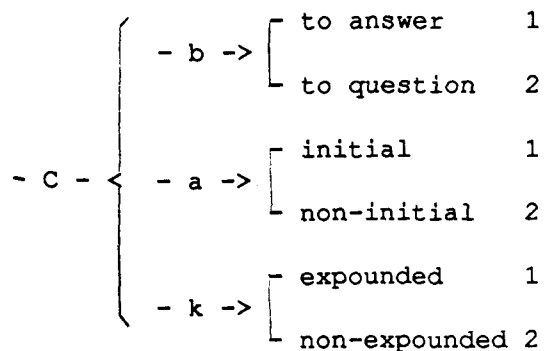
Q: Now, straight after the shooting where did Kelly go?  
A: To the police station.  
E: To the police station (Tone 3)

Example 4.121:

Q: What are some features of living things?  
A: Something that breathes air.  
E: Alright, living things sometimes breathe air.

### 4.9.3 System C subsystems 'a' and 'k'

All of the examples provided for System Cb2 (answering) and Cb1 (evaluating) are of the simple type (initial:non-expounded). But both answers and evaluations can entail clause complexes, and complexes of complexes in their realisation. Subsystems 'a' and 'k' are needed to indicate the boundaries or extent of each particular occasion of answering or evaluating. Subsystem 'a' indicates whether the message under scrutiny is initial or continuing. Subsystem 'k' indicates whether or not the message under scrutiny is followed by a further, closely related message.



**Figure 4.18 Subsystems 'a' and 'k' of System C**

Realisation Statements for Options comprising subsystems 'a' and 'k':

a1 initial

- ↘ first occurring clause entering into the realisation of any one particular occasion of answering or evaluating

a2 non-initial

- ↳ continuing (2nd, 3rd, 4th, ...nth) clause entering into the realisation of any one particular occasion of answering or evaluating

k1 expounded

- ↳ message under scrutiny is followed by a closely related message

\* 'there's more to follow'

k2 non-expounded

- ↳ message under scrutiny is not followed by another closely related message

a1 k1 initial:expounded

- ↳ first clause in a clause complex entering into the realisation of any one particular occasion of answering or evaluating

a1 k2 initial:non-expounded

- ↳ answer or evaluation is realised by a single, simple clause

a2 k1 non-initial:expounded

- ↳ continuing clause entering into the realisation of any one particular occasion of answering or evaluating is followed by a closely related message

a2 k2 non-initial:non-expounded

- ↳ terminal clause in a clause complex or complex of complexes realising any one particular occasion of answering or evaluating

While subsystems 'a' and 'k' indicate the boundaries or extent of any one particular occasion of evaluating or answering, they do not indicate the logical structure of the clause (complex) entering into the realisation of an evaluation or answer. For this System F, the Logical System, is needed. Presented below are several examples of answers and evaluations coded both for their Interpersonal (System C) features and their Logical features (System F). For ease of reference, Systems C and F are reproduced in Figure 4.19 below.

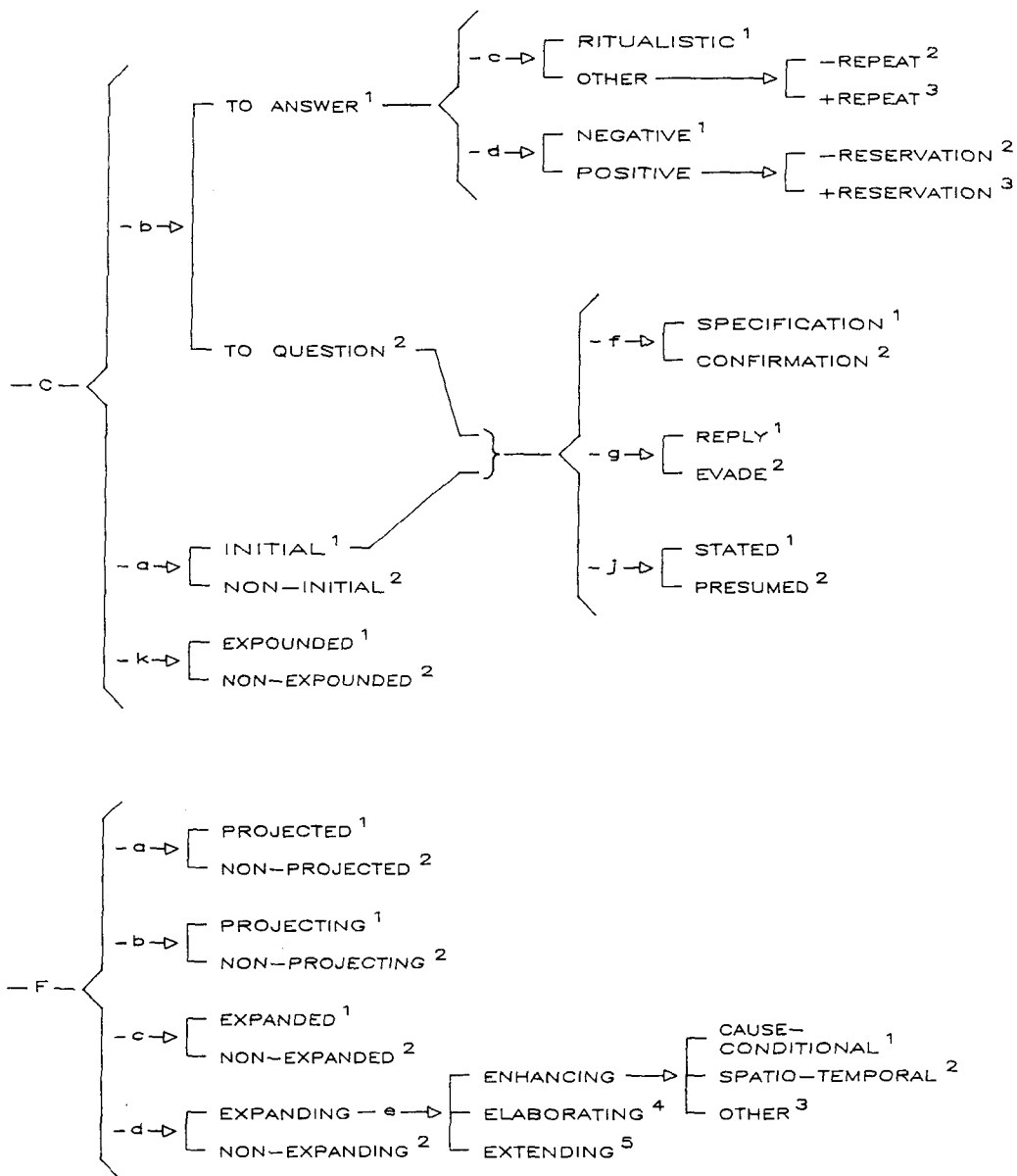


Figure 4.19 Systems C and F

The examples presented below should be read in conjunction with the above Figure.

Example 4.122: Answer complex

Q: (254) What did he say?  
 A: (255) He said  
     (256) that Fuller had confessed to him  
     (257) that he had robbed Kelly twice before  
     (259) and that he would give up  
     (260) but Kelly shot him

	Cabdefghjk			Fabcde
255	12	12	11	2122
256	22		1	1122
257	22		1	1212
259	22		1	121 5
260	22		2	122 1

Example 4.123: Answer complex

Q: (023) Why did Kelly go to Grady's house?  
 A: (024) to borrow the rifle  
     (025) to hunt for Fuller

	Cabdefghjk			Fabcde
024	12	11211		221 1
025	22		2	222 1

note: Clause 024 is itself expanding (enhancing:cause).  
 It expands the presupposed question clause.

Example 4.124: Jointly constructed answer complex with evaluation complex

Q: (099) What sorts of things happen in cytoplasm  
     (100) or why is it there?  
 A: (101) It's got the nucleus in it.  
  
 A: (102) And it's there [new speaker]  
     (103) cause it's all in the body  
     (104) and it's the blood that goes through.  
  
 E: (105) Well, it's not actually blood as such  
     (106) because cells make up blood;  
     (107) but it does hold the nucleus;  
     (108) That's one thing it does.  
     (109) It's actually where the reactions take place,  
           where processes in the cell go on.

	Cabdefghjk			Fabcde
101	12	12	11	2212
102	22		1	221 5
103	22		1	221 1
104	22		2	222 5

105	1131	1	2212
106	2121	1	221 1
107	21322	1	221 5
108	2122	2	222 4
109	12 12 12		2222

note: Message 109 is considered an Answer, not part of the Evaluation. Instances of teachers answering their own questions are not uncommon. (See Chapter Five, page 116.)

Example 4.124 exemplifies one further point concerning System C. In accord with the network for System C (see Figure 4.20 below), the options comprising subsystems 'f', 'g' and 'j' are ascribed only to the initial clause of an occasion of answering. Assigning these options to non-initial (continuing or terminal) clauses would be redundant. An occasion of evaluating, however, can involve both negative evaluation (for example messages 105 and 106) and positive evaluation (messages 107 and 108). Moreover, each of these may involve more than one strategy for evaluating. Message 105 for example repeats the pupil's Answer Statement with reversed polarity and so is coded '+repeat:negative'. Message 106 contradicts Answer Statement 104 and so is coded '-repeat:negative'. Hence the options comprising subsystems 'c' and 'd' are relevant to both initial and non-initial clauses constituting occasions of evaluating.

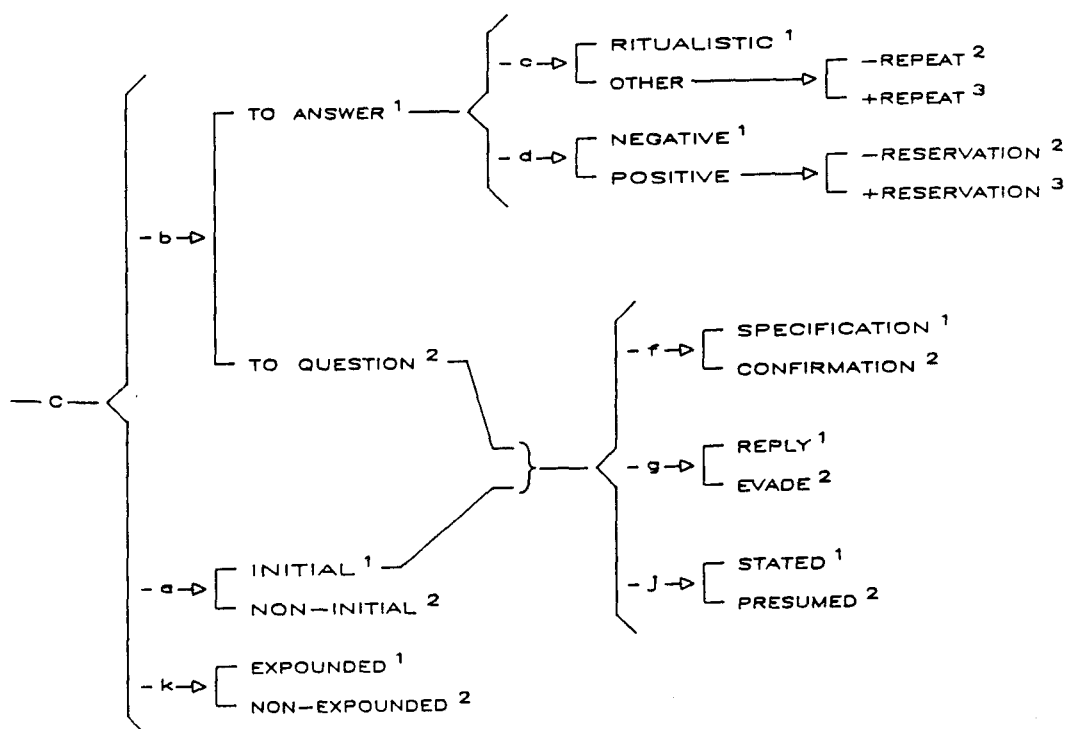


Figure 4.20 The Network for System C

#### 4.10 Application of the Network to Analysis

The main purpose of undertaking the project reported in this volume was to develop a methodology for analysing the meaning features of classroom questions, answers and evaluations. The semantic network presented in this chapter provides such a methodology. Having developed the network, attention was then directed to using it for actual analysis, firstly to test its efficacy and secondly to explore the patterning of meaning features, if any, in classroom questions, answers and evaluations. It was felt that much of teaching practice remains implicit, taken-for-granted, particularly by those engaged in it. Through use of the network to discover patterning of meaning features in question-answer-evaluation sequences, it was hoped to make the implicit explicit.

The basic unit of analysis for these purposes was the message (see page 55). 'Message' as the basic unit of analysis is linguistically motivated in a way that lines of transcript (Bellack, et al, 1966), acts (Sinclair and Coulthard, 1975) and turns at talk (Mehan, 1979) are not. To analyse the data these had first to be segmented into messages. Each message was then analysed and coded for its Interpersonal, Role Assignment, Experiential and Logical meaning features. Several examples from the data are presented below as a means of highlighting some of the decisions made when segmenting the data into messages and coding these for their meaning features. These examples also show how the data were coded for purposes of quantitative analysis. Only the most salient details of these examples are discussed.

##### Sample 1: Year 11 Science:

Joan: (523) What did you say about the sea horses before?

Tchr: (525) Oh, the male actually does most of the reproducing.

Joan: (526) How?

Tchr: (527) I don't know (528) how (529) or why.  
(530) I'm pretty sure (531) the male lays the eggs.

note: Some message numbers are missed out, for example message number (524) above. This reflects changes of mind regarding the segmentation of the data. The numbering of messages in the transcripts was not started anew with every change of mind; such would have taken more time than it was realistically worth. Care has been taken, however, to keep the message numbers consecutive and to ensure that there are no instances of two different

messages in the same transcript with the same message number.

In the following coding of Sample 1, 'no.' refers to the message number; 'sp' refers to the speaker number; 'Iabcdefghjk' refers to Interpersonal options taken up; 'Eabcdejkm' refers to Experiential options taken up; and 'Fabcde' refers to Logical options taken up.

Coding for above text:

no.	sp	Iabcdefghjk	D	Eabcdejkm	Fabcde
523	73	B11141	1	12 1652	2222
525	99	C12 12 12	2	41 4	2222
526	73	B11121 3	2	3	2222
527	99	C12 12 11	2	22 1	2212
528	99	C22 1	2	4	1212
529	99	C22 1	2	4	121 5
530	99	C22 1	2	21214	212 5
531	99	C22 2	2	41 44	1222

This coding, when read in conjunction with the semantic system network, indicates that:

- (1) the function of message (523) is that of a question in which the Wh- element is Thematic in the clause; it is uni-faceted, and has as its point of enquiry a Participant. There is no prompt. This much is shown, in the sequence listed, by the coding B11141.
- (2) the question is initiating (code D1); it does not occur as a Question Rejoinder.
- (3) the process is interactional (involves saying) and is non-exegetic, that is, the speaker is in the material environment of the classroom; this speaker is the teacher and that which the speaker said is queried; there are two circumstantial elements - one of Matter ('about the sea horses') and one of time ('before'). This information is encoded in the order mentioned by the sequence relevant to 'E' above.
- (4) The message is neither projected nor projecting; neither is it expanded or expanding. This is indicated by the coding F2222.

Hopefully this single discursive account is sufficient to demonstrate how to 'read off' the coding. Rather than belabour this point, I will instead mention those features of the above analysis which proved problematic in light of the grammar (Halliday, 1985a) upon which the analysis is based.

Sample 1 includes an instance of projection by the cognitive mental process 'know'. Messages (528) and (529) are elliptical versions of full propositions: 'how the male does most of the reproducing' and 'why the male does most of the reproducing'. These are projected by (527) 'I don't know'. Example 4.125 from the same transcript is also considered to be projecting on the grounds that a full proposition follows:

Example 4.125:

(354) Anyone know (355) what an articulated vehicle is?

In contrast, the following two examples are not considered to involve projection:

Example 4.126:

We don't know what else to put.

Example 4.127:

It might be a good idea to know what they are now though.

'What else to put' is analysed as Phenomenon and 'to know what they are now though' as Carrier.

Sample 1 also includes an instance of projection by a relational process:

(530) I'm pretty sure (531) the male lays the eggs.

In the same transcript is a second example of this phenomenon:

Example 4.128:

(620) Glad (621) I can't count like you.

Projection by a relational process is not discussed in Halliday's (1985a) An Introduction to Functional Grammar, but the latter volume is, as Halliday insists, an introduction.

Sample 2: Year 7 History:

Tchr: (156) What sort of state was Fuller in (157) when  
Constable Moore got to him?

Adrn: (160) He had blood all over him (162) and he seemed  
to be just wounded (163) and not much wrong with  
him.

Tchr: (164) Right, did it look (165) as though he was going to die from his wounds?

Many: (166) No.

Tchr: (167) No, right.

#### Coding for Sample 2:

no.	sp	I a b c d e f g h j k	D	E a b c d e j k m m	F a b c d e
156	87	B11151	1	22446	2212
157	87	B	1	42 44	222 2
160	03	C12 12 11	2	223441	2212
162	03	C22 1 2	2	22244	221 5
163	03	C22 2 2	2	4	222 4
164	87	B12 23	2	2224	2122
165	87	B22 22	2	42 4 4	1222
166	19	C12 21 12	2		
167	87	C11321 2 2	2		

Message (156) is analysed as having a Circumstantial process; 'Fuller' is the Carrier and 'in what sort of state' the circumstantial Attribute. 'In what sort of state' is considered to be an instance of abstract space (Halliday, 1985a:139). Message (163) is considered to be elliptical for 'there was not [anything] much wrong with him', with only the Existent expressed. Given this interpretation, Message (163) is an elaboration of Message (162).

Message (164) is analysed as having an Attributive process which projects Message (165):

'Did it appear // that he was going to die from his wounds?'

'From his wounds' is analysed as a circumstantial expression of cause (reason).

Messages (166) and (167) are coded for their Interpersonal features only, since only polarity is being expressed.

#### Sample 3: Year 7 Science:

Tchr: (568) We can divide mammals into three groups.  
(569) Melissa.

Lisa: (570) Monotremes, marsupials and placentals.

### Coding for Sample 3:

no.	sp	I a b c d e f g h j k	D	E a b c d e j k m m	F a b c d e
568	97	B1124	1	21146	2222
570	43	C12 11112	2	4	2222

There are several instances in the data of declaratives evoking responses which are best considered answers, as in Sample 3 above. These may be thought of as 'anticipated questions'; the students anticipate the coming question. Thus Message (568) is analysed as a question asking 'What are the three mammal groups?' and Message (570) is analysed as an answer to this question.

### Sample 4: Year 11 History:

Dave: (226) I think (227) it was a last minute decision to bring them together (228) because before that they said (229) they brought together the Assembly of Notables (231) and that failed as well. (232) And it was getting so close (233) and the people were beginning to get really agitated (234) so they brought together the Estates General (235) to try and like ease the tension between the Three Estates.

Tchr: (236) Right, but the important thing here to realise is that even if the Estates General was called spontaneously, once those people had been drawn together, with the experience of some of them from their political clubs, it was natural for a lot of the people who had been called together in the Estates General to think that they should be given more power than had ever previously been given the Estates General. ....

### Coding for Sample 4:

no.	sp	I a b c d e f g h j k	D	E a b c d e j k m m	F a b c d e
226	58	C12 12 11	2	22 2	2122
227	58	C22	1 2	22244	2212
228	58	C22	1 2	11 4	212 2
229	58	C22	1 2	42 44	121 1
231	58	C22	1 2	42 4	221 5
232	58	C22	1 2	22444	221 5
233	58	C22	1 2	22244	221 5
234	58	C22	1 2	42 44	221 1
235	58	C22	2 2	42 4	222 1
236	88	C1123	1 2	22144	2212

It should be pointed out with reference to David's answer (Messages 226-235) that the punctuation used in the transcripts is largely arbitrary. Messages (226 - 235) constitute a single occasion of answering, realised by one clause complex. The punctuation is provided to facilitate reading of the transcripts.

In Message (226) 'think' is considered projecting. 'Think' in the following example, however, expresses modality and so is not coded as a separate message and is not considered projecting:

Example 4.129:

It's the Country Club, I think.

Message (227) is coded as having an intensive Attributive process; 'to bring them together' is the Carrier and 'a last minute decision' the Attribute. 'They' in Message (228) refers exophorically to the authors of the text-book used for the unit of study: the French Revolution. Message (236) is a single message: 'the important thing here to remember' is the Identified element; 'is' is an Identifying:intensive process; and 'that even if the ... etc. is the Identifier. A number of the Year 11 History teacher's messages realised by Identifying clauses are of this kind. The clause structure is simple but the nominal group is very complex. Analyses of groups were not carried out in this study since analysis at message level was considered sufficient for purposes of the research.

These examples from the data highlight some of the problems encountered when segmenting the data into messages and analysing these for their meaning features. Most of the data were readily analysable by reference to Halliday's (1985a) Grammar. Problematic and novel cases were discussed with expert sources, including Hasan (personal communication) and Halliday (personal communication). Interestingly, even these two authorities sometimes disagreed on how to handle the analysis of certain cases. Where more than one interpretation or solution was possible the researcher strived for consistency of analysis across like-instances.

In this chapter a brief account of the nature of semantic networks has been presented. The semantic network developed for the analysis of classroom questions, answers and evaluations has been presented in full. And a brief account of decisions made while using the network to analyse and code the classroom language data for purposes of quantitative analyses has been provided. The results of these quantitative analyses are presented in the next two chapters, Chapters Five and Six.

## **Chapter 5: Patterns of Questioning and Answering**

### **5.1 Introduction**

The figures presented in this and the next chapter provide an account of who took up which options how often while asking, answering and evaluating in the Year 7 and 11 History and Year 7 and 11 Science lessons comprising this case study (see Appendix One). The figures are said to comprise a case study because the database upon which the frequencies are calculated is too small to make any outstanding claims of the kind 'this is what classroom science as opposed to classroom history is like' or 'this is what Year 7 as opposed to Year 11 is like'.

Nevertheless, the case study does provide a test of the efficacy of the semantic network and the analysis of classroom questioning, answering and answer evaluating using this network provides a way of locating patterns within these behaviours.

The patterns reported in this and the next chapter are relatively clear-cut ones which are supported by substantial differences in frequencies of occurrence. While Chi-squared tests were used informally in a few cases as a check on the strength of differences, they were not applied systematically. A full statistical analysis, especially one which attempted to compare years and subjects, was seen to be inappropriate with a sample containing one class for each combination of these factors; in other words, as mentioned above, a case study. Also, some of the more delicate options occurred so infrequently as to put the validity of this test in doubt. Therefore, the reported differences should be taken as suggestive rather than conclusive, though the focus on the largest differences in exploring patterns gives an assurance that the results are reliable.

Additional assurance comes from the fact that many of the patterns reported here directly corroborate the findings of Christie (1988) and Eggins, Martin and Wignell (1987) on how school science and history are linguistically constructed.

### **5.2 The Database**

The quantitative analyses which follow are based on a subset of the raw coded data. In particular, question-answer-evaluation triads were identified and transferred to a separate database. This was necessary

because the computer, unlike a human reader, could not readily be made to recognise which answer and evaluation went with which question. The following example illustrates the conversion undertaken and why it was necessary.

#### Text 5.1

97 (099) What sorts of things happen in cytoplasm,  
 97 (100) or why is it there?

26 (101) It's got nucleus in it.  
 21 (102) And it's there (103) cause it's all in the body  
 21 (104) and it's the blood that goes through.

97 (105) Well, it's not actually blood as such  
 97 (106) because cells make up blood.  
 97 (107) But it does hold the nucleus;  
 97 (108) that's one thing it does.  
 97 (109) It's actually where the reactions take place,  
 where processes in the cell go on.

In the raw data file the coded messages are listed in sequence:

		I a b c d e f g h j k	D	E a b c d e j k m m	F a b c d e
099	97	B1121	1	11 61	2212
100	97	B11131	1	21444	222 5
101	26	C12 12 11 2		213441	2212
102	21	C22 1 2		21444	221 5
103	21	C22 1 2		21444	221 1
104	21	C22 2 2		21144	222 5
105	97	C1131 1 2		21144	2212
106	97	C2121 1 2		21144	221 1
107	97	C21322 1 2		21444	221 5
108	97	C2122 2 2		21144	222 4
109	97	C12 12 12 2		21444	2222

In the triadic database the above extract is divided into three segments:

#### Text 5.2

100 97 Why is it [cytoplasm] there?  
 101 26 It's got the nucleus in it.  
 102 97 It does hold the nucleus.

103 97 Why is it there?  
 104 21 It's the blood that goes through.  
 105 97 Well, it's not actually blood as such.

106 97 Why is it there?  
 109 97 It's actually where the reactions take place.

The coding is rearranged accordingly:

		I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
100	97	B	1	1	1	3	1						1		2	1	4	4	4					2	2	2	5		1	
101	26	C	1	2				1	2	1	1	2			2	1	3	4	4	1				2	2	1	2		1	
102	97	C	2	1	3	2	2						2		2	1	4	4	4					2	2	1	5		2	
103	97	B	1	1	1	3	1		5				2		2	1	4	4	4					2	2	2	5		1	
104	21	C	2	2									2		2	1	1	4	4					2	2	2	5		3	
105	97	C	1	1	3	1							2		2	1	1	4	4					2	2	1	2		2	
106	97	B	1	1	1	3	1		5				2		2	1	4	4	4					2	2	2	5		1	
109	97	C	1	2				1	2	1	2	2			2	1	4	4	4					2	2	2	2		1	

The triadic database treats each question, answer and evaluation as a simple message. However, the numeral in the final column indicates how many messages are involved in each occasion of questioning, answering and evaluating. Thus the knowledge that the question, answer or evaluation is realised by a complex is recoverable. Though treating each question, answer and evaluation as a simplex may be disadvantageous for some purposes, the amount of information gained by making explicit which answer and evaluation goes with which question justifies the procedure.

The database used here to check the efficacy of the semantic network is comprised of the triadic question-answer-evaluation sequences of four lesson transcripts, one each from Year 7 Science, Year 11 Science, Year 7 History and Year 11 History. All four are examples of the genre known to teachers and pupils in Australia as 'oral revision lessons'. The topic of the two Science lessons was 'the classification of living organisms'. The topic of the Year 7 History lesson was 'Killer Kelly' and the topic of the Year 11 History lesson was 'the French Revolution'. The transcripts for these lessons can be found in Appendix One.

The database is comprised of 375 questions, 375 answers and 290 evaluations distributed as shown in the tables below.

			Teacher		Student		Total
			Questions		Questions		
			#	%	#	%	#
Year	7	History	57	92	5	08	62
Year	11	History	56	100	-	-	56
Year	7	Science	169	97	5	03	174
Year	11	Science	72	87	11	13	83
			354	94	21	06	375

Table 5.1: Questions: Frequency by Speaker and Class

A brief look at the transcripts for the Science lessons will reveal that in both there was a good deal more talk - as measured by the number of messages uttered in the forty minute lesson - than in the History lessons. Both Science teachers in this case study spoke very quickly and had a rapid fire style of delivery. This is reflected in the number of questions the Year 7 Science teacher managed to ask, and in the number of questions asked in the Year 11 Science lesson despite digressions concerning chickens, eggs and atheism, and the way external exams are marked. The two History teachers by comparison conducted their lessons at a significantly slower pace.

Teachers asked 94% of the questions in this case study. Students answered 90% of these. Teachers answered all twenty-one student questions, and they also answered seventeen of the questions they had themselves posed (see Table 5.2). This latter phenomenon is discussed in some detail in Chapter Six, page 157.

	SATQ		TASQ		TAOQ		Total
	#	%	#	%	#	%	#
Year 7 Hist	57	92	5	08	-	-	62
Year 11 Hist	54	96	-	-	2	04	56
Year 7 Sci	161	93	5	03	8	04	174
Year 11 Sci	65	78	11	14	7	08	83
	337	90	21	06	17	04	375

SATQ = Student Answers Teacher Question  
TASQ = Teacher Answers Student Question  
TAOQ = Teacher Answers Own Question

**Table 5.2: Answers: Frequency by Speaker and Class**

All but one evaluation in the whole database was made by a teacher; in Year 11 Science a student once evaluates another student’s answer. This single instance is included in the figure below for Year 11 Science.

	Qs	Evals	
		#	%
Year 7 History	62	46	74
Year 11 History	56	47	84
Year 7 Science	174	151	87
Year 11 Science	83	46	55
	375	290	77

**Table 5.3: Evaluation: Frequency by Class**

There are several reasons why there are fewer instances of evaluation than there are of questions/answers:

- (1) Teachers' answers to students' questions are not evaluated;
- (2) Instances of teachers answering their own questions are not evaluated;
- (3) Answer evasions are not evaluated;
- (4) Student answers may be followed by a Question Rejoinder asked by the teacher; and
- (5) An answer attempt may simply not be followed up by the teacher.

These latter three comprise the category 'other' in Table 5.4 below.

	Qs	Evals		SQs		TAOQs		Other	
		#	%	#	%	#	%	#	%
7 Hist	62	46	74	5	08	-	-	11	18
11 Hist	56	47	84	-	-	2	04	7	13
7 Sci	174	151	87	5	03	8	05	10	06
11 Sci	83	46	55	11	13	7	08	19	23
	375	290	77	21	06	17	04	47	13

Table 5.4: Non-evaluation: Frequency by Class

As can be seen evasions, Question Rejoinders and instances of simple non-follow up account for a significant proportion of non-evaluation following question-answer pairs. Of these, Question Rejoinders figure most prominently (see Chapter 6, page 157).

These data - 375 questions, 375 answers, 290 evaluations and 85 non-evaluations - provide the basis for all subsequent quantitative analyses.

5.3 Questions

Table 5.5 below highlights those features which comprise the typical or 'unmarked' circumstances of question asking in this case study. These circumstances can be summarised as follows:

- (A) Teachers ask the majority of questions.
  - (1) Of these, the vast majority are Wh-type questions
  - (2) with the Wh- element Thematic in the clause.

	TQs		Wh-		Polar		Complete		Incomplete		Wh-Thematic		Uni-faceted		Multi-faceted	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
7 Hist																
TQs	57	92	51	89	6(5QR)	11	1	02	1	02	49	96	57	100	-	-
SQs	5	08	-	-	5	100										
11 Hist																
TQs	56	100	55	98	1(1QR)	02	12	22	6	11	37	67	46	82	10	18
SQs	-	-														
7 Sci																
TQs	169	97	164	97	5(2QR)	03	7	04	7	04	150	92	105	62	64	38
SQs	5	03	1	20	4	80					1	100				
11 Sci																
TQs	72	87	66	92	6(2QR)	08					66	100	69	96	3	04
SQs	11	13	7	64	4	36					7	100				
Total																
TQs	354	94	336	95	18(10QR)	05	20	06	14	04	302	90	259	77	77	23
SQs	21	06	8	38	13	08					8	100				
	375	100	344	92	31	08										

n.b. Of the 344 Wh- questions asked 98% were Teacher Questions.  
 Of the 31 Polar questions asked, 58% were Teacher Questions  
 and 42% were Student Questions.

Table 5.5: Frequency of Questions by Speaker and Format

- (3) The majority of polar (yes/no) questions teachers ask occur as Question Rejoinders.
- (B) Students ask few questions. Those asked tend to be of the polar type.

The format of a question has implications for answering. In this case study answers to confirmation seeking (polar) questions tended to be more elaborated than answers to any other type of question. This is true for students and teachers alike (see page 147). However, answers to very few 'complete' or 'incomplete' type questions were elaborated. These latter types appear to restrict the discursive potential for answering, a matter discussed more fully in Section 5.4 below.

Note that the Year 11 History teacher was the most frequent user of 'incomplete' and 'complete' type questions. Moreover, there were no student questions in this lesson. Together this suggests an environment of restricted student speaking rights. The teacher to a considerable extent owned the discourse. The give-and-take in the Year 11 Science lesson, on the other hand, is reflected in part by the number of student questions asked. More than half of all student questions in this case study were posed in the Year 11 Science lesson.

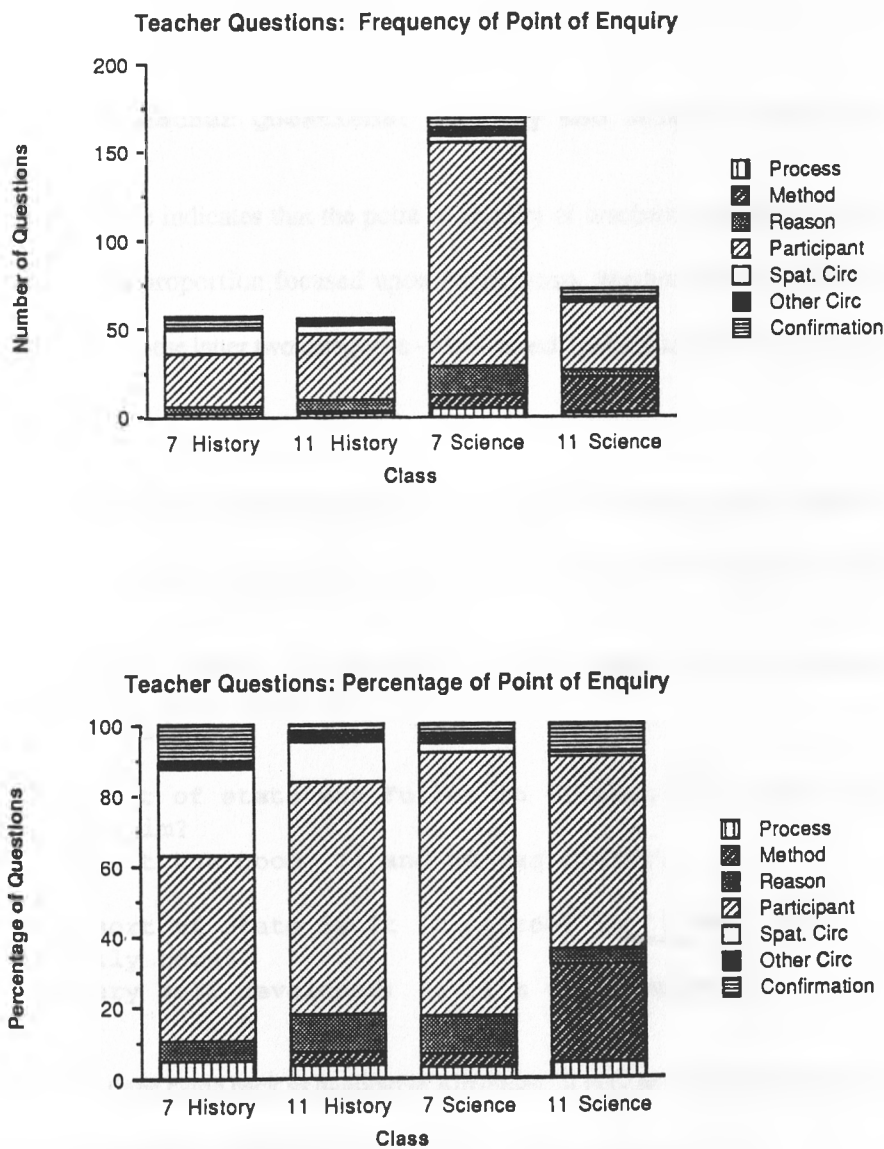
	7 Hist		11 Hist		7 Sci		11 Sci		Total	
	#	%	#	%	#	%	#	%	#	%
Process	-	-	-	-	-	-	-	-	-	-
Method	-	-	-	-	1	20	1	09	2	10
Reason	-	-	-	-	-	-	-	-	-	-
Participant	-	-	-	-	-	-	4	36	4	18
Circumstance	-	-	-	-	-	-	2	18	2	10
Confirmation	5	100	-	-	4	80	4	36	13	62
	5	24			5	24	11	52	21	100

Table 5.6: Student Questions: Frequency by Point of Enquiry

As stated earlier, students tended to ask confirmation seeking (polar) questions when they asked questions at all. Bellack, et al (1966:114) reported a similar finding, but suggested that the reason was not apparent from the data. Students interviewed in the present study suggested that teachers ask the kinds of questions they do [wh-types] ... "because teachers are the ones with the information and they have to make sure the kids know. When kids ask questions it's not to get information; it's just to make sure they're on the right track, so 'yes' or 'no' is enough". These comments indicate that for the students, teachers' questions are seen as

serving as 'informative' function, and students' questions are seen as serving a checking or clarifying function. More work would need to be done to draw a firm conclusion about this, but the students' comments are suggestive.

Teachers' questioning behaviour was predominated by questions requiring the specification of a Participant.



**Table 5.7: Teacher Questions: Frequency by Point of Enquiry**

These figures become easier to interpret when History and Science are compared:

	History		Science	
	#	%	#	%
Process	5	04	8	03
Method	2	02	27	11
Reason	9	08	20	08
Participant	67	59	165	69
Spatial Circ	20	18	5	02
Other Circ	3	03	5	02
Confirmation	7	06	11	05
	113		241	

**Table 5.8: Teacher Questions: History and Science Compared**

This table indicates that the point of enquiry of teachers' questions in History and Science differed primarily in the proportion focused upon Participants, Method and Circumstances, particularly Spatial Circumstances. These latter two categories - Method and Spatial Circumstance - raised some interesting problems of interpretation.

The line between abstract space (Halliday, 1985a:139) and qualitative attribution proved a fine one. The following three teacher questions were interpreted as having as their point of enquiry 'Spatial Circumstance':

Q: The other thing, of course, is that many of the peasants lived in what kind of conditions?

A: Pretty bad.

Q: What sort of state was Fuller in || when Constable Moore got to him?

A: He wasn't too good || and he was bloody.

Q: What sort of state is it [kangaroo] in || when it's actually born?

A: Not very well developed; || it's very immature.

Answers to all three came back as qualitative Attributes. It may be that these three should be interpreted as having Attributes as their point of enquiry. If so, the figures for the category 'Spatial Circumstance' decrease slightly and those for 'Participant' increase slightly.

Having raised the matter of qualitative attribution, I shall digress briefly here. Instances of questions unambiguously seeking a qualitative Attribute were rare in this case study. More often the qualitative Attribute was provided and the Carrier sought, for example

Example 5.1:

Which group became predominant?

Alternatively, the Attribute was turned into an Identified element and what was sought was the Carrier-become-Identifier:

Example 5.2:

Of those, the simplest is which one?

The teacher questions which did unambiguously seek a qualitative Attribute were of two kinds: (1) those in which the type of Attribute required was named:

Example 5.3:

How old was Gardiner || when he died?

and (2) those of the 'incomplete' type:

Example 5.4:

So the Revolution become more ... ? [extreme]  
Fertilisation is ... ? [internal]

For certain purposes the 'incomplete' type may be an optimal strategy. Attempts to pose the latter two questions in other ways that can be answered 'extreme' and 'internal' respectively proves an interesting exercise.

In this case study, the Year 11 History teacher in particular seemed to struggle with posing questions for which the desired answer was a value-oriented qualitative Attribute:

Example 5.5:

Q: What can we say about the monarchy?

A: It was despotic.

Further studies of classroom questions could reveal whether this problem was idiosyncratic to this one teacher or whether the problem lies within English grammar, a grammar with which it is perhaps difficult to unambiguously pose such questions. The database for this case study is large enough to suggest the possibility but not to explore it in any detail.

The second problem of interpretation is related to the Year 11 Science teacher's use of 'how do we divide?'. In message 106 this teacher asks 'How do you divide up eucaryotes?'. The student replies 'phylum'. The teacher then alters the question in a Question Rejoinder: 'Ok, what are the two main groups or kingdoms?'. Thereafter group names are accepted as answers to:

Q: (130) How do we divide up plants, generally?

A: Vascular and nonvascular.

E: OK, vascular and nonvascular.

Q: (311) How do we divide them (animals) up?

A: Invertebrates and vertebrates.

E: [teacher writes this on board]

Q: (336) How do we divide up invertebrates?

A: Arthropods.

E: [teacher writes this on board]

In message 379 the teacher asks 'How do we divide vertebrates up?'. The student answering supplies the principle for classification: 'Types, levels'. The teacher replies 'No, not what do we divide them into. How's the main differences...?'. From this point on the students are expected to supply the distinguishing characteristics of the vertebrate groups in answer to the questions:

Q: (426) How do we divide the various vertebrates?

Q: (587) The reptiles?

Q: (596) How would you divide birds and mammals?

Q: (622) How do we divide up the three groups of mammals?

Based on what answers were found acceptable it was tempting to code questions 106, 130, 311 and 336 as having 'Participant' as their point of enquiry - 'What are the main subgroups of the named superordinate group?'. Moreover, the possibility of also coding questions 426, 587, 596 and 622 as 'Participant' orientated ones suggested itself - 'What are the distinguishing features of the various vertebrate groups?'. In the triadic database for Science this would reduce from 27 to 15 the number of questions with 'Method' as point of enquiry.

However, it was decided to keep to a literal reading of questions for purposes of coding. This eliminated the problem of having to decide how far to go when interpreting 'metaphorical' questions. It also overcame the temptation to code a question by reference to its answer rather than to the question itself. Moreover, doing so takes into account the fact that, for example, the Year 11 Science teacher did pose his questions by asking 'How do we divide?'. If coded as though this were not so, the contrast between his way of asking and that of his Year 7 counterpart could not be brought out. This contrast in the two Science teachers' ways of asking is captured in the following examples from the data:

Example 5.6: Year 7

Tchr: (217) What are the two basic groups that we  
classify animals into?  
Kris: (218) Fish and amphibians.  
Tchr: (219) No, before we get to that sort of  
classification. (220) The big, broad ones?  
Gina: (221) Vertebrates and invertebrates.  
Tchr: (222) Right, vertebrates and invertebrates.

Example 5.7: Year 11

Tchr: (310) Now, animals. (311) How do we divide  
them up?  
Jodi: (312) Um, by  
mS: (313) Invertebrates and vertebrates.  
Tchr: [writes this on board]

Example 5.8: Year 7

Tchr: (486) Alright, our next group along?  
Audr: (487) Birds.  
Tchr: (488) Birds.  
Tchr: (489) Some features of birds?  
Heln: (490) Feathers.  
Tchr: (491) Right, most birds will have feathers on  
their bodies.

Example 5.9: Year 11

Tchr: (596) How would you divide birds and mammals?  
Many: (597) Feathers and fur.  
Tchr: (598) OK.

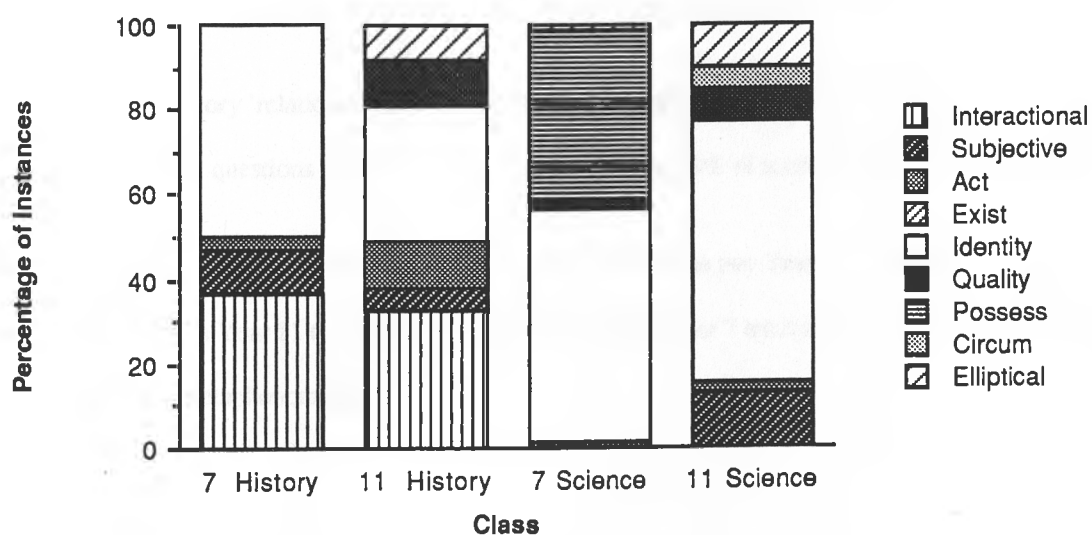
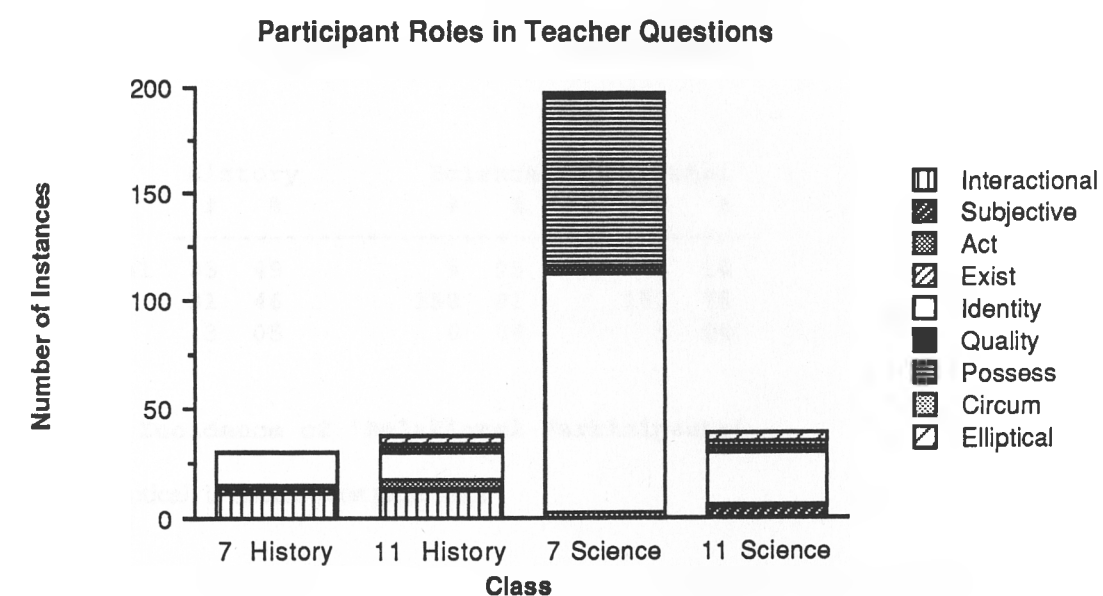
This difference in preferred ways of asking largely accounts for the gap between the proportion of questions with 'Participant' as point enquiry in Years 7 and 11 Science.

Even with the provisos outlined in the last several pages, teacher questions having 'Participant' as point of enquiry are by far the most prevalent. Given the frequency of occurrence of these, a more refined analysis is in order.

In the frequency distribution table (Table 5.9) below, Process types rather than Participant roles are provided. It is by means of 'reading off' the Process type that one knows which Participant roles are at risk for enquiry. To facilitate reading of the table, the Process types and their key Participants are listed in Figure 5.1:

Process type	Key Participants	
non-relational	er role	ed role
interactional	Sayer	Verbiage
subjective	Senser	Phenomenon
act	Actor	Goal
	Behaver	Range
exist	Existent	
relational		
identity (intensive:identifying)	Identified	Identifier
qualitative (intensive:attributive)	Carrier	Attribute
possess (typically)	Possessor	Possessed
circumstantial	Carrier	Attribute/Circ
	Id/Circ	Ir/Circ

**Figure 5.1 Processes and Their Key Participants**



**Table 5.9: Participant Roles in Teacher Questions**

Over-all, 78% of teachers' 'Participant' orientated questions sought 'relational Participants', to coin a term. The incidence of such questions in Science was virtually double that in History.

	History		Science		Total	
	#	%	#	%	#	%
Non-relational	33	49	9	05	42	18
Relational	31	46	150	91	181	78
Elliptical	3	05	6	04	9	04

**Table 5.10: Incidence of 'Relational Participants'**

(The category 'elliptical' is discussed on page 128.)

The higher incidence of 'relational Participants' in Science should not be surprising in light of the research of Christie (1988) and Eggins, Martin and Wignell (1987) concerning the means whereby school science is constructed. These researches are discussed on page 137, and also in Section 6.6.

The History teachers also asked questions seeking 'relational Participants', but additionally were concerned with questions concerning who said what to whom. I shall return to these points below (see page 139).

Within the category 'relational', questions asking for Identifiers (identity) predominated. In History 87% of 'relational Participant' questions sought Identifiers and in Science 89% of such questions sought Identifiers.

There is some difference in the kind of Identifiers sought by the two Year 11 teachers as compared to the two Year 7 teachers. The Year 11 teachers are more likely than the Year 7 teachers to ask questions in which the Identified element is a metaphenomenon:

Example 5.10:

Therefore, what is the complication for your amphibians?

Example 5.11:

What was the other problem that went hand in hand with this unequal distribution of wealth?

The Year 7 teachers, on the other hand, were more likely than the Year 11 teachers to ask 'identity' orientated questions which sought technical terms or definitions of terms.

Example 5.12:

What was that [record of witnesses] called?

Example 5.13:

When we talk about arid || what does that actually mean?

Of fifteen 'identity' orientated teacher questions in Year 7 History, six (40%) were of this kind. Sixteen of one hundred and nine (15%) of the Year 7 Science teacher's 'identity' questions sought definitions or technical terms. By contrast, the Year 11 History teacher asked no such questions and the Year 11 Science teacher only two (08% of his 'identity' orientated questions).

The researcher in her role as resource teacher worked with the teachers involved in this study in the formulation of a whole-school language across the curriculum policy. From this it is known that many teachers in the school equated 'teaching language' with 'teaching vocabulary'. And many held the view that after age 12 or so language development virtually ceased. (How so many students successfully complete Years 8 through 12 and beyond remains a mystery!). These beliefs about language may have influenced these teachers' teaching practices including the patterns of questioning reported here. But this remains speculative.

Students interviewed about this finding did not seem surprised by it. They suggested that Year 7 students ... "need to learn the words" but Year 11 students "should already know them". One Year 12 girl put it succinctly: "The Year 7s are beginning a cycle of learning and need support. By Year 11 the basic stuff is in your own hands". The students' perspective seems to be that Year 11 students should know the language of their subjects, and it's up to them, not the teachers, to ensure that they do.

The examples of Teacher Questions from Year 7 and 11 Science lessons (page 124) illustrate another prominent phenomenon. This is the high degree of ellipsis in the Science teachers' questions. The category 'elliptical' in Table 5.10 (page 127) refers to instances in which the question is so elliptical that it is impossible to know what the process is. This occurs in both Science and History lessons:

Example 5.14:

Financial problems of what nature?

Example 5.15:

The reptiles?

Elliptical forms in which it was possible to recover the process were also used by both History and Science teachers. Such elliptical forms appear to occur in several textual environments.

- (1) Sequent multi-faceted questions can be reinstated by means of (a) nominating a next answerer, as in message 438 in Example 5.16 below; (b) asking 'what else?', as in message 442 below; (c) by asking for example 'another feature?'; or (d) simply by asking 'and?', as in message 207 in Example 5.17 below.

Example 5.16:

TQ: (435) Alright, some features of reptiles?  
SA: (436) Their body temperature varies.  
TE: (437) That means another term where we've got  
cold-blooded, that's good. (438) Gavin.  
SA: (439) A hard, scaly skin.  
TE: (440) Right, they've got a hard, scaly skin this  
time (441) which indicates perhaps that  
they can live away from water.  
TQ: (442) What else?

Example 5.17:

TQ: (200) What were the Three Estates? Jane.  
SA: (201) Um, ... I can't think.  
SA: (202) Proletariat.  
TA: (203) Right, there's the nobility.  
SA: (204) Clergy.  
TE: (205) The clergy, right.  
SA: (206) The peasants.  
TQ: (207) And?  
SA: (208) Third Estate.

- (2) Question Rejoinders which re-seek or focus on the Answer are often elliptical.

Example 5.18:

TQ: (310) Of those, the simplest is which one?  
SA: (311) Mammals.  
QR: (312) The simplest, Krista?

Example 5.19:

TQ: (178) Right, now where does Moore take Fuller?  
SA: (179) To the hospital.  
QR: (180) Which hospital?

(3) Instances in which the same kinds of questions are asked about various members of a group or sub-group are often elliptical. So the Science teachers ask as initiating questions:

Example 5.20:

Some examples of crustaceans?  
Some features of reptiles?  
Some of the non-vascular ones?  
Main features?

The non-elliptical forms of these are considered to be of the Identifying:intensive type - e.g. What are some examples of crustaceans? and What are some features of reptiles? - and are coded as such.

In this case study the Science teachers asked many more elliptical questions than the History teachers. The higher incidence of elliptical questions in Science is accounted for by the use of such questions in the third environment mentioned above.

This is a distinguishing characteristic of this case study, but not of Science as opposed to History generally. One of the Year 9 History lessons which informed the formation of the semantic network was organised around the construction of a summary table of Australian bushrangers. The teacher first asked for the names of five principal bushrangers, and then for factors that are important in the formation of a summary about them. Once such a factor was named, for example, age at death or nationality, the questions were asked by means of invoking the name of each bushranger in turn.

Example 5.21:

Tchr: (081) Age at death we'll just put here.  
TQ: (082) Morgan? John.

Thus, certain textual environments encourage the use of elliptical questions more than others. This may not be very important except for two things:

(1) to successfully interpret highly elliptical questions, the students must be paying close attention to the textual goings on. The hard black-and-white language of lesson transcripts rarely adequately conveys the split-second timing of language exchanges in the classroom, nor the extent to which teachers and students do pay attention to what the other says. Learning to cope with highly elliptical questions may be one of the skills

underlying what Mehan (1979:133) refers to as 'interactional competence in the classroom'.

(2) Asking questions elliptically creates time for more talk - as measured by the number of messages uttered in a forty minute lesson. Not only rate of utterance but the incidence of elliptical questions (and answers - see Section 5.4) influences the fact that the total number of messages uttered in the two Science lessons (1492) in this case study is significantly greater than that for the two History lessons (891). Thus elliptical questions permit more ground, in a quantitative sense, to be covered.

It was pointed out on page 127 that a goodly share of the questions having 'non-relational Participants' as their point of enquiry in History were concerned with asking what was said. While this is true, there are some interesting differences between the Year 7 and Year 11 History teachers' use of these questions. (See 'interactional' in Table 5.9, page 126.)

All eleven of the Year 7 History teacher's 'interactional' orientated questions - those seeking a Sayer, or more often, Range:Verbiage - are 'exegetic'; that is, the Sayer is a participant in the historical event under focus rather than a participant in the here and now classroom interaction.

Example 5.22:

What did he say?

where 'he' refers variously to Fuller, Kelly, Moore and the witnesses at Kelly's trial. Nine of the Year 11 History teacher's 'interactional' questions are 'exegetic' -

What did they conclude?  
What did they swear in that Tennis Court Oath?  
What things were promised or foreshadowed in that  
Declaration of Rights of Man?.

The latter is reinstated six times. In the remaining three 'verbal' questions the Sayer is 'non-exegetic', namely 'we':

Example 5.23:

What can we say about the monarchy?

These differences in the kinds of 'interactional' orientated questions reflect a difference in what constitutes 'history' within the Year 7 and Year 11 lessons under focus.

In the Year 7 History lesson, the discourse composes a kind of story. It is concerned with relations of time and cause between events that took place, and focuses on the people who did things and had things done to them. These events are recoverable from the testimony of witnesses at the trial of Killer Kelly. Asking questions centred upon what the witnesses at the trial said was instrumental in determining what had actually taken place.

The Year 11 History discourse, by comparison, is abstract, focusing on what classes of people or actions dressed up as things do or have done to them. So there are questions concerning 'What happened to the Revolution as it developed?' (messages 40 and 41), and 'What did the Philosophes do?' (message 142). The National Constituent Assembly, itself a generic class, authored the Declaration of Rights of Man, but this authorship is effaced by use of the agentless passive in the question - 'What things were promised or foreshadowed in that Declaration of Rights of Man?'.

These kinds of differences in what constitutes school history were first pointed out by Eggins, Wignell and Martin (1987) following linguistic analyses of Junior Secondary History textbooks. (See also Martin, Wignell, Eggins and Rothery, 1988.)

The Year 11 History teacher's 'interactional question - 'What things were promised or foreshadowed in that Declaration of Rights of Man?' - along with the 'What can we say? type, in contrast to the Year 7 History teacher's direct 'What did he say?' reflects the fact that the Year 7 class was to some extent 'doing' history while the Year 11 class was 'learning about' history. This distinction is characterised by Eggins, Wignell and Martin (1987:90) as follows:

For the historian, the process of "doing history" involves firstly observing the "story", then gathering and storing relevant facts, and finally producing an interpretation. However, in learning "about history" this process is reversed: textbooks present first the interpretation, then the relevant facts, and finally as exemplification the story.

The Year 7 History class in so far as possible was 'doing' history; the students were reconstructing an historical event from transcripts of actual court testimony and from maps and census records. Interpretation centred around the fairness or otherwise of Kelly's sentence. By contrast, the Year 11 History lesson, like a

textbook account, first interprets (1) the significance of the French Revolution and (2) its causes. Then some of the events that took place are reviewed. The "story" itself is not exemplified.

The several 'subjective' orientated questions reflect the same kind of difference in level of abstraction as do the 'interactional' questions in the two History lessons. The three 'subjective' questions (see Table 5.9, page 126) in Year 7 History ask for what textual participants saw (messages 066 and 118) or how they reacted (message 079). The Year 11 History teacher, by contrast, asks 'What do we know about their payment?' (message 375), where the Senser is 'we' and the historical participants are, as it were, at one remove. His other 'subjective' question is more direct: 'What did the King agree should be called together?' (message 91).

The Senser in the Year 11 Science teacher's 'subjective' questions is 'non-exegetic', namely 'who', meaning who in the class:

Example 5.24:

Come on, who can think of a better [distinction]?

Who can think of a single cell group of algae?

Four answers are offered in response to this latter question and so in the triadic database it is shown as occurring four times. These two forms - 'who can think of' - are metaphors for 'what is a better distinction?' and 'what is (an example of) a single cell group of algae?'. All of this is to say that 'subjective' questions do not figure importantly in the Year 11 Science lesson.

In the preceding several pages, the incidence of kind of Participant sought in teachers' questions has been discussed. Patterns of difference within Science, and within History; differences in patterns of occurrence in Year 7 and Year 11; and differences between Science and History have been highlighted. There is one further distinction which more than any other distinguishes Science and History. This distinction refers to Process types generally, and so is relevant to teachers' questions. This is the distinction between 'universal' and 'instantial'.

The option 'universal' denotes a sense of habitual, a sense of on-going universal true state, whereas 'instantial' denotes a sense of single-occasion or relevance to some one particular instance. These options co-occur with 'non-coding' Processes (see page 70). As Tables 5.11 and 5.12 below show, the Processes occurring in Science teachers' questions are over-whelmingly of the 'universal' type, and those of the History teachers' the

'instantial' type.

	Universal		Instantial		Total
	#	%	#	%	
7 Hist	12	30	28	70	40
11 Hist	-	-	36	100	36
7 Sci	159	99	2	01	161
11 Sci	57	95	3	05	60
	228		69		297

**Table 5.11: Universal and Instantial Processes in Teachers' Questions**

	Universal		Instantial		Total
	#	%	#	%	#
History	12	16	64	84	76
Science	216	98	5	02	221

**Table 5.12: Universal and Instantial Processes in Teachers' Questions: Science and History Compared**

Thus, History tends to talk about what happened, once-upon-a-time, as an event. Science talks about what is, the true state of affairs in the physical universe. (This truth will endure until scientific opinion changes! B. Barnes, 1974).

The exceptions to the rules that Science is 'universal' and History 'instantial' are few. Twelve of the seventeen exceptions occur in the Year 7 History lesson. These exceptions are quite regular. The teacher's six questions asking for definitions are coded 'universal' since definitions persist over time and reflect a true state of affairs. The other six are concerned with locations, for example:

Example 5.25:

Where is the cave?  
What's Best's Farm now?

The locations did, do now and will continue to exist, though their names may (have) change(d). These too are coded 'universal'.

The Science exceptions are less regular, but all five lack the sense of on-going true state:

Look, if we had a school with no specific rooms || how could we arrange || for teachers to find the kids, for the lessons to ever go on || without it being a great jumbled mess?

Can anyone think || without any definite rooms how you could...

It depends || on whether you regard us as the ultimate creation, doesn't it?

What's water got to do with it?

A little more technically orientated than that?

Section 5.3 has provided an analysis of who asks what kinds of questions how often in this case study. In encapsulated form it can be stated that:

(1) Teachers ask many more questions than students;

(a) teachers favour wh-type questions while students favour polar questions.

(2) The majority of teachers' questions seek a 'Participant' in answer. Questions seeking an explanation of Reason or Method, or specification of Process or Circumstance are by comparison infrequent.

(a) Science teachers' 'Participant' orientated questions tend to seek a 'relational Participant', especially an Identifier, while History teachers' questions seek Identifiers as well as Range:Verbiage. The Year 7 teachers are more likely than the Year 11 teachers to ask questions seeking definitions and technical terms.

(3) The Science teachers tended to ask more elliptical questions than the History teachers. Many instances are accounted for by the fact that the Science teachers asked the same kinds of questions about various members of a group or sub-group.

(4) Within History, 'interactional' and 'subjective' questions reflect a difference for what it is that constitutes history in the Year 7 and Year 11 lessons.

(5) Science teachers' questions were with few exceptions 'universal' while those of the History teachers were 'instantial'. Science talks about what is, has been and shall be; it presents a picture of the true state of affairs in the physical universe. History, on the other hand, talks about what was, as single-occasion events.

I shall conclude this section by briefly discussing points one and two above, suggesting that each in some measure 'makes sense'. That teachers asked the majority of the questions 'makes sense' given the situational

constraints operative in these classrooms. By 'situational constraints' is meant both pragmatic considerations and more abstract, theoretical ones. And the prevalence and patterning of 'Participant' seeking questions 'makes sense' given the linguistic means whereby school science and history are constructed.

While many authors have decried the fact that it is teachers, not students, who ask questions in classrooms, Westbury's (1973) is one of the few balanced accounts of why this practice persists. Westbury suggests that all teaching involves the tasks of (a) presenting and covering a body of material, (b) engendering mastery of that material by his students, (c) creating affect on the part of his students to secure compliance to the demands of the learning situation, and (d) managing the class. Typically the teacher must meet these demands with only three resources: himself, a text or two, and such group climate as can be created within the school.

The pedagogic practice of teachers asking rapid fire questions is, Westbury argues, a workable strategy for teachers because it permits them, given their limited resources, to cope with the demands of the classroom setting.

It is a *coping strategy* within the repertoire of possible methods available to the teacher that secures some task attention, gives some measure of control over the activity of students, facilitates coverage of content, and offers a drill and practice situation that leads to some, albeit more often than not a nominal, mastery of the facts that carefully tailored tests require as the symbols of school learning. (Westbury, 1973:103; italics original)

Notice, however, that this 'coping strategy' is predicated on a particular conception of knowledge, a conception of knowledge as a content, as a body of facts to be transferred from a text via the teacher to students. It is, as Westbury states,

the conception of tasks of education that legitimises the methods of the conventional classroom. ... They are designed to open, more or less systematically, the boxes of knowledge symbolised by subjects to students. The existing classroom draws upon a technology of books and teacher talk to effect these goals. (Westbury, 1973:116)

This is especially true of those classrooms wherein the curriculum is of the 'collection' type (Bernstein, 1977), as is the case in the lessons comprising this case study. In the collection type curriculum contents are clearly bounded and discrete. In the 'integrated' type curriculum, by contrast, contents stand in an open relation to each other. Bernstein (1977) suggests that within collection type curriculum, emphasis is placed upon attaining states of knowledge, as opposed to ways of knowing. Even in the Year 7 History lesson the emphasis was on the

facts of the case more than on finding out how to recover those facts, though the latter may have been done in an earlier lesson.

Placing emphasis on attainment of states of knowledge in turn affects pedagogic practice, for the underlying theory of learning of collection type curricula is didactic.

Given the constraints operative in the lessons comprising this case study, it can be suggested that the teachers were acting in good faith on their understanding of what counts as having knowledge, and what counts as valid transmission of knowledge. Discussion of these latter two points - what appears to count as having knowledge and what counts as valid transmission of knowledge in these lessons - is developed in more detail in Section 7.5 (see page 183).

It can be argued that the proportion of teachers' questions seeking a 'Participant' in answer reflects their (implicit) understanding of the linguistic means whereby school science and history are constructed.

The researches of Christie (1988); Eggins, Martin and Wignell (1987); and Martin, Wignell, Eggins and Rothery (1988) have revealed the linguistic means whereby school textbook Biology, Geography (a science) and History are constructed. The patterning of the language used in the lessons comprising the present case study provides a spoken analog of the language used in the textbooks analysed in the above researches.

The above researchers point out that the tasks of the scientist are observing, ordering and explaining the experiential world. In the process of observing, natural phenomena are divided up and named. These names become technical terms; most of these are nouns. These phenomena are then ordered through the setting up of field-specific taxonomies. The phenomena so classified are then explained.

In the science lessons analysed in this case study, the focus was the 'classification of living organisms'. The lessons to a large degree centred upon the construction of taxonomies. Eggins, Martin and Wignell (1987:27) define a taxonomy as follows:

A taxonomy is an ordered, systematic classification of some phenomena based on the fundamental principles of **super-ordination** (where something is a type of or kind of something else) or **composition** (where something is a part of something else). (emphases original)

In their questioning, the Science teachers frequently used two of the several linguistic resources available for creating taxonomic relationships of superordination and composition. These were the use of Identifying: intensive Processes for both superordination and composition:

Example 5.26:

What are those five groups of vertebrate animals?  
Some features of amphibians?

and Attributive relational Processes of Possession or Circumstance for composition:

Example 5.27:

What else do fish generally have?

They also asked questions requiring a technical term or the definition of such a term:

Example 5.28:

Yes, what are the correct terms [for eat and make food]?

Example 5.29:

What is an invertebrate animal?

As pointed out by Eggins, Martin and Wignell (1987:42) the most familiar and probably most frequently used means of defining technical terms is through an Identifying relational clause.

Given (i) the focus of the Science lessons - the classification of living things - and (ii) the linguistic resources available for constructing taxonomies and defining technical terms entering into these, it is not surprising that so many of the Science teachers' questions were 'relational Participant' and more particularly 'Identifier' seeking. These teachers were simply exploiting the linguistic resources available to them for achieving their aims for the lesson.

The History teachers also asked questions concerned with naming, not phenomena of the world of nature but individuals, groups and locales. These were not, therefore, classificatory. The Year 7 History teacher also asked a number of questions requiring definitions, using Identifying relational clauses to do so. And as already mentioned (page 127) the Year 11 History teacher asked several questions in which the Identified elements were

metaphenomena. These, along with several questions seeking either an Attribute:

Example 5.30:

So the Revolution became more ....?

or a Carrier:

Example 5.31:

What seemed inevitable?

account for the main types of 'relational Participants' sought in History teachers' questions. It was primarily their 'interactional' and 'subjective' orientated questions which reflected a difference in how history was being approached in the two lessons.

To briefly recapitulate, the Year 7 History teacher's 'interactional' and 'subjective' questions were 'exegetic', referring to what the witnesses in the trial of Killer Kelly said and saw. Through the testimony is revealed who did what to whom in what circumstances. Thus, these questions were instrumental in reconstructing the historical event. To this extent, the Year 7 History students were 'doing' history.

By contrast, people are effaced from the Year 11 History lesson. It is the Revolution which has something happen to it, and which becomes extreme but then slows down and takes a different direction. Generic classes of people, not individuals, act or are acted upon. In some of the Year 11 teacher's 'interactional' and 'subjective' orientated questions even these generic classes are effaced. In these ways the Year 11 teacher's approach to history was similar to that of history textbooks. And like a textbook, the Year 11 History lesson first presented an interpretation and then the relevant facts of the Revolution. In this sense, the Year 11 students were 'learning about' history.

The patterning of meaning features taken up in these two teachers' 'Participant' orientated questions is significant in revealing how history was being differentially constructed in the two lessons.

In this section (5.3) I have attempted to show (i) who asked what kinds of questions how often, and (ii) that the patterns that have emerged make sense given the situational and textual environments relevant to these

patterns.

The questions were asked for a particular purpose - to check the state of students' knowledge. For this, answers had to be provided. It is to answers that we now turn.

5.4     **Answers**

The semantic features of a question establish a potential, a range within which to answer. Not just any old answer will do; the answer, to be considered appropriate, must fall within the range for answering established by the question. The answer, that is to say, must be relevant to the point of enquiry of the question. Answers falling outside of this range will be heard as either bizarre or more likely, to be taken as an indication that the question was misheard. In the database comprising this case study, all answers fell within the range of semantic appropriacy. This does not mean, however, that they were all positively evaluated. That is another matter (see Chapter Six, pages 154-164).

In this section the frequency of occurrence of 'minimal' versus 'expounded' student and teacher answers is discussed. This analysis is based on the incidence of answers, distributed as shown in Table 5.2, reproduced below.

			SATQ		TASQ		TAOQ		Total
			#	%	#	%	#	%	#
Year 7	Hist		57	92	5	08	-	-	62
Year 11	Hist		54	96	-	-	2	04	56
Year 7	Sci		161	93	5	03	8	04	174
Year 11	Sci		65	78	11	14	7	08	83
			337	90	21	06	17	04	375

SATQ = Student Answers Teacher Question  
TASQ = Teacher Answers Student Question  
TAOQ = Teacher Answers Own Question

**Table 5.2:   Answers: Frequency by Speaker and Class**

Ninety percent of all instances of answering were those of students, in response to teachers' questions. Of the 337 student answers provided, the majority were 'minimal:non-expounded' (see System C of the semantic

network, page 95). This means that the question was answered with the briefest, most elliptical answer possible.

Thus, when the point of enquiry was (i) a Process, Participant or Circumstance, only that element was provided;

Example 5.32:

TQ: What was the name of the police officer?  
SA: Constable Moore.

(ii) when the point of enquiry was explanation of method or reason, only the hypotactic clause providing the method or reason was provided;

Example 5.33:

TQ: Why would you [nocturnal animals] need larger eyes  
at night?  
SA: To see things better in the dark.

(iii) when the point of enquiry was what was said or implied, only the projected clause is provided;

Example 5.34:

TQ: What else did he say about Fuller's body, the  
condition of it?  
SA: Uh, pretty bad.

(iv) when the Identified element was a metaphenomenon, only the Identifier/fact clause was provided;

Example 5.35:

TQ: What's the main thing about their reproductive  
systems that's important?  
SA: They lay eggs.

(v) when the point of enquiry was confirmation seeking, only the polarity Adjunct 'yes' or 'no' was provided.

Example 5.36:

TQ: Right, did it look || as though he was going to die  
from his wounds?  
SA: No.

Of 337 students answers, 245 or 73% were 'minimal:non-expounded', that is to say, the briefest possible.

	Student Answers	Minimal:non-expounded	
	#	#	%
Year 7 Hist	57	27	47
Year 11 Hist	54	44	82
Year 7 Sci	161	133	83
Year 11 Sci	65	41	63
	337	245	73

**Table 5.13: Frequency of Minimal:non-expounded Student Answers**

Faced with these figures, it is interesting to ask 'why?'. Several hypotheses concerning the brevity of students' answers can be advanced. Barnes (1986) suggests that students' responses to teachers' questions are characterised by *presentational* talk.

Presentational talk is concerned with getting right answers, with satisfying a teacher's criteria, and not primarily with reordering the speaker's thoughts. *It is likely to be abbreviated*, and to focus more upon surface conformity to the teacher's requirements than upon understanding. (Barnes, 1986:73; italics added)

This contrasts with *exploratory* talk, which serves the purposes of understanding, ... "giving the pupils an opportunity to reorder their pictures of the world in relation to new ideas and new experiences" (Barnes, 1986:73).

Students interviewed advanced rather different reasons. Amongst these students, short answers are valued. "Long answers are a waste of time and confusing. You try for brevity and conciseness". And another student suggests ... "If you know, you just give the answer. If you don't, you stretch out the answer. Like you know what it is, but can't explain so you keep talking until you get it". Short, unhesitating answers appear to reflect 'knowingness' for these students.

Risk of embarrassment in front of peers is also significant. From a Year 12 student, "It doesn't pay to rave on and look too smart in front of your friends", and a Year 8 girl says, "If you go on, you get embarrassed in front of your friends. Like you know too much and get called 'goody goody'". The students interviewed appeared to be under peer group pressure to know but not to know too much!

There is yet another possible explanation for the brevity of student answers. This third possibility is that some questions invite elaboration whereas others do not. To explore this possibility, the number of 'expounded'

answers to questions (i) by format, and (ii) by point of enquiry were counted. The results are presented below, followed by a discussion of these results.

From Table 5.14 it can be seen that twenty percent of all student answers were expounded. These answers were expounded on average by 1.75 messages. This means that the initial answering message was followed by a further 1.75 messages, on average. In Year 7 History, students' answers were more likely than not to be expounded. Not only did the Year 7 History students frequently expound upon their answers, they did so at greater length than the other students in this case study. Their teacher was patient with this; unlike her Year 7 counterpart in Science, she never cut a student off while that student was speaking. Students were allowed to answer as thoroughly as they felt necessary.

Class and TQ Format	Total # SAs	Non-expounded		Expounded		By ave. # messages
		#	%	#	%	
<hr/>						
<u>7 History</u>						
Wh-Thematic	49	24	49	25	51	2.13
Incomplete	1	1	100	-	-	-
Complete	1	-	-	1	100	2.00
Polar	6	2	33	4	67	2.50
	57	27	47	30	53	2.28
<hr/>						
<u>11 History</u>						
Wh-Thematic	35	29	83	6	17	2.00
Incomplete	6	6	100	-	-	-
Complete	12	11	92	1	08	1.00
Polar	1	-	-	1	100	2.00
	54	46	85	8	15	1.67
<hr/>						
<u>7 Science</u>						
Wh-Thematic	142	125	88	17	12	1.47
Incomplete	7	6	86	1	14	1.00
Complete	7	5	71	2	29	2.00
Polar	5	4	80	1	20	1.00
	161	140	87	21	13	1.37
<hr/>						
<u>11 Science</u>						
Wh-Thematic	59	51	86	8	14	1.63
Incomplete	-	-	-	-	-	-
Complete	-	-	-	-	-	-
Polar	6	4	67	2	33	1.50
	65	55	85	10	15	1.57
<hr/>						
	337	268	80	69	20	1.75

Table 5.14: Student Answer Expounding by Question Format and Class

Table 5.15 below reveals that polar questions were the most likely to evoke an expounded answer and 'incomplete' types the least to do so in this case study.

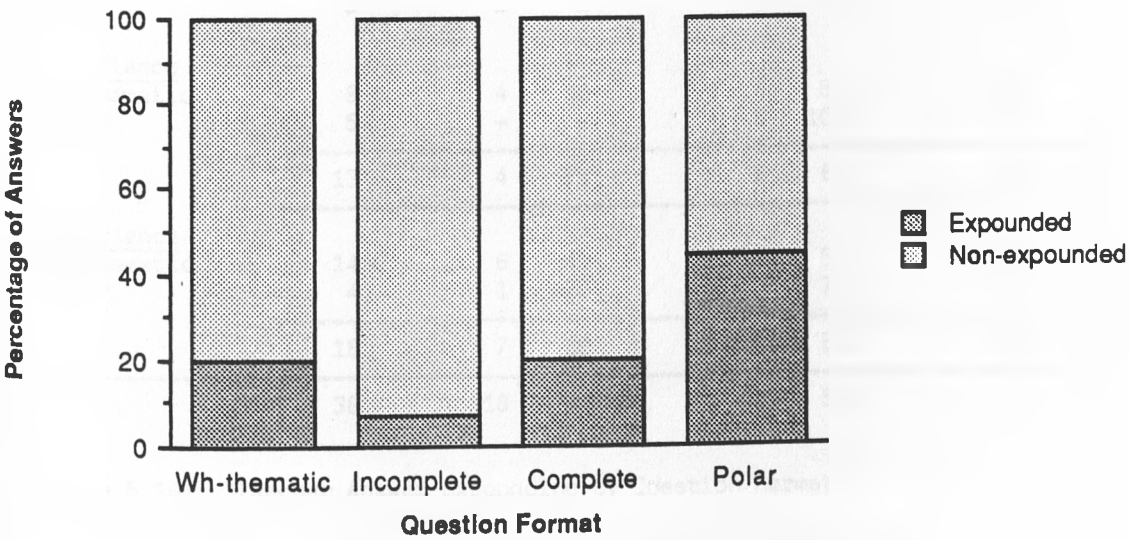
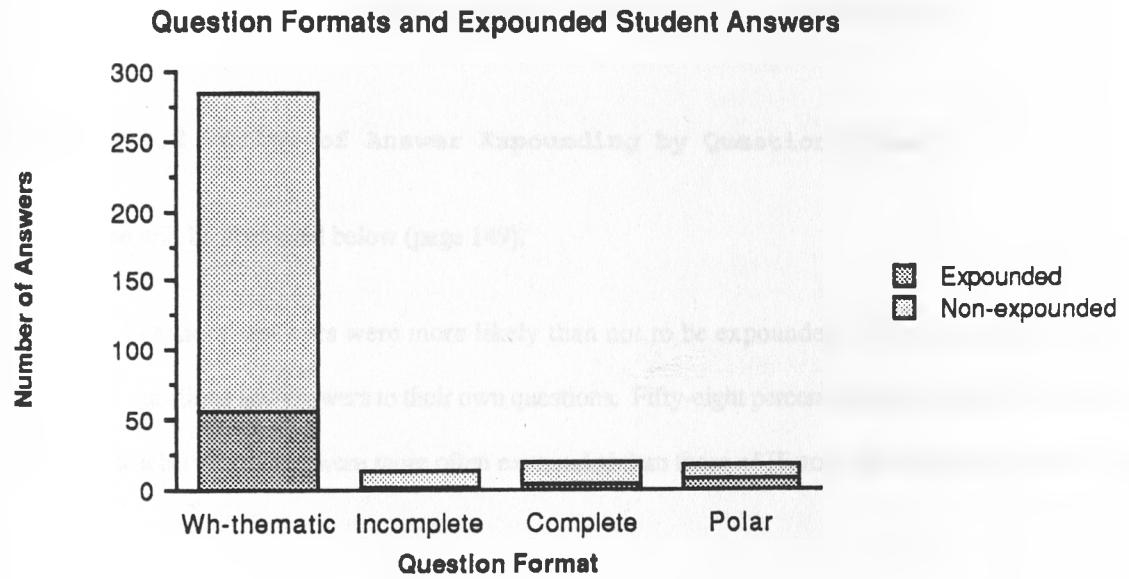


Table 5.15: Question Formats and Proportion of Expounded Student Answers

Question format formed a cline from most to least likely to evoke an expounded answer:

**Figure 5.2 Cline of Answer Expounding by Question Format**

Teachers' answers were more likely than not to be expounded. This was true of their answers to students' questions and answers to their own questions. Fifty-eight percent of teachers' answers were expounded. Science teachers' answers were more often expounded than those of History teachers and at greater length.

Table 5.16: Teacher Answer Expounding by Question Format

Like student answers, teachers' answers to polar questions were most likely to be expounded, followed by Wh-thematic types. There were no instances of teachers answering 'incomplete' or 'complete' type questions.

	Wh-thematic		Polar		Total
	#	%	#	%	#
Expounded	13	54	9	64	22
Non-expounded	11	46	5	36	16
	24		14		38

Table 5.17: Proportion of Teacher Answers Expounded

Two main points emerge from this exploration of the influence of question format on answer expounding:

- (i) Question format was significant for evoking or restricting answer expounding; answers to polar questions were the most often expounded, and 'incomplete' types the least. 'Complete' and 'Wh-thematic' types fell somewhere in between.
- (ii) The majority of teachers' answers were expounded, those to polar questions slightly more often than those to Wh-thematic types.

These two points are further borne out when we look at answer expounding in relation to point of enquiry of the question.

	Process		Method		Reason		Partic		Circum		Confirm		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
<hr/>														
<u>Student Answers</u>														
Expounded	3	25	6	22	9	35	37	17	6	18	8	44	69	20
Non-expounded	9	75	21	78	17	65	184	83	27	82	10	56	268	80
<u>Teacher Answers</u>														
Expounded	1	50	3	100	2	67	6	43	1	50	9	64	22	58
Non-expounded	1	50	-	-	1	33	8	57	1	50	5	36	16	42
<u>All Answers</u>														
Expounded	4	29	9	30	11	38	43	18	7	20	17	53	91	24
Non-expounded	10	71	21	70	18	62	192	82	28	80	15	47	284	76
<hr/>														

Table 5.18: Answering Expounding by Point of Enquiry of Question

Students' answers to questions seeking Confirmation were the most often expounded. These were followed by questions seeking an explanation of Reason. Answers to questions having a 'Participant' as point of enquiry were least often expounded. Teachers tended to expound much more than students. Answers to questions with 'Method' as their point of enquiry were most often expounded, followed by answers to 'Reason' and 'Confirmation' orientated questions. Again, answers to 'Participant' seeking questions were least expounded. Over-all answers to Confirmation seeking questions were most often expounded. Answers to questions seeking an explanation of 'Reason' follow in frequency, then 'Method' and 'Process' orientated ones. Answers to 'Participant' orientated questions were least often expounded, this despite the fact that these are the most frequently asked type of question.

On the evidence provided in this exploration, it can be suggested that:

- (i) Question format did influence the likelihood of an answer being expounded; answers to polar questions were most often expounded and 'incomplete' types the least.
- (ii) Point of enquiry also influenced the likelihood of an answer being expounded; Confirmation seeking questions were most often expounded, followed by explanation of Reason and Method, and specification of Process. Answers to questions having Participants and Circumstances as their point of enquiry were least expounded.
- (iii) Teachers expounded their answers much more often than do students, and at greater length.

I shall discuss these three points in reverse order, taking teachers' answers first.

The answers teachers provide are responses to either students' questions or to questions they have themselves posed. In this case study 64% (14/22) of teachers' answers to students' questions were expounded, and 56% (22/38) of teachers' answers to their own questions were expounded, so there isn't a significant difference in frequency of expounding in the two situations.

The teachers in this case study tended to answer their own questions only after a series of unsuccessful student answer attempts. Before answering a question themselves, they first worked at leading students to the desired answer.

Example 5.37:

Tchr: Osmosis is a process when things move into plants.  
Can anybody remember || why that movement takes  
place?

Luis: It gives it oxygen and nutrients.

Tchr: Right, that's why the process takes place ||  
because there's oxygen and nutrients to move.  
Can anybody remember || what actually happens  
though? You need to remember || what osmosis  
does.

Luis: There's movement over the tissues.

Tchr: Alright, solutions move through the tissues.  
Where do they go from? Why does the water go  
into the plant instead of the other way? Krista.

Kris: They go through the roots.

Tchr: Alright, the thing that I'm after is the amount  
of stuff outside and inside. The thing you need  
to remember is that there's movement from a high  
concentration. Alright, movement from a high  
concentration like in salt water or out there in  
the soil into the plant inside. Alright, from a  
high to a low concentration.

Both situations like this and student questions may be perceived by the teacher as cases of students genuinely not knowing, so the teacher uses his or her answer to 'teach to' the question. If this is so, a 'minimal:non-expounded' answer is likely not sufficient for the purpose. This, I believe, accounts for the frequency and length with which teachers' answers are expounded. Teachers use their answer to teach to the question.

To now take the second point: over-all 73% of students' answers were 'minimal:non-expounded'. This accords with a study by Mishler (1978) of primary school classrooms, where 78% of student answers consisted of only a single word or phrase. However, teachers' confirmation seeking questions in Mishler's study tended not to be expounded, whereas in the present case study these are the most likely student answers to be expounded. Likewise, in the present study, they are the most likely teacher answers to be expounded. This finding is at odds with received educational wisdom. 'Yes/no' questions are considered to be 'closed' in so far as they (supposedly) restrict or severely delimit the cognitive and discursive potential for answering (Mishler, 1978:293) Teachers are actively discouraged from asking them for that reason (Dillon, 1983).

Dillon (1982b) cites several studies in which declarative statements have evoked longer responses than questions. His explanation for this perhaps also accounts for why in the present study confirmation seeking questions were more likely to be expounded than Wh-types.

A question is designed to elicit information, whereas a statement offers information. The respondent is instructed 'Supply the information requested' or 'Accept/reject the information offered'. That would appear to make questions more effective in enhancing response, since accept/reject is a one-word or even a one-nod task. But a statement has more informational 'surprise value' and is more ambiguous with respect to response beyond accept/reject. What direction to develop and when to terminate are less clearly defined than in the case of an interrogative. In accepting/rejecting the information, respondents bring to bear information and experience which they already possess, together with the structure and organisation of what they know. They are left free to adduce all manner of justifications, to make comparisons and adjustments, to give supportive data, examples of counter instances and so forth. But respondents are less free to do any of that when answering a question. A question specifies the topic, the type of information to be supplied, and also the amount of response that is adequate. That is: 'supply the information requested, then stop'. Thus a question may be said comparatively to circumscribe response and to delimit inquiry. (Dillon, 1982b:140)

This argument perhaps holds the key for why answers to confirmation seeking questions were more expounded than Wh-types in the present case study. A confirmation seeking question posits a proposition to be confirmed/accepted or denied/rejected. By secondary school, students have learned that simple confirmation or denial is not enough; the grounds for confirming or denying must also be provided. "Just 'yes' or 'no' isn't enough; you have to justify your answer". A 'minimal:non-expounded' 'yes' or 'no' may be sufficient to accept/reject the proposition, but to provide the grounds for confirmation or denial the answer needs to be expounded. Wh-questions, by comparison, are more likely as Dillon says, to 'specify the topic, the information to be supplied and also the amount of response that is adequate'.

This latter argument would hold also for question format and expounding of answers. Answers to polar questions (confirmation seeking ones considered from the point of view of format rather than point of enquiry) were most likely to be expounded - 44% -, and 'incomplete' types the least (07%) (see Table 5.15, page 144). One in five student answers to 'Wh-Thematic' and 'complete' type Wh-questions were expounded. Of these four formats - polar, Wh-thematic, Complete and Incomplete - the incomplete type most restricts discursive potential for answering. Such questions are instructions to 'fill in the blank':

Example 5.38:

In the adult form they live on land || and breathe  
by ...?

Though 'yes/no' questions - whether considered from the viewpoint of their format or point of enquiry - supposedly severely 'circumscribe response' and 'delimit inquiry', secondary school teachers setting tests know better. In test papers teachers typically use imperatives/commands (demand:goods & services:symbolic - see System network A, page 80) and/or polar/confirmation seeking questions to evoke discursive, non-minimal answers.

Example 5.39:

Comment on the significance of the Tennis Court Oath.

Example 5.40:

Do you think justice was done to James Kelly?  
Give two reasons for your answer.

(The Higher School Certificate Examination paper in New South Wales is predicated on this same [implicit] understanding of the cline of discursive potential created by various formats for demanding information).

Based on the evidence provided by this case study, confirmation seeking ('yes/no') questions are not as 'circumscriptive' or 'delimiting' as they are assumed to be in the educational literature. The matter merits further research.

In this chapter patterns of questioning and answering have been reported and interpreted. This chapter in many respects serves as a preliminary to Chapter Six in which patterns of answer evaluation are discussed. Evaluation reflects what count as legitimate answers to teachers' questions. To make explicit what criteria teachers (implicitly) use to evaluate answers, the nexus between question, answer and answer evaluation must be considered.

## Chapter 6: Patterns of Answer Evaluation

### 6.1 Introduction

If the semantic features of a question define what can count as a legitimate answer, evaluation indexes what does count as a legitimate answer to a classroom question. In this chapter the meaning features of evaluations are discussed. In particular, the various strategies whereby evaluation is signalled and the patterns of evaluation preferred by the individual teachers in this case study are reported, and analyses of which question/answer types are most at risk and alternatives to evaluation are presented. From these patterns can be inferred the criteria teachers appear to use to evaluate students' answers. Discussion of these criteria concludes the chapter.

### 6.2 Strategies for Evaluation

Evaluation serves as a signal that an answer attempt has been accepted or rejected by the evaluator, in this study, the teacher. Answers can be unequivocally accepted ('positive:-reservation' in *System Cb1*, page 99), unequivocally rejected ('negative') or reserved - 'I take your point, but ...' ('positive:+reservation'). These assessments are encoded through a small class of Rejoinders realised by minor clauses - 'yes', 'no' 'right', 'well', 'close' ('ritualistic'), through Rejoinders which enhance or extend the Answer Statement ('-repeat'), or Rejoinders which restate the Answer Statement ('+repeat'). These means of signalling evaluation can be used singly or severally. These, then, are the values and strategies of evaluation.

While these seem straightforward enough, deciding the evaluatory status of an answer is occasionally problematic. There are cases (1) in which the teacher seems to accept an answer but then proceeds to put the question again.

#### Example 6.1:

Tchr: Can anyone remember || why plants need cell walls  
on their cells? Helen.

Heln: Save it from being hurt.

Tchr: Save it from being hurt. Protection might be a better way of saying that.  
What else? Gavin.

Gavn: Keeps the moisture in.

Tchr: Right, holds the moisture in.  
Think about this: || plants and animals are very different in one way || and that's their internal support structure. || Right, think about the nature of animals || and they have bones; || plants don't. So what do you think the cell wall might do there?

Morg: Give it added strength, like hold it together.

Tchr: Right, since there isn't any internal sort of structure to hold plants up || they have to have a stronger cell wall. || And that's what keeps the plant together. || So the main difference between cells of plants and animals is the cell wall.

Both Helen's and Gavin's answers are considered to be positively evaluated for purposes of coding since only retroactively does it become apparent that something more is wanted in answer.

(2) As the above example shows, the question 'what else?' can mean 'what as well?' or 'what instead?'. Which meaning is intended is not always clear, even retroactively. In this study 'what else?' is automatically coded '+additional' (see subsystem h, page 90), so avoiding the temptation of coding an utterance on the basis of what ensues.

(3) Teachers may appear to accept answers but then proceed to answer the question him or herself.

Example 6.2:

Tchr: Can anybody remember something that is special about those blood cells? We did have a look at some.

Jame: There are two: white ones and red.

Tchr: Right, two different sorts, white and red.  
Morgan.

Morg: Well, um, white are usually used as antibodies; || they get the germs.

Tchr: Right, white cells are anti-bodies.  
What do the red ones do then?

Morg: They uh carry the oxygen around through the body.

Tchr: Right, that's one of the main functions of blood. Alright, one of the things to remember about those red cells [that] is different to anything else is they don't have a nucleus. Because they just travel along the stream of fluid || they don't need a nucleus; || they don't do anything || other than hold oxygen. So that's one thing to remember that's special about those blood cells.

In this sequence the contributions of James and Morgan are considered to be positively evaluated.

(4) When several answers have been provided, a single evaluation can validate one and reject the other(s).

Example 6.3:

Tchr: What can we say about the monarchy?

Gary: It was corrupt.

Rob: Despotic.

Tchr: Right, I think what we're more concerned about is the despotism in France rather than corruption.

In this instance, Gary's answer is considered negatively evaluated and Rob's positively evaluated.

(5) Evaluation may be withheld. Coulthard (1977:104) and Edwards and Mercer (1987:47) have suggested that withholding evaluation or responding to a student answer attempt with a Question Rejoinder is tantamount to negative evaluation, that such strategies signal rejection of the attempted answer.

To check this view, the researcher asked a number of secondary school students, "If a teacher asks you a question, you answer it, and then the teacher doesn't say anything or asks another question, what does it mean?". All of the students interviewed responded, "You got the answer wrong", or words to that effect.

There are only a few examples in the database in which a question immediately follows an unambiguously correct answer:

#### Example 6.4:

Tchr: What are some of the characteristics or features of living things?

Chrs: They respond to stimulus.

Tchr: Alright, by respond to stimulus << can somebody explain >> what that means? Luisa.

It may be that the 'alright' in the second question should be heard as a 'ritualistic;positive' evaluation rather than a part of the question, but the intonation of the utterance does not support such an interpretation. (This brief episode, by the way, illustrates how interpretative the act of transcription is.)

For purposes of analysing which question/answer types were most 'at risk' (see Table 6.6 below), positive evaluation rates were used as the basis of calculation. Thus evaluations were either positive or non-positive, and if non-positive, the question/answer was included in the 'at risk' category.

### **6.3 Non-evaluation of Student Answers**

In the present case study instances of no evaluation were more common than negative evaluation (see Table 6.1 overleaf). When the researcher mentioned to several practicing teachers how loathe the teachers in this case study seemed to be to negatively evaluate a student answer, they responded by saying that they had been explicitly taught not to negatively evaluate, not to reject a student's answer because to do so invalidates not only the answer, but the student answering. Interestingly, there was an interpersonal element, a sense of rebuke in several of the Year 7 teachers' more terse negative evaluations.

#### Example 6.5:

Tchr: Now, straight after the shooting, where did Kelly go, Helen?

[no response]

Renae?

Rene: Best's Inn.

Tchr: No.

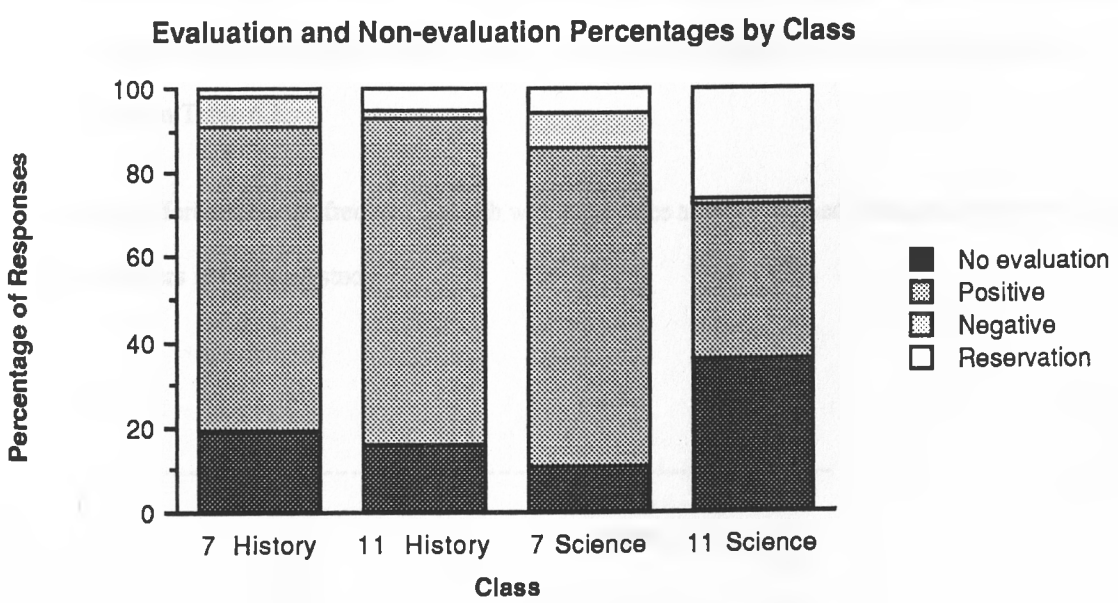
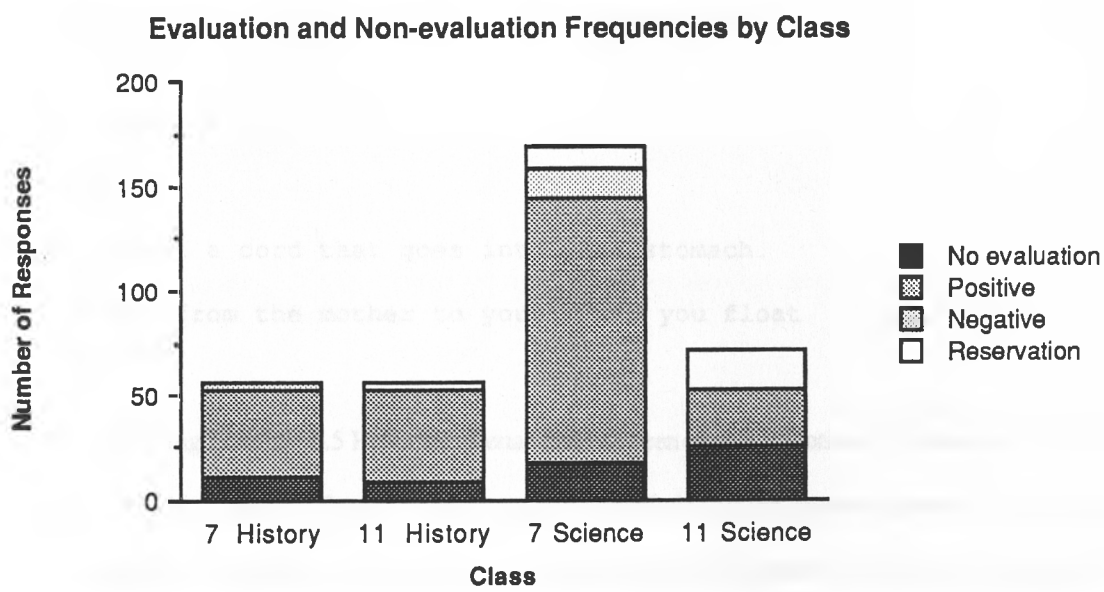


Table 6.1: Evaluation and Non-evaluation Frequencies by Class

Example 6.6:

Tchr: What's the feature to make you a placental animal? Gavin.

Gavn: You got to live in water.

Tchr: No!

Morg: You got a cord that goes into your stomach.

Gavn: Yeah, from the mother to you || and you float around.

In the segment comprising Example 6.5 Helen and Renae had not been paying attention. The teacher's terse 'no' is less a comment on the quality of Renae's answer as her behaviour. In the second segment, Example 6.6, Gavin's initial suggestion is met almost with contempt; however, as his subsequent elaboration indicates, he had a point.

As a general rule, it appears that teachers take the injunction not to negatively evaluate students' answer attempts seriously, preferring to (1) answer their own questions (TAOQ); (2) simply not follow up the answer (NFU); or reply with a Question Rejoinder (QR) instead. These three strategies account for the instances of 'no evaluation' reported in Table 6.1.

There are differences in the frequencies with which the three aforementioned strategies of non-evaluation are used by the teachers in this case study.

	TAOQ		QR		NFU		Total
	#	%	#	%	#	%	
7 History	-	-	10	91	1	09	11
11 History	2	22	7	78	-	-	9
7 Science	8	44	10	56	-	-	18
11 Science	7	27	17	65	2	08	26
	17	27	44	69	3	04	64

**Table 6.2: Frequency Distribution of Non-evaluation Strategies by Class**

Generally speaking, the History teachers are more likely than the Science teachers to respond with a Question Rejoinder and the Science teachers are more likely than the History teachers to answer their own questions.

	TAOQ		QR		NFU		Total
	#	%	#	%	#	%	#
History	2	10	17	85	1	05	20
Science	15	34	27	61	2	05	44
	17		44		3		64

**Table 6.3: Frequency of Non-evaluation Strategies by Subject**

Two of the three environments in which teachers answer their own questions have been mentioned:

- (1) that in which there have been a series of unsuccessful student answer attempts, illustrated in Example 5.37, page 148;
- (2) that in which the teacher has accepted a student answer, but then provides a further answer of her own, as in Example 6.2, page 152. The Year 7 Science teacher is particularly prone to do this.
- (3) The third instance is infrequent (two occurrences in the whole database); teachers simply go ahead somewhat pre-emptively to answer.

Example 6.7:

Tchr: What else [was promised in the Declaration of Rights of Man]? Freedom of speech; || freedom of the press; || the right of the individual not to be interfered with by other individuals.

Dave: Or be taxed.

Over-all the majority of teachers' non-evaluations take the form of Question Rejoinders. These ask the same question again ('re-seek' in subsystem h, page 90); seek clarification (option h2); focus on some aspect of the student's answer attempt ('focus on answer'); or pose a new, variant question ('focus on question'). Of these, Question Rejoinders which focus on some aspect of the student's answer occur most frequently.

	Re-Seek		Seek Clar		Focus on A		Focus on Q	
	#	%	#	%	#	%	#	%
7 Hist	1		1		8		-	10
11 Hist	1		-		4		2	7
7 Sci	4		-		5		1	10
11 Sci	2		2		10		3	17
	8	18	3	07	27	61	6	14
							44	

**Table 6.4: Frequency Distribution of Question Rejoinders by Class**

That teachers tend to avoid negative evaluation, preferring instead Question Rejoinders, and particularly those focusing on the answer, can be interpreted as an encouraging finding. A Question Rejoinder which focuses on the student's answer indicates where the answer has gone wrong while affording the student an opportunity to amend his original answer. Thus, these Question Rejoinders serve what Applebee and Langer (1983:170) call a collaborative rather than an evaluative function. They build upon rather than reject what the student has provided.

A teacher answering his own question may retroactively indicate where the students' answers have gone wrong, but the correction is coming from the teacher, not the students. Re-seeking, that is, asking the same question again, lets the student know he has made a mistake, but doesn't indicate the source of error. Seeking clarification for the sake of having the student re-explain himself is, as Dillon (1983:31) points out, fruitless because the student has just said what he means. The clarification seeking question gives no clue as to what the teacher got from the answer and what s/he missed. A Question Rejoinder focusing on the question disambiguates the initial question and at least in that way is constructive.

Having seen what the alternative strategies to evaluation are, we can now ask if there are certain questions, considered from the viewpoint of their point of enquiry, less likely than others to be evaluated. From Table 6.5 below, it can be seen that there are. Answers to confirmation seeking questions are least likely to be evaluated, followed closely by answers to questions with 'Method' and 'Reason' as their point of enquiry. It can also be seen that these same questions are the most likely to be responded to with a Question Rejoinder focusing on the answers. (See pages 160-164 for further discussion.)

Patterns of Evaluation and Non-evaluation by Point of Enquiry

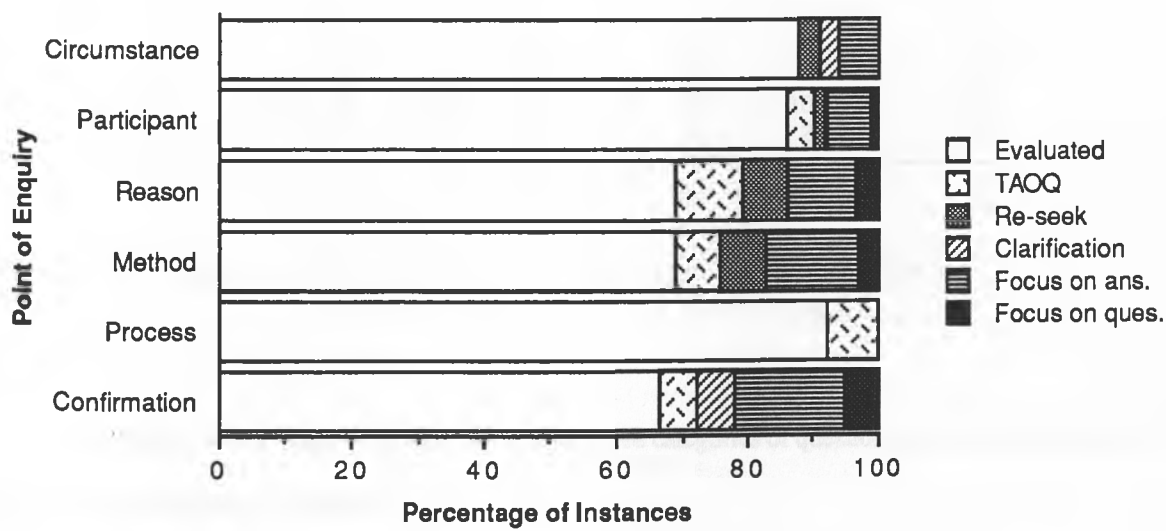
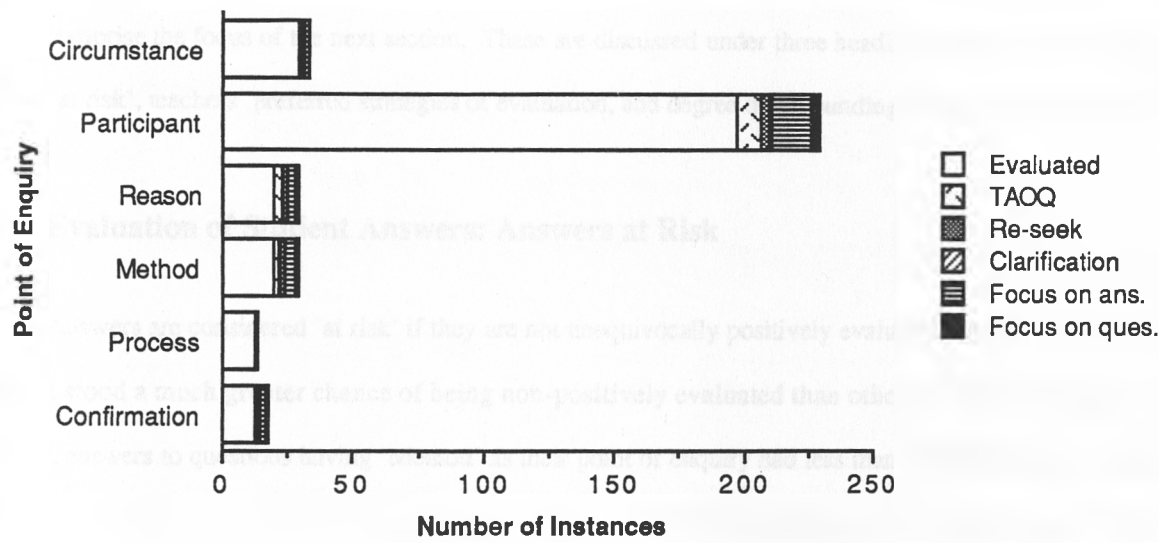


Table 6.5: Patterns of Evaluation and Non-evaluation by Point of Enquiry

In this section have been discussed the strategies the teachers in this case study adopt as alternatives to student answer evaluation. However, evaluation is more likely to occur than not. Patterns of evaluation of student answers comprise the focus of the next section. These are discussed under three headings: those answers which are most 'at risk', teachers' preferred strategies of evaluation, and degree of expounding in teachers' evaluations.

### 6.4 Evaluation of Student Answers: Answers at Risk

Answers are considered 'at risk' if they are not unequivocally positively evaluated. Answers to certain questions stood a much greater chance of being non-positively evaluated than others in this case study. In particular, answers to questions having 'Method' as their point of enquiry had less than a 50/50 chance of being positively evaluated. Answers to questions having 'Reason' and 'Confirmation' as their point of enquiry fared little better.

Point of Enquiry	No Evaluation		Positive		Negative		Reservation		Total
	#	%	#	%	#	%	#	%	#
Confirmation	6	33	10	56	2	11	-	-	18
Process	1	08	11	85	-	-	1	08	13
Method	9	31	13	45	7	24	-	-	29
Reason	9	31	16	55	2	07	2	07	29
Participant	35	15	164	71	23	10	10	04	232
Circumstance	4	12	23	70	4	12	2	06	33
	64	18	237	67	38	11	15	04	354

Table 6.6: Answers at Risk: Non-positive Evaluation by Point of Enquiry

As stated previously (page 158), answers to these three categories of question are the ones most likely to evoke a Question Rejoinder in response:

	Method	Reason	Confirm.	Circ.	Partic.	Process
Positive	45%	55	56	70	71	85
Negative	24	07	11	12	10	-
Reservation	-	07	-	06	04	08
TAOQ	07	10	05	-	04	08
NFU	-	-	-	-	01	-
Re-seek	07	08	-	03	01	-
Seek Clarif.	-	-	05	03	03	-
Focus on Answer	14	10	18	06	06	-
Focus on Quest.	03	03	05	-	01	-

Table 6.7: Response Rates by Point of Enquiry

What is it about 'Method', 'Reason' and 'Confirmation' seeking questions that make them difficult to answer successfully compared to 'Participant', 'Process' and 'Circumstance' seeking ones? Suggestions towards an answer to this query must take into account the nexus between questions, answers and evaluations.

It was stated previously that the semantic features of a question determines its inherent answer potential. Every question involves a degree of interpretative latitude. The answer to the question

#### Example 6.8:

Tchr: Where did Kelly shoot Fuller?  
Many: On the right hand side.

named an anatomical location. 'Just outside the mouth of the cave' - a geographical location, would also have been responsive to the semantic features of the question. In the following, Morgan has provided the implicational meaning of a term, rather than a definition:

#### Example 6.9:

Tchr: Warm-blooded means what exactly? Morgan.  
Morg: They can live in cold climates || without dieing  
|| cause they don't [remainder drowned out by  
teacher]  
Tchr: It allows them to adapt to different climates.  
What does it physically mean to be warm-blooded  
though? Deanna.  
Dena: Their temperature stays the same.

And the following segment illustrates that a 'why' question can be interpreted in more than one way:

Example 6.10:

Tchr: Osmosis is a process where things move into plants. Can anybody remember || why that movement takes place?

Luis: It gives it oxygen and nutrients.

Tchr: Right, that's why the process takes place || because there's oxygen and nutrients to move. Can anybody remember || what actually happens though? You need to remember what osmosis does.

Luis: There's movement over the tissues.

Tchr: Alright, solutions move through the tissues. Where do they go from? Why does the water go into the plant instead of the other way? Krista.

Kris: They go through the roots.

Tchr: Alright, the thing that I'm after is the amount of stuff outside and inside. The thing you need remember is that there's movement from a high concentration. Alright, [there is] movement from a high concentration like in salt water or out there in the soil into the plant inside. Alright, from a high to a low concentration.

While all questions entail a degree of interpretative latitude, it can be argued that those seeking a 'Participant', 'Process' or 'Circumstance' require less interpretation than those seeking 'Method', 'Reason' or 'Confirmation'. A question seeking a Participant requires that an entity be named or its status specified.

Example 6.11:

Tchr: OK, now, who went with Kelly on his search? Jason.

Jasn: The little boy.

Tchr: What was his name?

Example 6.12:

Tchr: Alright, what about James Anderson? Who was he?

Rene: Another doctor.

Tchr: He was a surgeon.

One seeking a Process requires that the events which (have) take(n) place be enumerated (what happened?) or that an action performed is stated (what does/did X do?). Questions asking 'why?' require an explanation of causes, reasons or purposes. As Example 6.10 shows, the finer focus may not always be transparent to the answerer. 'Method' orientated questions require an explanation of the ways, principles, or sometimes even the reason things are/were done.

Example 6.13:

Tchr: How do the gills actually work?

Heln: They um take in the water || and they take out  
the oxygen || and they let out the water.

Example 6.14:

Tchr: How did they manage to get rid of the opposition?

Elis: They had the mob support.

Confirming or denying the proposition stated in a confirmation seeking question is only part of the task; providing the grounds for doing so is also a significant part of the task. Providing such grounds involves interpretation. The following example from a trial Higher School Certificate exam paper illustrates this point:

Example 6.15:

Should ethnic groups in Australia be encouraged to preserve their own language? Give reasons for your answer.

All questions entail an inherent potential for answering. Part of the conditions that must be met to answer is interpretation of the question. The student's task in classrooms is made more complicated by the fact that teachers often have some one particular interpretation in mind, as Examples 6.9 and 6.10 show. The students' job then becomes one of matching their interpretation with that of the teacher.

Moreover, the teacher typically has a particular answer in mind based on this interpretation. So the student has the further task of finding ... " one answer or formulation from among the many available which matches the teacher's unstated expectations" (Mehan, 1974:125).

Related to this is the fact that answers to questions seeking a 'Participant', 'Process' or 'Circumstance' can be specified whereas those seeking 'Method', 'Reason' or grounds for Confirmation/denial require an explanation. The Macquarie Dictionary (Delbridge, 1985:1625,619) defines **specify** as 'to name or state', and **explain** as 'interpret'. An answer requiring the name of a single entity, process, place or time has a better chance of matching the teacher's unstated expectations than does a more discursive answer.

Interestingly, teachers interviewed concerning the finding that answers to 'Method', 'Reason' and Confirmation seeking questions were less often positively evaluated than 'Participant', 'Process' and 'Circumstance' seeking ones all focused on the nature of the answer and students' inability to meet the demands for answering. None mentioned the (potential) ambiguity of the questions, nor the nature of evaluation. The teachers interviewed suggested that 'Participant' seeking (who/what?) questions, 'Process' (what happened?, what does/did X do?) and 'Circumstance' (when?, where?) seeking ones required a "low level of understanding", that the answers were "known as fact" and could be "parroted back to the teacher". Answers to 'Method' (how?), 'Reason' (why?) and Confirmation (yes/no) seeking questions, on the other hand, required "real understanding"; they required "students to think" and "reason". These latter questions "invite construction of whole new patterns". Certainly these questions require that a greater quanta of information be recalled, sifted for relevance to the question and synthesised into an intelligible proposition or argument. That is to say, they require a higher degree of *integrative work* (Gerot, 1985) than answers to 'Participant', 'Process' and 'Circumstance' orientated ones.

One teacher in particular also felt that there was an interpersonal component involved; that students felt intimidated by 'how?', 'why?' and 'yes/no' questions because they "might be shown up as not knowing". The same teacher acknowledged that students are rarely given "sufficient time to think through, much less talk through their answers" because "the pressure to get through the material is so great".

This account does not constitute an answer to the issue of why answers to certain questions are more 'at risk' than others, but it does suggest directions a more detailed investigation could fruitfully take.

6.5 Strategic Preferences and Expounded Evaluations

Teachers differed in both their preferred strategy for evaluating and the extent to which they expounded their evaluations. In Table 6.8 below all messages involved in evaluation of students' answers are categorised by value and strategy. The evaluative categories referred to are outlined in Chapter Four, pages 99-101.

	7 History		11 History		7 Science		11 Science	
	#	%	#	%	#	%	#	%
<hr/>								
Positive								
Ritualistic	18	27	1	01	13	05	4	04
Replicative	20	30	20	19	52	20	6	07
Echoic	6	09	17	16	51	20	3	03
-Repeat	16	24	54	51	101	39	50	54
Negative								
Ritualistic	2	03	-	-	5	02	-	-
+Repeat	-	-	1	01	3	01	1	01
-Repeat	3	05	1	01	18	07	27	29
Reservation								
Ritualistic	-	-	-	-	1	-	1	01
+Repeat	1	02	1	01	4	02	-	-
-Repeat	-	-	11	10	10	04	-	-
<hr/>								
# of messages	66		106		258		92	
# of evaluations	46		47		151		46	

Table 6.8: Values and Strategies of Evaluation by Class

Several tendencies can be noted in these figures. Firstly, the Year 7 History teacher, more than her colleagues in this case study, tended to evaluate minimally, using ritualistic comments or word-for-word repetitions of students' answers. By contrast, the other three teachers, especially the Year 11 teachers, tended to expand upon the students' answers ('-repeat'), supporting or refuting the answer by providing additional, relevant information.

Example 6.16:

Tchr: How would you divide birds and mammals?

Mari: Heart chambers for birds and mammals.

Tchr: Both have four. (refutation)

This, together with expounding of evaluations, can be seen as 'teaching to the answer'. Teachers answer their own questions as a means of teaching to the question; they expand and/or expound upon students' answers as a means of teaching to the answer (see also page 167).

Secondly, the Year 11 History teacher and the Year 7 Science teacher tended to paraphrase (see 'echoic') students' answers in their evaluations more than did their counterparts.

Example 6.17:

Tchr: Why might you want to classify them [animals]  
into different groups?

Chrs: If there's any relation between where they live.

Tchr: Alright, we can look at relationships between  
the organism and where they live.

It is a moot question as to whether teachers' paraphrases of students' answers preserve the meaning the student intended, or whether the answer provides a base from which the teacher imposes his own meaning (Lemke, 1982; Edwards and Furlong, 1978:31).

Thirdly is the degree to which the Year 11 Science teacher negatively evaluated by contradicting or refuting (see 'negative:-repeat').

Example 6.18:

Tchr: Who can think of a single cell group of algae?

Stud: Green algae.

Tchr: Uh, green algae includes multi-cellular ones.

Refuting by giving counter-information reflects a certainty in both scientific fact and scientific authority. The Year 7 Science teacher's refutations also tended to provide counter-information, whereas those of the History teachers were more of the interpersonal comment kind: 'I think you're a little ahead of yourself'. The Science teachers had the weight of scientific authority to fall back on whereas it seems that the History teachers had no recourse to any kind of equivalent historical authority.

The notions scientific authority, knowledge and method are enormously influential in shaping our

schools' concepts of 'knowledge' and 'pedagogy'. It would divert me from my purpose to develop this argument here, but the reader is commended three works which lay bare the beliefs underlying the notion 'scientific authority' and its influence in schooling. Russell (1983) accepts 'scientific authority' as given; in so doing he exposes how deeply the notion itself and the assumptions underlying it are engrained. Bowers (1980) analyses the conceptual code which underlies the patterns of thought and activities that make up life in schools. This conceptual code enshrines scientific/technicist ideology. Barry Barnes (1974) argues that scientific knowledge is a system of beliefs, no less than other belief systems; science carries the weight of authority because society agrees for this to be so. In this way Barnes' argument provides an interesting counterpoint to that of Russell.

To return to the notion 'teach to the answer': given the purpose of oral revision lessons to check and validate knowledge (see Chapter Three, page 52) and the pedagogic means of doing this - teachers asking questions, students providing answers, and teachers evaluating the answers - evaluation is the primary slot for teaching or re-teaching in revision lessons. Teachers do this by taking up the student's answer and expanding/expounding upon it. This is what is meant by teaching to the answer. The following example illustrates this notion.

Example 6.19:

Tchr: It [being paid by the government] brought the Revolution into dispute with who?

Lind: The Pope.

Tchr: Right, dispute with the Pope. Remember || that France is a Catholic country || and the Pope himself was not pleased with that || because it was taking away from the Church some of the powers it had long had. The Church itself had always been conservative. The clergy then were put in a dilemma; || they had to choose between the Church and the Revolution.

Three of the four teachers in this case study took advantage of this strategy.

	7 History		11 History		7 Science		11 Science	
	#	%	#	%	#	%	#	%
<hr/>								
<u>Positive</u>								
Non-expounded	33	80	26	60	81	64	19	73
Expounded	8	20	17	40	46	36	7	27
By ave. # messages		2.25		3.88		3.02		4.86
<u>Negative</u>								
Non-expounded	4	100	1	100	9	84	11	58
Expounded	-	-	-	-	5	36	8	42
By ave. # messages		-		-		3.60		1.88
<u>Reservation</u>								
Non-expounded	1	100	1	33	7	70	1	100
Expounded	-	-	2	67	3	30	-	-
By ave. # messages		-		4.00		2.33		-
<hr/>								

Table 6.9: Expounding in Teachers' Evaluations of Student Answers

The exception is the Year 7 History teacher; in her class the students expounded (their answers) more than the teacher her evaluations (see page 143). Over-all, twenty-nine percent of the History teachers' evaluations were expounded and thirty-five percent of the Science teachers'. The expansions of the Year 11 teachers were longer, on average, than those of the Year 7 teachers.

	Non-expounded		Expounded		Total
	#	%	#	%	#
<hr/>					
History	66	71	27	29	93
Science	128	65	69	35	197
<hr/>					
	194	67	96	33	290

Table 6.10: Expounded Evaluations by Subject

	Expounded #	By No. of Messages	Ave. # Messages
<hr/>			
Year 7	62	182	2.94
Year 11	34	123	3.62
<hr/>			
	96	305	3.17

Table 6.11: Average Number of Messages in Expounded Evaluations

## 6.6 Criteria for Evaluating Student Answers

From the patterning of teachers' responses to student answer attempts can be inferred the general criteria that teachers use to evaluate those student answers. It must be stressed that these criteria are implicit; it is doubtful that either the teachers or students are explicitly aware of the rules which are operating, yet both teachers and students act in accord with these rules. Moreover, these criteria or rules are general; the finer criteria varies from moment to moment during the evolving lesson. Nevertheless, for a student answer attempt to be positively evaluated, all eight of the following criteria must be met:

1. Semantic potential: The answer must fall within the inherent answer potential established by the meaning features of the question. Answers which do not are heard as bizarre, or as instances of the question being misheard. There are no instances of this criteria not being met in this case study, but the following constructed example illustrates what is meant.

### Example 6.20:

Tchr: What was the name of the police officer?

Stud: To uh Parramatta Police Station.

2. Shared focus: The student's answer must comply with the teacher's focus. That is to say, the teacher and student must interpret a potentially ambiguous question in the same way.

### Example 6.21:

Tchr: Alright, their [monotremes'] main point is that they lay eggs || as well as the other main feature that all mammals have?

Adam: They have fur.

Tchr: No.

Gavn: They suckle their young.

Tchr: Right, suckling. That means they feed them with milk || so that they lay eggs || and they feed milk. They're the monotremes.

It is scientific fact that all mammals have fur; it is one of their distinguishing characteristics. The teacher may have made her intentions clearer had she asked something like - 'What else do they do that make them so unusual?'. The student's answer is considered wrong because the student and teacher did not share the same focus on the question, not because the information provided was factually inaccurate. Examples 6.9 and 6.10 on pages 161 and 162 provide further instances in which the teacher and student did not share the same focus on the question.

3. Sequential agenda: Students' answer must comply with the sequential agenda the teacher has in mind.

Example 6.22:

Tchr: Some of the non-vascular ones [plants]?

Mari: Mosses and lichens.

Tchr: Usually we start with the various algae groups; ||  
some of them are single-cell.

Mosses and lichens are examples of non-vascular plants, but are of a higher order taxonomically than algae. The review of 'the classification of living organisms' in the Year 11 Science lesson, from which this example comes, is organised around the construction of a taxonomy from the simplest to the most complex living things (see Transcript 1.4, Appendix One). So although the answer Marie provides is factually accurate, it does not fit as the next step in the taxonomy being constructed.

4. Specificity: The answer must be specific. Teachers ask questions using general nouns and verbs, for example 'thing', 'do', 'happen', so as not to divulge the answer in the course of asking the question. The student's answer, however, must be quite specific.

Example 6.23:

Tchr: Right, now where does Moore take Fuller? Melinda.

Meln: To the hospital.

Tchr: Which hospital?

5. Comprehensiveness: The answer must provide a sufficient quantum of information.

Example 6.24:

Tchr: What are arthropods?

Phil: All animals that have a skeleton sort of formed.

Tchr: Where is that skeleton though?

'All animals that have a skeleton sort of formed' would include the vertebrates. However, the teacher here appears to realise that Phil is having difficulty formulating his answer and provides a kind of prompt to help him along. The answer hints at understanding, but in itself does not provide a sufficient quantum of information for the teacher to be certain of this.

6. Formulation: The wording of the answer must satisfy the teacher; in particular, technical terms must be used where possible.

Example 6.25:

Tchr: Ah, what's the main difference between plants and animals?

Neil: Food; || one eats food || and the other makes it.

Tchr: Yes, what are the correct terms?

7. Veracity: The answer must be in accord with the facts as the teacher understands them.

Example 6.26:

Tchr: What does 'putrid' mean?

Stud: Heavy.

Tchr: No.

8. Behavioural protocol: Students must display proper classroom decorum while answering. When a 'don't call out rule' is in effect, answers can be rejected on the grounds not of their accuracy, but on the grounds of the answerer's impropriety. This is not a major problem in the four lessons comprising this study, but as every teacher knows too well, it can be.

Example 6.27:

Tchr: Why would we group things?  
Crag: Cause they're different.  
Tchr: If you want to talk || you put your hand up.

(From a supplementary transcript collected early in the research project.)

Interestingly, answers provided out of turn, that is, those which breach a 'don't call out' rule, are less likely to be sanctioned if factually accurate than if not.

These criteria are inferential constructs; they are based on observations of the non-positive responses teachers provide to students' answers. All eight criteria must be met if the answer is to be positively evaluated, and the teacher is ultimate and usually sole arbiter of whether or not this is so. Where the answer is not positively evaluated, these criteria provide an account of where the attempt breaks down.

In this case study, the majority of answers not reaching criteria failed to meet the requirement that the answer accord with the facts as the teacher understood them (veracity).

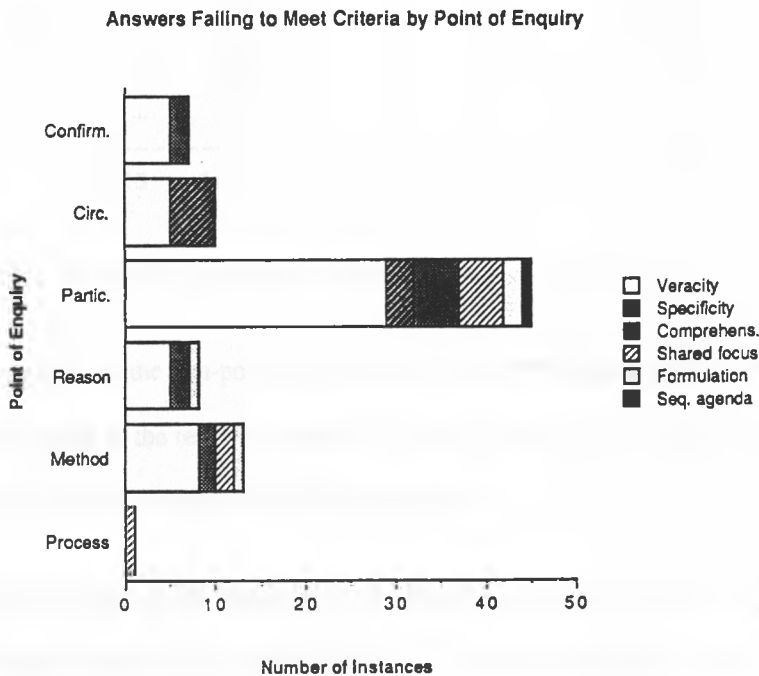


Table 6.12: Answers Failing to Meet Criteria by Point of Enquiry

n.b. There are no instances of answers breaking down through failure to fall within 'semantic potential' or failing to meet 'behavioural protocol' in this study.

Over-all the pattern of answer breakdown did not differ greatly between Year 7 and Year 11.

	Year 7		Year 11		Total
	#	%	#	%	#
Shared Focus	3	07	5	13	8
Seq. Agenda	-	-	1	03	1
Specificity	6	14	2	05	8
Comprehensive	8	18	3	08	11
Formulation	1	02	3	08	4
Veracity	26	59	26	65	52
	44		40		84

Table 6.13: Type of Answer Breakdown by Year

The difference between Science and History, however, is striking.

	History		Science		Total
	#	%	#	%	#
Veracity	9	36	43	73	52
Specificity	7	28	1	02	8
Comprehensive	5	20	6	10	11
Shared Focus	2	08	6	10	8
Formulation	2	08	2	03	4
Seq. Agenda	-	-	1	02	1
	25	100	59	100	84

Table 6.14: Type of Answer Breakdown by Subject

Nearly three-quarters of the non-positively evaluated answers in Science did not meet the requirement that they accord with the facts as the teachers understood them. Only slightly more than a third of the non-positively evaluated answers in History failed to reach this criterion.

This difference may be interpreted as being a reflection of (i) what constitutes knowledge in school biology and school history, and (ii) mode of teaching. These are discussed in turn.

In support of the first claim Christie's (1988) and Eggins, Martin and Wignell's (1987) work is again

cited. In accord with Eggins, Martin and Wignell, Christie points out that

... it is of the nature of biological knowledge that it creates taxonomies of living things. These taxonomies represent ways of ordering things into classes and sub-classes, and they are also ordered in terms of the part/whole relationships of living things. Secondly, as well as seeking to create taxonomies of living things, biology also seeks to indicate what living things do, and how they come to be.  
(Christie, 1988:130)

Nominal groups name the entities to be classified and relational processes construct the class/sub-class (superordination) and whole/part (composition) relations upon which classification is based. Relational processes also build states of being - e.g. 'Plant cells have cell walls', or 'Vacuoles are just empty'. Given these features, it is not surprising that the majority of the Science teachers' questions in this study were 'Participant' seeking (see page 120), and that these sought 'relational Participants' in particular (see page 138). Moreover, the very high incidence of 'universal' processes (see page 134) in Science teachers' questions makes sense given the nature of biological knowledge. Christie suggests that "... as an area of human endeavour biology appears to seek to make statements about **what is the case**" (Christie, 1988:110, bold original).

The findings in this study support this view. Science teachers to a much greater extent than their colleagues in History refuted students answers, providing counter-information to do so (see page 166). And seventy-three percent of answers not positively evaluated were rejected on the grounds that they did not accord with the facts. The belief in the facticity of science is reflected repeatedly and unmistakably through the patterns of meaning features taken up in teachers' questions and their evaluations of student answers.

By contrast, History is considered much more interpretative. "The historian's task is to make the story of people meaningful by selecting, interpreting and generalising from facts of the recoverable past" (Eggins, Martin and Wignell, 1987:66). In the case of Killer Kelly certain 'facts' of the shooting and its aftermath can be established from the testimony of those involved. The interpretation of these events and circumstances surrounding them would have differed for the participants: Kelly felt differently about the shooting than Fuller did! And the interpretation differed for the students reconstructing this historical event. The discussion of the fairness of Kelly's sentence is interesting in this regard (see Transcript 1.1, Appendix One, pages 202-204). In the Year 11 History lesson the discussion of why the Estates General was convened also reflects varying interpretations (see Transcript 1.2, Appendix One, page 212). Interestingly, in both of these instances the teachers work to bring students around to one particular viewpoint.

'Facts' - those events which took place, the people involved in those events, and the circumstances surrounding them - provide the basis for interpretation in history. Explaining the 'why' and the 'significance' of these events involve interpretation. In the History lessons included in this study, thirty-six percent of non-positively evaluated answers did not meet the requirement of facticity (veracity). Slightly more than twenty-five percent were not specific enough. Five of the seven answers failing to meet this criterion were answers to questions asking for locations and occurred within the Year 7 History lesson. Why the Year 7 History teacher insisted on the degree of detail she did is not clear. Four of the five answers failing to meet the requirement of comprehensiveness in History were answers to 'Reason' or 'Confirmation' seeking questions. Three of these occurred in the environment of discussing the fairness of Kelly's sentence, that is, in an interpretation of what happened.

The patterns of meaning options taken up reflect differences in how Science and History were being constructed in these lessons. It can also be suggested that they reflect a difference in the mode of teaching. Douglas Barnes (1976, 1986) describes two distinct kinds of teaching which he calls Transmission teaching and Interpretation teaching.

The Transmission teacher sees it as his task to transmit knowledge and to test whether the pupils have received it. ... For the Interpretation teacher, however, the pupil's ability to reinterpret knowledge for himself is crucial for learning, and he sees this as depending on a productive dialogue between the pupil and himself. (Barnes, 1976:142)

Barnes (1976:145) continues, saying ... "What Transmission teachers value is the memorizing of established knowledge".

The differences in type of answer breakdown in Science and History suggest that in this study the Science teachers more than their History colleagues tended to a Transmission mode of teaching. This is consistent with Barnes' (1976:142) finding that Biology and Physics teachers tended to the Transmission mode of teaching while History teachers varied between the Transmission and Interpretation modes.

No doubt the patterns in questioning, answering and evaluating reported for Science and History in this and the last chapter reflect an interaction of predominant teaching mode and the ways these subjects are linguistically constructed. In the next chapter, Chapter Seven, a summary of these patterns is presented, and their implications for what appears to count as legitimate knowledge and its transmission in this case study are discussed.

## Chapter 7: Legitimate Answers to Legitimate Questions

### 7.1 Finding the Answers

The research reported in this thesis grew out of a concern for what it is that students have to do to provide legitimate answers to questions asked in various genres of pedagogic discourse. The research undertaken here addressed this question with reference to spoken classroom discourse, of a particular kind, the oral revision lesson.

From the outset the author adopted the viewpoint that the semantic features of a question establish the inherent answer potential for that question. That is to say, such features establish what can count as an answer.

Teachers typically know the answers to the questions they ask; they ask questions to find out if students also know. This is particularly true in revision lessons. Within the range of possible answers to a teacher's question is one best answer - the one the teacher has in mind. This can be called **the answer**.

A teacher's evaluation of a student's answer reflects the extent to which the latter approximates **the answer**. So while the semantic features of a question define what can count as an answer, the semantic features of a teacher's evaluation reflect or index what counts as **the answer**.

To find out what students had to do to provide **the answer** to teachers' questions in this case study, the semantic features of questions, answers and evaluations, and their nexus were analysed using a semantic network devised for the purpose. The semantic network is an account of the meaning options available to teachers and students. Counts of who took up which options how often provided a way of locating patterns within questioning, answering and evaluating. These analyses, in turn, made it possible to:

- (1) provide a description of teaching practice;
- (2) locate differences in patterning of meaning options taken up in History and Science, and to a lesser extent in Years 7 and 11; and
- (3) infer the criteria teachers use to evaluate answers in spoken classroom discourse.

To the extent that the semantic network accounts for the language data comprising this case study and permits the above goals to be achieved, its efficacy is demonstrated.

Provided below is a brief summary of the patterns of meaning options taken up in questioning, answering and evaluating in this study. The implications of these for what appears to count as legitimate knowledge and its transmission in this study is discussed. Recommendations for further research are made as relevant.

## 7.2 Making Explicit Implicit Teaching Practices

In this study, as that of Bellack, et al (1966), the teacher's role was that of questioner and evaluator, while that of the student was answerer. In the present study ninety-four percent of all questions were asked by teachers and all but one evaluation of an answer was made by a teacher. Students answered ninety percent of the questions asked. Of the ten percent of questions teachers answered, six percent were in response to student questions and four percent were in response to their own questions.

Teachers asked many more wh-type questions than polar ones. Fully two-thirds of these were Participant seeking. Questions seeking the specification of a Process or Circumstance, or explanation of a Reason or Method were infrequent by comparison. The differential patterning of these Participant seeking questions is discussed in sections 7.3 and 7.4 below.

The analysis of questions using the semantic network has demonstrated the important fact that a change in the form of a question is a change in its meaning. Changing the latter, of course, alters the inherent answer potential of the question. The teachers in this study showed their awareness of this when, for example, they altered the wording of their questions:

### Example 7.1: Year 7 Science

(642) (How do non-flowering plants, or ) what are some ways  
that non-flowering plants might reproduce?

The wording (form) of a question not only indicates its point of enquiry.

### Example 7.2:

- (a) Where did Kelly shoot Fuller?
- (b) Why did Kelly shoot Fuller?

It also establishes the discursive potential for answering. In the present study, answers to Confirmation seeking,

'Reason' and 'Method' questions were more often elaborated than those to 'Process', 'Circumstance' and 'Participant' seeking ones, though the first three of these can be answered minimally. So, for example, while the question 'Why did Kelly shoot Fuller?' could be minimally answered - 'to get even with him' or 'to teach him a lesson' - this kind of question was more likely to evoke an elaborated answer than the question 'Where did Kelly shoot Fuller?'.

The format of a question also influences discursive potential for answering. In the case study, answers to polar questions were most often expounded and answers to 'incomplete' types the least often. Thus, the answer to a question like 'Were the Philosophes influential in the outbreak of revolution?' was more likely to be elaborated than the answer to 'The Philosophes were influential in the outbreak of revolution because ... ?'. Taken together, these findings for which types of questions evoke the most expounded answers suggest that 'yes/no' type questions are much less restricting or delimiting than traditionally believed in pedagogic circles.

While answers to Confirmation seeking, 'Reason' and 'Method' questions were most likely to be elaborated, they were also least likely to be positively evaluated. In other words, answers to these questions were most 'at risk'. A correlation between being most often elaborated and (therefore) least positively evaluated suggested itself; however, this correlation did not hold up under analysis. The reasons answers to these questions are 'at risk' are less easily explained.

Teachers interviewed concerning the matter suggested that the demands for answering these kinds of questions were beyond the students' abilities. This explanation ignores the fact that students are often successful in answering these questions in the classroom, and certainly can do so outside of the classroom context. The author has heard twelve-year old remedial students conduct a quite sophisticated analysis of why a long wheel-base is preferable to a short wheel-base in four-wheel drive vehicles. The same students were able to explain with clarity and detail how the braking system on a trail-bike works. Such discussions are likely to entail less 'communicative stress' (Brown and Yule, 1983:34) than those concerning, for example, why movement takes place in the process of osmosis.

Students' inability - if inability it is - may be one in a complex of factors also including the degree of interpretation needed to achieve a shared focus on the question with the teacher, the degree of integrative work required to construct an answer and the greater potential for mis-match with what a teacher expects as the answer

when that answer is discursive rather than a single element. These possibilities are suggestive only, but do point to directions for further research.

One of the reasons answers to some types of questions are more at risk than others may be the difficulty of reaching the criteria for evaluation used by teachers. Through analysis of the nexus of questions, answers and evaluations, it has been possible in this study to infer the criteria teachers use to evaluate answers in spoken classroom discourse. To the author's knowledge this is the first study to articulate the criteria so used. Further studies will be needed to validate or disprove these. However, in this case study, there appeared to be eight criteria students' answers had to meet in order to be positively evaluated. Firstly, the answer had to fall within the **semantic** or **inherent answer potential** established by the meaning features of the question. The student and teacher had to **share** the same **focus** on the question; that is to say, the answer had to reflect the same focus on the question as the teacher intended. Thirdly, the students' answers had to comply with the **sequential agenda** the teacher had in mind. The answer had to be **specific** but also **comprehensive**. The answer had also to be **formulated** in a way acceptable to the teacher, and it had to accord with the facts (**veracity**) as the teacher understood them. Finally, **behavioural protocol** for answering had to be observed.

Knowing the criteria for evaluation provides a way of analysing where an answer attempt breaks down when non-positively evaluated. There were striking differences in types of answer break-down in Science and History. This was part of a wider set of differences between these two subjects, reflecting (i) the ways in which these subjects are linguistically constructed, and (ii) the facticity and authority of Science on the one hand and the interpretativeness of History on the other. The set of differences between History and Science located in this study is discussed below.

### 7.3 Differential Patterns of Meaning in Science and History

History and Science were most differentiated in this case study by the type of Participant sought in Participant seeking questions, the type of process which occurred in teachers' questions and by what teachers did when confronted with an inadequate student answer.

As stated in section 7.2 above, two-thirds of the 354 questions asked by teachers in this study had a

Participant as their point of enquiry. Within Science ninety-one percent of Participant-orientated questions sought 'relational Participants', particularly Identifiers. These questions were instrumental in naming and classifying the entities entering into the taxonomies of living things constructed during the course of the Science lessons. In History, the percent of 'relational Participants' sought was half that of Science. One-third of History teachers' questions asked for what was said. These were important for reconstructing what had taken place.

'Universal' processes reflect a habitual or on-going state of being, an is-ness. 'Instantial' processes reflect a one-off, already has-taken-place occurrence. Ninety-eight percent of Science teachers' questions were of the 'universal' process type while eighty-four percent of the History teachers' questions were of the 'instantial' type. Science talks about what is, as the true state of affairs in the natural, physical world, and History talks about what happened, as one-off events in the past.

Two-thirds of students' answers in this study were positively evaluated. Negative evaluation was rare; more common were strategies which evaluated by implication, particularly replying with a Question Rejoinder or teachers answering their own questions. In this study, the History teachers were more likely than the Science teachers to ask Rejoinder Questions. The Science teachers, on the other hand, were more likely than their History colleagues to answer their own questions. Teachers answered their own questions in two particular environments: they did so following a series of unsuccessful student answer attempts, or provided a further answer following approval of one or more student answers.

Science teachers, when negatively evaluating a student answer, tended to refute by giving counter-information. History teachers' refutations were more a kind of commentary - 'Now, you're a little ahead'.

Knowing the criteria teachers use to evaluate answers in spoken classroom discourse provides a way of discussing where a student's answer breaks down. The difference in the pattern of answer breakdowns in History and Science was striking. Nearly three-quarters of the non-positively evaluated answers in Science did not meet the requirement that they accord with the facts as the teachers understood them. Only slightly more than a third of the non-positively evaluated answers in History failed to reach this criterion. The belief in the facticity of science is reflected repeatedly in the patterning of meaning features taken up in the Science teachers' questions and evaluations.

The patterns in questioning, answering and evaluating reported for Science and History in this study give credence to Christie's (1984:17) claim that ...

a body of knowledge is a way of defining phenomena and of addressing these, or a way of asking questions about experience, and of finding answers to them.

The kinds of phenomena of concern to science and history differ, science being concerned with observing, ordering and explaining the physical universe and history with interpreting the story of people. What phenomena are relevant and what questions can be asked in what ways and what kind of answers can be provided about these phenomena differ in the two fields.

In this study, the differences between History and Science in meaning patterning were fairly clear-cut. Fewer differences between Years 7 and 11 were located using the semantic network as an analytical tool.

#### **7.4 Patterns of Meaning in Years 7 and 11**

The Year 7 teachers in this study were more likely than their Year 11 counterparts to ask questions which sought technical terms or definitions of technical terms. The reasons for this are not clear. On the other hand, the Year 11 teachers were more likely than the Year 7 teachers to ask questions in which the Identified element was a metaphenomenon:

##### Example 7.3:

What was the other problem that went hand in hand with  
this unequal distribution of wealth?

This latter state of affairs may itself be part of a prevalent linguistic phenomenon not sufficiently tapped by a message-level analysis. The Year 11 History teacher in particular, but also the Year 11 Science teacher, tended to use simple clause structures but very complex nominal groups. The above example is typical. The present study could be usefully supplemented by an analysis of nominal groups in the language data. Such an analysis would reveal the degree of nominalisation, and with it, the degree of grammatical metaphor (Halliday, 1985a; 1987) used in teachers' and students' talk. Though no analyses to support the claim are offered here, the author has reason to believe that the Year 11 teachers in this study used a good deal more grammatical metaphor than their Year 7 colleagues.

Few differences on a developmental axis were revealed in the present study. The exploration of possible differences between Years 7 and 11 could be usefully extended (1) through an analysis of nominal groups, as already suggested, and (2) by analysing lesson transcripts in which Teacher X addressed the same general topic in both his/her Year 7 and Year 11 classes. Teachers Y and Z would do likewise. Such a configuration is possible in a large school such as the one in which the author worked. In a database of this kind, over-all differences, if any, could fairly reliably be taken to reflect either (i) a developmental dimension, or (ii) a differential in the way the subject was being constructed in the various classes. Findings of either or both kinds would extend our understanding of language processes in the classroom.

## **7.5 Legitimate Knowledge: Some Tentative Remarks**

Bernstein (1977:85) has defined 'knowledge' as follows:

Formal educational knowledge can be considered to be realised through three message systems: curriculum, pedagogy and evaluation. Curriculum defines what counts as valid knowledge, pedagogy defines what counts as a valid transmission of knowledge, and evaluation defines what counts as a valid realisation of this knowledge on the part of the taught.

These three facets are inter-related. A view of what constitutes valid knowledge influences pedagogic practice. Evaluation also influences pedagogic practice, and in turn, reflects what counts as having knowledge.

Based on the evidence provided by this case study, there appears to be a conflict or tension between the stated aims of the curriculum (see Appendix Three) and its actualisation in classroom practice (pedagogy). I would suggest that our evaluation practices are at the centre of this conflict.

The lessons comprising this case study are realisations of curricula. In the curricula of which they are realisations, the development and use of skills are heavily emphasised. This suggests that 'ways of knowing' (Bernstein, 1977:98) ought be valued. However, in the lessons comprising this case study, 'ways of knowing' receive scant attention. Instead, attention is squarely on 'states of knowledge' (Bernstein, 1977:98).

It could be claimed that this is an artifact of the particular data collected - oral revision lessons, the purposes of which are the check and validation of transmitted knowledge. Taking the argument a step further, however, the fact that such lessons regularly appear on teachers' agenda is itself significant. Oral revision lessons

are typically conducted as a preliminary to a test. As a form of evaluation, tests assess **what** students know, not **how** they know or what they are able to do with the how and what of their knowing.

A teacher, during interview, put it this way: "It's the tyranny of the test that most influences what we do." Thus, teachers who might otherwise wish to adopt an Interpretation mode of teaching (Barnes, 1976) lapse back into a Transmission mode (see page 175).

Barnes, discussing the persistence of Transmission teaching in the face of suggestions that such is not an optimal mode for learners, captures the teachers' dilemma:

Teachers hear conflicting voices urging them to this and that. ... One is the voice that urges the teacher to cover ground, to drill the basics, to prepare for examinations and to concentrate upon surface performance rather than upon the depth of understanding which is encouraged by voluntary involvement in learning. This first voice is the pervasive one, particularly now, when teachers know that their pupils will eventually have to go out into a harsh world of consumer riches and dwindling jobs. It is particularly pervasive because it often issues from the mouths of the pupils and their parents. (Barnes, 1986:81)

Barnes was writing of the British experience, but his comments are no less true for Australia. A recent article in The Sydney Morning Herald (June 12, 1989) published the results of an invitation to nominate the best teachers in the state. These nominations came from students, ex-students, fellow teachers and parents. Of twenty-seven high school teachers nominated, twenty (74%) were cited for the results their students obtained in the Higher School Certificate or other examinations. The general public values good test results, and tests predominantly assess the attainment of states of knowledge.

Thus, that which counts as valid knowledge (curriculum) includes the development and use of skills, but evaluation procedures emphasise the accretion of facts. In the face of this latter phenomenon, question-answer-evaluation routines remain a legitimate form of pedagogic practice, at least for those confronted by the pressures generated both inside (see page 136) and outside the classroom.

## 7.6 Suggestions for Additional Research

The research reported in this volume comprises a case study. Through this case study the value of the semantic network for the analysis of meaning features in classroom discourse is demonstrated. This network could

now be usefully employed in the analysis of a much larger corpus of language data, across any genre of classroom discourse in which question and answer, and optionally, evaluation, sequences figure.

Many of the remarks made in this thesis are put forward as hypotheses. Analyses of a much larger database comprised of various types of lessons, test papers and assignments will be needed to test these hypotheses. Through such analyses the findings of this study will be replicated, extended or found wanting. And through such analyses our understanding of what counts as legitimate knowledge in our schools will advance.

Understanding of the fine-grained nature of some of this knowledge is beginning to be revealed through the linguistic analyses of scientific, historical and spoken texts. Christie's (1988); Eggins, Martin and Wignell's (1987), Hasan's (1987b) and Lemke's (1982) approaches both complement and extend the analysis available through use of the semantic network presented in Chapter Four. Rather than extend this network in delicacy ad infinitum, so making it completely unwieldy, detailed studies of knowledge construction in spoken classroom discourse could employ several modes of analysis.

In these ways, linguistic analyses have begun and can continue to provide legitimate answers to questions of legitimate pedagogic concern.

## References

- Applebee, A.N. and Langer, J. (1983): Instructional scaffolding: reading and writing as natural language activities. Language Arts, 60(2), 168-175.
- Aschner, M.J., Gallagher, J.J., Perry, J., Afsar, S., Jenne, W., and Farr, H. (1965): A System for Classifying Thought Processes in the Context of Classroom Verbal Interaction. Urbana, Illinois: University of Illinois.
- Bailey, M. (1978): The analysis of sequential structures educational data. Unpublished doctoral dissertation, Macquarie University, Sydney, Australia.
- Barnes, B. (1974): Scientific Knowledge and Sociological Theory. London: Routledge and Kegan Paul.
- Barnes, D. (1976): From Communication to Curriculum. Harmondsworth: Penguin Books.
- Barnes, D. (1986): In D. Barnes, J. Britten and M. Torbe. Language, the Learner and the School (3rd ed.). Harmondsworth: Penguin Books.
- Bellack, A., Kliebard, H., Hyman, R., and Smith, F. (1966): The Language of the Classroom. Teachers College, Columbia University, New York: Teachers College Press.
- Bernstein, B. (1977): Class, Codes and Control Vol. 3: Towards a Theory of Educational Transmissions (2nd ed.). London: Routledge and Kegan Paul.
- Bernstein, B. (1986): On pedagogic discourse. In J. Richardson (Ed.). Handbook for Theory and Research in Sociology of Education. Connecticut: Greenwood Press.
- Berry, M. (1975): Introduction to Systemic Linguistics Vol. 1: Structures and Systems. London: Batsford Ltd.
- Bloom, B.S. (Ed.) (1956): Taxonomy of Educational Objectives: Handbook I: Cognitive Domain. New York: Longman, Green.
- Bowers, C.A. (1980): Ideological continuities in technicism, liberalism and education. Teachers College Record, 81(3), 293-321.
- Brown, G. and Yule, G. (1983): Teaching the Spoken Language. (Cambridge Language Teaching Library). Cambridge: Cambridge University Press.
- Christie, F. (1984): Language and Schooling. A paper presented at the International Seminar of the International Federation of the Teaching of English on Language, Schooling, and Society held at Michigan State University.

- Christie, F. (1988): The construction of knowledge in the junior primary school. In L. Gerot, J. Oldenburg, and T. Van Leeuwen (Eds.).
- Clark, C.M., Gage, N.L., Marx R.W., Peterson, P.L., Stayrook, N.G., and Winne. P.H. (1979): A factorial experiment on teacher structuring, soliciting and reacting. Journal of Educational Psychology, 71(4), 534-522.
- Clements, R.D. (1964): Art student-teacher questioning. Studies in Art Education, 6, 14-19.
- Connell, R.W. (1985): Teachers' Work. Sydney: George Allen and Unwin.
- Coulthard, R.M. (1977): An Introduction to Discourse Analysis. London: Longman.
- Delbridge, A. (Ed.) (1985): The Macquarie Dictionary (Revised Edition). Sydney, Australia: Macquarie Library.
- Dillon, J.T. (1982a): Cognitive correspondence between question/statement and response. American Educational Research Journal, 19(4), 540-551.
- Dillon, J.T. (1982b): The effect of questions in education and other enterprises. Journal of Curriculum Studies, 14(2), 127-152.
- Dillon, J.T. (1983): Teaching and the Art of Questioning. Bloomington, Indiana: Phi Delta Kappa Educational Foundation. Fastback 194.
- Edwards, A.D. and Furlong, V.J. (1978): Language and Teaching. London: Heineman.
- Edwards, D. and Mercer, N. (1987): Common Knowledge. London: Methuen.
- Eggins, S., Martin, J.R., and Wignell, P. (1987): Working Papers in Linguistics 5. Department of Linguistics, University of Sydney.
- Firth, J.R. (1935): The technique of semantics. Transactions of the Philological Society, Reprinted in J.R. Firth, Papers in Linguistics 1934-1951. London: Oxford University Press, 1957.
- Firth, J.R. (1950): Personality and language in society. Sociological Review, 42. Reprinted in J.R. Firth, Papers in Linguistics 1934-1951. London: Oxford University Press, 1957.
- French, P. and MacLure, M. (1979): Getting the right answer and getting the answer right. Research in Education, 22, 1-23.
- Gall, M.D. (1970): The use of questions in teaching. Review of Educational Research, 40(5), 701-720.

- Gerot, L.L. (1982): A question of answers in reading comprehension. Unpublished MA(Hons) thesis, Macquarie University, Sydney, Australia.
- Gerot, L.L. (1985): Integrative work: an exploration of what makes reading comprehension test questions easy or difficult to answer. In J.D. Benson and W.S. Greaves (Eds). Systemic Perspectives on Discourse Vol. 2. Selected Applied Papers from the 9th International Systemic Workshop. Norwood, New Jersey: Ablex.
- Gerot, L.L. (1987a): What Counts as Having Knowledge: a Case Study. A paper presented at the 8th World Congress of Applied Linguistics held at the University of Sydney 16-21 August.
- Gerot, L.L. (1987b): Structure and System in Spoken Classroom Discourse. A paper presented at the 14th International Systemic Workshop held at the University of Sydney 24-28 August.
- Gerot, L.L. (Mss): Towards the Generic Structure of Classroom Discourse.
- Gerot, L., Oldenburg, J., and Van Leeuwen, T. (Eds.) (1988): Language and Socialisation: Home and School. Proceedings of the 1986 Working Conference on Language in Education. Macquarie University, Sydney, Australia.
- Guszk, F.J. (1967): Teacher questioning and reading. Reading Teacher, 21, 227-234.
- Halliday, M.A.K. (1961): Categories of the theory of grammar. Word, 17, 241-292.
- Halliday, M.A.K. (1967): Intonation and Grammar in British English. The Hague: Mouton.
- Halliday, M.A.K. (1973): Explorations in the Functions of Language. London: Edward Arnold.
- Halliday, M.A.K. (1974): Discussion. In H. Parrett (Ed.). Discussing Language. The Hague: Mouton.
- Halliday, M.A.K. (1978): Language as Social Semiotic. London: Edward Arnold.
- Halliday, M.A.K. (1979): Modes of meaning and modes of expression: types of grammatical structure and their determination by different semantic functions. In D.J. Allerton, E. Carney and D. Holdcroft (Eds.). Function and Context in Linguistic Analysis. Cambridge: Cambridge University Press.
- Halliday, M.A.K. (1981a): Introduction. In M.A.K. Halliday and J.R. Martin, (Eds.).
- Halliday, M.A.K. (1981b): Options and functions in the English clause. In M.A.K. Halliday and J.R. Martin (Eds.).

- Halliday, M.A.K. (1984): Language as code and language as behaviour. In R.P. Fawcett, M.A.K. Halliday, S. Lamb, and A. Makkai (Eds.). The Semiotics of Culture and Language. London: Frances Pinter.
- Halliday, M.A.K. (1985a): An Introduction to Functional Grammar. London: Edward Arnold.
- Halliday, M.A.K. (1985b): Part A. In Halliday, M.A.K. and Hasan, R. Language, Context and Text: Aspects of Language in a Social-semiotic Perspective. Geelong, Victoria: Deakin University Press.
- Halliday, M.A.K. (1985c): Spoken and Written Language. Geelong, Victoria: Deakin University Press.
- Halliday, M.A.K. (1987): Grammar and discourse. Unpublished course notes. Sydney: Sydney University.
- Halliday, M.A.K. (1988): On the ineffability of grammatical categories. In J.D. Benson, M.J. Cummings and W.S. Greaves (Eds.). Linguistics in a Systemic Perspective. Philadelphia: John Benjamins.
- Halliday, M.A.K. and Hasan, R. (1976): Cohesion in English. London: Longman.
- Halliday, M.A.K. and Hasan, R. (1985): Language, Context and Text: Aspects of Language in a Social-semiotic Perspective. Geelong, Victoria: Deakin University Press.
- Halliday, M.A.K. and Martin, J.R. (Eds.) (1981): Readings in Systemic Linguistics. London: Batsford.
- Hasan, R. (1979): On the notion of text. In J.S. Petofi (Ed.). Text vs Sentence (Papers in Text Linguistics), 20, Parts 1 and 2. Hamburg: Buske Verlag.
- Hasan, R. (1980): What's going on: a dynamic view of context in language. In J.E. Copeland and P.W. Davies (Eds.). The Seventh LACUS Forum. Columbia, South Carolina: Hornbeam Press.
- Hasan, R. (1982): Situation and the Definition of Genre. A revised version of the paper presented for discussion at the Multi-Disciplinary Workshop on the Analysis of a Naturally Occurring Conversation: The MAP. To appear in A.G. Grimshaw (Ed.). Perspectives on Discourse (tentative title). Norwood, New Jersey: Ablex.
- Hasan, R. (1983): A semantic network for the analysis of message function in English. Mimeo.
- Hasan, R. (1985a): Part B. In Halliday, M.A.K. and Hasan, R. Language, Context and Text: Aspects of Language in a Social-semiotic Perspective. Geelong, Victoria: Deakin University Press.
- Hasan, R. (1985b): Linguistics, Language and Verbal Art. Geelong, Victoria: Deakin University Press.

- Hasan, R. (1987a): The grammarian's dream: lexis as most delicate grammar. In M.A.K. Halliday and R.P. Fawcett (Eds.). New Developments in Systemic Linguistics Volume 1: Theory and Description. London: Francis Pinter.
- Hasan, R. (1987b): Reading picture reading. A paper presented at the 13th Australian Reading Association Conference, Sydney, Australia. To be published in the Proceedings by the Australian Reading Association.
- Hasan, R. (1988a): Contextual configuration. Unpublished seminar notes. Macquarie University.
- Hasan, R. (1988b): Language in the processes of socialisation: home and school. In L. Gerot, J. Oldenburg and T. Van Leeuwen (Eds.).
- Hasan, R. (Mss): Offers in the making: a systemic functional approach.
- Henrici, A. (1981): Some notes on the systemic generation of a paradigm of the English clause. In M.A.K. Halliday and J.R. Martin (Eds.).
- Hoetker, J. and Ahlbrand, W. (1969): The persistence of the recitation. American Educational Research Journal, 6, 145-167.
- Huddleston, R. (1984): Introduction to the Grammar of English. Cambridge: Cambridge University Press.
- Hughes, D.C. (1973): An experimental investigation of the effects of pupil responding and teacher reacting on pupil achievement. American Educational Research Journal, 10(1), 21-37.
- Hyman, R.T. (1979): Strategic Questioning. Englewood Cliffs, New Jersey: Prentice-Hall.
- Hymes, D. (1967): Models of the interaction of language and social setting. Journal of Social Issues, 23.
- Hymes, D. (1972): Introduction. In C. Cazden, V. John, and D. Hymes (Eds.). Functions of Language in the Classroom. Columbia, New York: Teachers College Press.
- Kirk, S. and Sider, D. (1989): Top teachers, unsung heroes. The Sydney Morning Herald. (June 12, 1989).
- Krathwohl, D.R., Bloom, B.S. and Masia, B.B. (1964): Taxonomy of Educational Objectives: Handbook II: Affective Domain. London: Longmans, Green.
- Kress, G.R. (Ed.)(1976): Halliday: System and Function in Language. London: Oxford University Press.
- Kress, G.R. (1985): Linguistic Processes in Sociocultural Practice. Geelong, Victoria: Deakin University Press.

- Lamb, W.G. (1976): Ask a higher-level question, get a higher level answer. Science Teacher, 43(4), 22-23.
- Lemke, J.L. (1982): Classroom Communication of Science. Final report to the National Science Foundation (USA). Eric ED 222 346.
- Lemke, J.L. (1985): Using Language in the Classroom. Geelong, Victoria: Deakin University Press.
- Malinowski, B. (1923): The problem of meaning in primitive languages. Supplement I in C.K. Ogden and I.A. Richards, The Meaning of Meaning. London: Kegan Paul.
- Martin, J.R. (1983): Conjunction: the logic of English text. In J.S. Petofi and E. Sozer (Eds.). Micro and Macro Connexity of Texts. (Papers in Text Linguistics, 45). Hamburg: Helmut Buske Verlag.
- Martin, J.R. (1984): Language, register and genre, a reading in the Deakin B.Ed Children Writing course, Course Reader. Geelong, Victoria: Deakin University Press.
- Martin, J.R., Wignell, P., Eggins, S. and Rothery, J. (1988): Secret English: discourse technology in a junior secondary school. In L. Gerot, J. Oldenburg and T. Van Leeuwen (Eds.).
- Mehan, H. (1974): Accomplishing classroom lessons. In A.V. Cicourel, K. Jennings, S. Jennings, K.C. Leiter, R. MacKay, H. Mehan and D. Roth. Language Use and School Performance. New York: Academic Press.
- Mehan, H. (1979): Learning Lessons. Cambridge, Massachusetts: Harvard University Press.
- Mishler, E.G. (1975): Studies in dialogue and discourse II: types of discourse initiated and sustained through questioning. Journal of Psycholinguistic Research, 4(2), 99-121.
- Mishler, E.G. (1978): Studies in dialogue and discourse III: utterance structure and utterance function in interrogative sequences. Journal of Psycholinguistic Research, 7(4), 279-305.
- Monroe, W.S. and Carter, R.W. (1923): The Use of Different Types of Thought Questions in Secondary School and Their Relative Difficulty for Students. Bureau of Educational Research, Bulletin No. 14. Urbana, Illinois: University of Illinois.
- Redfield, D.L. and Rousseau, E.W. (1981): A meta-analysis of experimental research on teacher questioning behaviour. Review of Educational Research, 51(2), 237-245.
- Russell, T.L. (1983): Analyzing arguments in science classroom discourse: can teachers' questions distort scientific authority?. Journal of Research in Science Teaching, 20(1), 27-45.
- Sanders, N. (1966): Classroom Questions, What Kinds?. New York: Harper and Row.

- Schreiber, J.E. (1967): Teachers' question-asking techniques in social studies. Doctoral dissertation, University of Iowa. Ann Arbor, Michigan: University Microfilms, No. 67-9099.
- Sinclair, J. McH. and Coulthard, R.M. (1975): Towards an Analysis of Discourse: The English Used by Teachers and Pupils. London: Oxford University Press.
- Stevens, R. (1912): The Question as a Measure of Efficiency in Instruction: A Critical Study of Classroom Practice. Contributions to Education No. 48. New York: Teachers College, Columbia University.
- Stubbs, M. (1976): Language, Schools and Classrooms (1st ed.). London: Methuen.
- Stubbs, M. (1983): Language, Schools and Classrooms (2nd ed.). London: Methuen.
- Taba, H., Levine, S. and Elzey, F.F. (1964): Thinking in Elementary School Children. USOE Cooperative Research Project No. 1574. San Francisco State College.
- Turner, G.J. (1973): Social class and children's language of control at age five and age seven. In B. Bernstein (Ed.). Class, Codes and Control: Vol. 2. London: Routledge and Kegan Paul.
- Walker, R.F. (1986): Oral language in learning and doing. In F. Christie (Ed.). Language and the Social Construction of Experience. Papers from the 1983 Working Conference on Language in Education. Deakin University.
- Wells, G. and Montgomery, M. (1981): Adult-child interaction at home and at school. In P. French and M. MacLure (Eds.). Adult-Child Conversation. London: Croom Helm.
- Westbury, I. (1973): Conventional classrooms, open classrooms and the technology of teaching. Journal of Curriculum Studies, 5(2), 99-121.
- Winne, P.H. (1979): Experiments relating teachers' use of higher cognitive questions to student achievement. Review of Educational Research, 49(1), 13-50.
- Wittgenstein, L. (1958): Philosophical Investigations. Oxford: Basil Blackwell.
- Zahorik, J.A. (1968): Classroom feedback behaviour of teachers. Journal of Educational Research, 62(4), 147-150.

## Appendix One: Lesson Transcripts

Conventions used in transcription:

1. The data are segmented into messages. A message is that configuration of meanings realised by a clause. The principles for segmenting the data into messages are outlined in Section 4.10, (see Chapter Four, page 107). Each message is numbered. Although they are numbered consecutively some numbers are omitted (e.g. #31 in the first transcript, page 194). These omissions reflect changes of mind during the research process regarding clause boundaries.
2. Material in round brackets ( ) is not analysed, being interpreted as the speaker changing his/her mind regarding what/how to say something.
3. Solid underlining indicates simultaneous utterances. Two (or more) speakers were speaking at the same time.
4. Material in square brackets [ ] provides contextual information.

Tchr: (001) OK, settle down quickly 7W. Adrian.  
(002) Right, now first things first: as you can  
see (003) I've got my little girl with me here  
today; (004) she's not well. (005) This is Alex.

Many: (006) Hi Alex.

Tchr: (007) OK, what we're doing today, we're revising  
Killer Kelly for the test that you're having on  
Monday.

Matt: (008) We did that yesterday.

Tchr: (009) What do you mean, you did it yesterday?

Mike: (010) We were supposed to have the test yesterday.

Tchr: (011) No, we were supposed to revise yesterday.

Matt: (012) (We did uh) we did Evidence 7 yesterday.

Many: (013) With Mrs Barber.

Tchr: (014) Oh good, so you finished that yesterday.  
(015) Alright, what I want to do is ask you some  
specific questions (016) and I want (017) you  
to put your hand up (018) and I'll nominate you  
to answer. (019) Is that clear?

Many: (020) Yes.

Tchr: (021) Cause I don't want (022) you all calling  
out.  
(023) Right, first question: why did James Kelly  
go to James Grady's house? Michael.

Mike: (024) To borrow the rifle (025) to hunt for James  
Fuller.

Tchr: (026) Did he know (027) who he was going to hunt  
for?

Mike: (028) No, (029) he was just trying to look and  
see if any

Jasn: (030) Yes.

Mike: (032) ah yes, (he was) he did;  
(033) he was looking for somebody who had stolen  
his goods.

Adrn: (034) He was looking for Fuller.

Tchr: (035) That's right. (036) Don't call out  
please. (037) He was looking for the person that  
was responsible for stealing his property.

Tchr: (038) Right, what's Grady's house now?

Matt: (039) It's the Country Club, I think.

Adrn: (040) Dural

Tchr: (041) Dural Country Club.  
 (042) Right, you all know (043) where that is?

Matt: (044) Just along Old Northern Road past the top of Galston Road, up near the shops up there.

Adrn: (045) Up near the Y in the road.

Tchr: (046) Right.  
 (047) OK, now, you've already told me (048) what Kelly asked for. (049) What did he ask for, just again?

Kirs: (050) A gun,

Tchr: (051) Right, a gun.

uS: (052) A rifle.

Kirs: (053) to go hunting.

Tchr: (054) Right.  
 (055) OK, now, who went with Kelly on his search? Jason.

Jasn: (056) The little boy.

Tchr: (057) What was his name?

Jasn: (058) Uh, Joseph something.

Many: (059) Handle.

Tchr: (060) Joseph Handle, right.  
 (061) Now, Kelly and Handle went out searching.  
 (062) How far did they travel (063) before they got to the cave?

Gerl: (064) Eight miles.

Tchr: (065) Eight miles, right.  
 (066) Now, what did they see that indicated to them that somebody was there? Penny.

Penn: (067) He saw (the smoke) the smoke signals.

Tchr: (068) Smoke signals, right, (069) that indicated that there must be somebody there.  
 (070) Right, now, where is the cave? Adrian.

Adrn: (071) Uh, (about eight) uh about three hundred metres down that way next door.

Jasn: (072) The next property, down to the left of the school.

Tchr: (073) Alright, what side are we on then?

Adrn: (074) We're on the

Jasn: (075) Left.

Adrn: uh left side. (076) But if (you're on Galston Road) you're looking from Galston Road  
(077) you're on the right hand side.

Tchr: (078) That's right.  
(079) OK, now, how did Fuller react (080) as soon as he saw Kelly?

Gerl: (081) (He thought, um) he reacted (082) and said (083) uh "I'll give myself up" in a surrendering kind of way.

Tchr: (084) Yes, can someone be a little more specific? Melinda.

Meln: (085) He said uh (086) "For God's sake don't shoot me; (087) I give myself up".

Tchr: (088) Right.  
(089) OK, what did Kelly do then? Anthony.

Tony: (090) Shot 'im.

Tchr: (091) Shot him. (092) Where'd he shoot him?

Bjrn: (093) Under the arm.

Many: (094) On the right hand side.

Tchr: (095) OK, that's good.  
(096) Now, he shot him on the right hand side.  
(097) What does that imply?

Adrn: (098) That he's not going to die; (099) he's just wounded.

Tchr: (100) Right.

Matt: (101) He's trying to get even with him.

Adrn: (102) Yeah.

Tchr: (103) Not necessarily that he was shooting to kill.  
(104) Where do you think he would have shot him  
(105) if he was meaning to kill him?

Matt: (106) In the arm (107) to try and wound him.

Fion: (108) In the head.

Tchr: (109) Pardon?

Matt: (110) If he wanted to kill him? (111) In the head.

Tchr: (112) In the head, right. (113) And if he was that close to him (114) it wouldn't have been difficult to have shot him.

Mark: (115) In the chest; (116) try to put it through his heart.

Tchr: (117) That's right.  
(118) OK, now, what did Joseph Handle see in the cave that indicated to him, right, that they had certainly got the right person?

Mich: (119) Um, he saw in the cave the pots that James Kelly had lost.

Tchr: (120) That's right.

Adrn: (121) That he had [had] stolen.

Tchr: (122) That he had [had] stolen. (123) So that's a pretty good indication, isn't it, that they had found the right person responsible for stealing the goods.  
(124) Now, straight after the shooting, where did Kelly go? Helen.  
[no response]  
(125) Renae.

Rene: (126) Best's Inn.

Tchr: (127) No. (128) Rebecca.

Rebc: (129) To the police station.

Tchr: (130) To the police station.

Many: (131) Castle Hill.

Tchr: (132) Castle Hill Police Station.  
(133) Now, what then tells you (134) that Castle Hill is close by?

Mich: (135) Cause the Constable walked (to the um) to where Fuller lay (136) and then he picked him up (137) and carried him to the hospital.

Tchr: (138) Right, now you're getting a little bit ahead.  
(139) Michael.

Mike: (140) He went to the closest one first.

Tchr: (141) He would have gone to the closest police station first, (142) so that's how we know that Castle Hill is not too far away from

Tchr: (142 cont.) Galston.  
 (144) Now, what was the name of the police officer?  
 Michael.

Mike: (145) Constable Moore.

Tchr: (146) Constable Moore, right.  
 (147) Now, what did Constable Moore do  
 (148) after Kelly had told him (149) what he  
 had done? Michael.

Mike: (150) He went to the spot that Kelly described  
 (151) and he assisted Fuller (152) and took him  
 to hospital. (153) Like (he asked) Fuller told him  
 some things (154) and then he took Fuller to the  
 hospital.

Tchr: (155) Right, he took him to hospital.  
 (156) What sort of state was Fuller in (157) when  
 Constable Moore got to him?

Tony: (158) Oh, uh, he wasn't too good (159) and he was  
 bloody.

Adrn: (160) (He was just laying)

Tchr: (161) Adrian.

Adrn: (cont.) he had blood all over him (162) and he  
 seemed to be just wounded (163) and not much wrong  
 with him.

Tchr: (164) Right, did it look (165) as though he was  
 going to die from his wounds?

Many: (166) No.

Tchr: (167) No, right.  
 (168) Now, what did Fuller say to Constable Moore?  
 Michelle.

Mich: (169) He said (170) that the villain hadn't done  
 the trick (171) and that he'd get even with him.

Tchr: (172) Right. (173) What does that tell you about  
 Fuller?

Mike: (174) Oh, he was a mean man (175) and (he always)  
 uh, he wanted to pay back Kelly for what he'd done.

Tchr: (176) Right, he's not a very nice sort of a  
 person is he; (177) he doesn't really feel any  
 regret for what he'd done.  
 (178) Right, now where does Moore take Fuller?  
 Melinda.

Meln: (179) To the hospital.

Tchr: (180) Which hospital?

Matt: (181) Parramatta.

Tchr: (182) Parramatta Hospital, right.  
(183) Now, what happens to Fuller in Parramatta Hospital? Adrian.

Adrn: (184) He dies. (185) No, he speaks to one of the (people) doctors, (186) and uh he tells him (187) he's uh alright.

Jasn: (188) "I'll get even with him".

Adrn: (189) Yeah.

Mike: (190) He told him (191) that he'd robbed um Kelly twice before

Tchr: (192) Uh huh.

Mike: (193) and he'd pay him back.

Adrn: (194) He admitted (195) that he'd robbed him twice before (196) and he'd get even.

Tchr: (197) Right, OK, so that's how Constable Moore had had contact with Fuller before. (198) So he already knows (199) what kind of person he is.  
(200) Now, uh, where did Kelly go -  
(201) we'll switch over a bit -  
(202) after he left Constable Moore? Somebody else, Garlinn.

Garl: (203) To uh Parramatta Police Station.

Tchr: (204) To Parramatta Police Station  
(205) where he gave himself up, right.  
(206) Now, what did Constable Moore think of Kelly? Melinda.

Meln: (207) Um, he's pretty good; (208) he was pretty nice.

Tchr: (209) Yes, he's really got (no) nothing to complain about (210) as far as Kelly goes. (211) Anthony.

Tony: (212) He said (213) that his character was very good (214) and his conduct was moderate.

Tchr: (215) Yes. (216) OK, what does that mean?

Tony: (217) Uh, that he was all right.

Tchr: (218) Right. (219) Now, there's one thing that we didn't talk about. (220) Where had Fuller escaped from?

Meln: (221) A chain gang.

Tchr: (222) A chain gang. (223) What's that?

Meln: (224) Where they're joined up in chains  
 (225) and they have to work.

Tchr: (226) Right,

uS: (227) Hard labour.

Tchr: (cont.) so he's a convict, isn't he, an escaped  
 convict. (228) Now, OK, we know (229) that  
 Fuller died as a result of the wounds that he had  
 received from Kelly. (230) We also know  
 (231) that Kelly didn't necessarily mean to go and  
 kill him. (232) Obviously he meant to shoot him,  
 right?  
 (233) Now, um, before we go on and look at the  
 verdict, (234) let's have a look at the evidence  
 of some of the other people at the trial.  
 (235) Right, the first one was John Tunnicliffe.  
 (236) What did he say?

Mike: (237) He was a surgeon at Parramatta Hospital  
 (238) (and he said um) and then he said um  
 (239) Fuller, (um wanted to rob) wanted to get  
 Kelly back.

Adrn: (240) Wait a minute.

Mike: (241) Uh, he had robbed Kelly twice before  
 (242) and what kind of villain he was.

Tchr: (243) No, I think you're a little ahead of your-  
 self, Michael. (244) Adrian.

Adrn: (245) He said (246) that Fuller had died from the  
 bullet holes in his right side (247) and he said  
 (248) that the bullet holes were the cause of  
 death.

Tchr: (249) Yes, right.

Sara: (250) He was a surgeon; (251) he attended the  
 hospital.

Tchr: (252) He attended the hospital. (253) Alright,  
 let's be a little more specific then.  
 (254) What did he say? Michelle.

Mich: (255) He said (256) (that um Kelly had confessed  
 to him that, I mean) Fuller had confessed to him  
 (257) that he had robbed Kelly twice before

Tchr: (258) [to Michael] You were right.

Mich: (259) and that he would give up (260) but Kelly  
 shot him.

Tchr: (261) Right. (262) Michael was right in what he  
 said before. (263) We said (264) you were wrong.  
 Sorry. (265) OK, good.

Tchr: (266) Alright, what about James Anderson?  
 (267) Who was he? Renae.

Rene: (268) Another doctor.

Tchr: (269) He was a surgeon.

Rene: (270) And he said (271) that Fuller died of two  
 small bullet wounds under his right arm.

Tchr: (272) Right. (273) What else did he say about  
 Fuller's body, the condition of it? Gerald.

Gerl: (274) Uh, very bad.

Tchr: (275) Right, he was putrid, wasn't he?  
 (276) What does putrid mean?

Matt: (277) Smelly.

uS: (278) Heavy.

Tchr: (279) No. [to 'heavy']

Adrn: (280) Disgusting.

Matt: (281) Very smelly.

Tchr: (282) Smelly and filthy dirty, right.  
 (283) OK, Brian McMahon was the next person to  
 give evidence. (284) What did he say? Michael.

Mike: (285) He said (286) that um Fuller had escaped  
 from the chain gang (287) and um, committed  
 frequent robberies (288) and that made him take  
 to the bush.

Tchr: (289) Right.

Adrn: (290) That's what Moore said.

Tchr: (291) Yes, he said the same thing (292) so we've  
 got two people with evidence now that are telling  
 us the same type of thing.  
 (293) What's the point of it?

Mike: (294) Oh, to show you (295) how bad a man Fuller  
 was.

Tchr: (296) Right, to show you the bad character that  
 he was.  
 (297) OK, the last one is Michael O'Brien.  
 (298) Now, he doesn't say anything about Fuller;  
 (299) he just talks about Kelly.  
 (300) What does he say? Gerald.

Gerl: (301) He says (302) that he was sometimes a  
 moderate um, oh um

Tchr: (303) conduct

Gerl: (304) yeah, conduct.

Tchr: (305) What does that mean?

Gerl: (306) He's (good in most ways) uh good mannered.

Tchr: (307) Right.

Adrn: (308) And his attitude.

Tchr: (309) OK, right, now, so far then we have lots of evidence that suggests that Fuller is not really a nice sort of person; (310) he escaped from a chain gang; (311) (he's been) he's robbed twice before. (312) There's a pretty good indication that he was the one responsible for robbing Kelly (313) because items of Kelly's possession were found in the cave. (314) Now, no one has anything good to say about him. (315) Yet people have lots of good things to say about Kelly. (316) OK, he's never been in any trouble before (317) because we'd have known about it at the trial. (318) So, the verdict at the trial was what?

Penn: (319) He was found guilty of murder (320) and he was sentenced to death (321) but (death was, seven years) they changed that to Moreton Bay.

Adrn: (322) (They commuted it to)

Tchr: (323) It was changed.

Adrn: (cont.) it was commuted to seven years in chains at Moreton Bay.

Tchr: (324) Right, sentenced to death,

uS: (325) Hard labour.

Tchr: (326) but the sentence was changed to seven years hard labour. (327) Right, what you've got to have worked out is whether or not you think that was a fair sentence.

Adrn: (328) No.

Tchr: (329) Alright, Adrian, why don't you think that was a fair sentence?

Adrn: (330) Because um they wanted to catch Fuller anyway, (331) and uh I suppose it was Fuller's fault that he got shot, (332) if he is going around stealing things (333) and uh, I don't see (334) why he doesn't get punished for it.

Tchr: (335) OK, but do you think (336) he deserves to die for it?

Many: (337) Yes.

Tchr: (338) Don't call out.

Adrn: (339) He didn't mean him to die. (340) It was just to wound him (341) and sort of give him a warning. (342) So in a way you could call it accidental death.

Tony: (343) Manslaughter.

Tchr: (344) Right, manslaughter. (345) Well then, shouldn't he still be punished?

Gerl: (346) He did kill him.

Tchr: (347) (Indirectly he did) well, not just indirectly; (348) he was responsible for his death, (349) so shouldn't he be punished in some way?

Adrn: (350) Ah yes, I suppose (351) but that's a bit rough.

Tchr: (352) Seven years hard labour?

Adrn: (353) Yeah.

Mich: (354) Maybe he could get just one year or something.

Adrn: (355) No, about three years, (356) but not death; (357) that's stupid.

Tchr: (358) Right. OK, you've given us a pretty good reason. (359) Penny.

Penn: (360) Uh (even, because he was) when Kelly shot Fuller, (361) he didn't mean to get 'im; (362) he meant to wound him (363) and teach him a lesson. (364) Anyway, we're told (365) that Kelly has a good character (366) and Fuller has a bad character (367) and has escaped from a chain gang (368) and has (done) stolen lots of times before (369) and he's a bad man (370) and should be kept in a chain gang (371) and (Fuller, I mean) Kelly only meant to wound him, not shoot him.

Tchr: (372) So what are you saying?

Penn: (373) I'm saying (374) Kelly shouldn't get that much punishment.

Matt: (375) I reckon he should get about (four) four years (376) but not hard labour. (377) I reckon he should get four or five years (378) but not hard labour (379) because uh he didn't mean to do it. (380) Like he meant to wound him (381) but not to kill him.

Tchr: (382) Right. (383) Alright, let's have a show of hands. (384) Who thinks (385) seven years hard labour was too much for the crime that he committed? [hands are raised] (386) Right, that's most of you, isn't it. Right.

Meln: (387) Pardon?

Tchr: (388) The question was, who thinks seven years was too much. (389) Right, OK, I think it probably was too (390) because (everybody) - (391) hands down - everybody has sort of said (392) that Kelly was a good character.

(393) There's something else in the booklet that we looked at too, that tells us something about the witnesses at the trial. (394) What was that called? Michelle.

Mich: (395) The census.

Tchr: (396) The census.  
(397) What's a census? Michelle.

Mich: (398) It's taken every few years of a lot of families of the area

Tchr: (399) Right,

Mich: (cont.) of their religion, and uh where they were born and that sort of thing.

Adrn: (401) On the 21st of June, every five years.

Many: (402) The 30th.

Tchr: (403) It's the 30th.

Adrn: (404) I thought (405) it was the 21st.

Penn: (406) My dad did one the other day at home.  
(407) He did one, (it) two days ago. (408) It asked him about ages and

Tchr: (409) No, not the Federal census, it wasn't.  
(410) It comes out every five years; (411) that's next year, alright.

Tony: (412) Isn't it like a family tree?

Tchr: (413) Not really, no. (414) It's to sort of let the Federal government know what nationality people are, the age group of people living in a certain community, that sort of thing.

(415) That's why we looked at some of the old [census] records.

(416) OK, I think we've just about gone through everything. (417) Is there anything (you're not sure of) that you want cleared up (418) before [we have] this test on Monday?

Matt: (419) Do we need to know about the name of the boy?

Tchr: (420) You need to know Joseph Handle's name, yes.

Gerl: (421) Do you need to know all the evidence names?

Matt: (422) Yeah, like the surgeon's name?

Tchr: (423) Uh you needn't know their names, no.

Adrn: (424) (Do we) will we have to tell you  
(425) where things like uh Grady's Cottage now  
is and Best's Farm and that?

Tchr: (426) You'll have to know the two main roads,  
Galston Road and Old Northern Road.

Adrn: (427) And will we have to tell you  
(428) where they are, (429) sort of like um

Tchr: (430) No, you won't be given that.

Adrn: (cont.) Grady's Cottage is just before?

Tchr: (431) It might be a good idea to know what  
they are now though, (433) like Grady's Cottage  
is now ....?

Many: (434) Dural Country Club.

Tchr: (435) Dural Country Club. (436) Oh, Best's Farm  
we did talk about. (437) That's where Kelly and  
Handle went straight on to the shooting, wasn't it.  
(438) What's Best's Farm now?

Many: (439) Springvale Nursery.

Tchr: (440) Any more questions? (441) No?  
(442) That's it then.

Tchr: (001) Right, quiet please. (002) First of all, how many of you have this book with you today, the French Revolution?

Dave: (003) Me.

Tchr: (004) Right, well look, there's only one copy there (005) so we won't worry about everybody making sure they've got one. (006) What I'm going to do is I'm going to revise this topic. (007) I'm going to try and do it fairly quickly (008) but I'm going to use that small book as the basis of the review (009) mainly because it's the book that we've been through, (010) and it's the book most of you have access to. (011) First of all, (before we) before we start to get involved in the various changes that the French Revolution brought, (012) it's important just to remember again that the French Revolution is remembered because it brought about major changes. (013) The changes were so major in fact that nothing had been seen like it before. (014) And a lot of the political institutions that we have today and most of the countries, for example that belong to the United Nations call themselves democratic (015) and say (016) that they have the Revolution to be thankful for for that. (017) Uh, of course there are other countries that belong to the United Nations that aren't democratic (018) but they would still call themselves democracies (019) and if they do call themselves democracies (020) they (must be able to relate or) must think (021) that they can relate back to some of the principles of the French Revolution. (022) Uh, perhaps that will become clearer (023) as we go on. (024) Uh, but the point here is that most countries in the world today are democratic nation states. [writes] (025) Right, (most modern countries) <<(026) it wouldn't hurt for you to copy this down either>> uh, alright, most modern countries today are democratic nation states. (027) What I was trying to say is that nearly all of the members of the United Nations are nation states (028) and nearly all of them call themselves democratic. (029) The interesting thing is of course that a lot of the communist countries also call themselves democratic. (030) But that's more a matter of interpretation. (031) Right, the French Revolution is important (032) because it gave birth to some of the political ideas that are pursued, are followed in the nation states. (033) So that's (only a brief) only a brief survey then of why the French Revolution is important to us today. (034) What we are most important[ly] looking at of course is the actual nature of the French Revolution, (035) why the French Revolution came about. [writes] (036) The main years of the

Tchr: (cont.) French Revolution that we're concerned with are the years between 1789 and 1799. (037) Remember (038) that what we've seen of the French Revolution is that it was a rather complicated series of events. (039) Remember (040) that the changes that were sort of first were only minor changes. (041) What then happened to the Revolution (042) as it developed?

Rob: (043) It became extreme.

Gina: (044) The Jacobites took over.

Tchr: (045) Well, they were one group that took over. (046) The Jacobites did take over. (047) But what can we say about the nature of the French Revolution from the beginning of 1789 through the next decade? Linda.

Lind: (048) It got out of hand.

Tchr: (049) It got out of hand in what way?

Warw: (050) As they got more (051) they seemed to want more.

Tchr: (052) Right, as they achieved more (053) they wanted to try and achieve yet more still. (054) So the Revolution became more ...? (055) What's the word we've been using? (056) Ex ...?

Elis: (057) Extreme.

Tchr: (058) Extreme. (059) The Revolution became more extreme (060) until a point was reached where there was a reaction to the extremism (061) and the Revolution slowed down (to the point where you'll remember that the work we're looking at now with Napoleon) (062) uh under Napoleon while the Revolution continued, (063) it continued at a much slower pace (064) and took a different direction to what it had been taking. (065) Right, (what was the) what was the probably major cause of the French Revolution (066) if we can say there was a major cause? (067) Maybe we should consider (068) what the major causes were again. (069) Peter.

Pete: (070) Uh, France went broke.

Tchr: (071) Right, so we're talking about ...?

Rob: (072) Financial state.

Tchr: (073) Financial [writing] financial problems. (074) Financial problems of what nature?

Gary: (075) Too many debts to be paid.

Tchr: (076) Right. (077) Why did the French have so many debts to pay?

Warw: (078) From all the wars.

Tchr: (079) Right, they seemed to be continually involved in wars, uh wars against the British, uh financing wars of well uh War of Independence in America for one. (080) David.

Dave: (081) Also, um, later (the finance ministers) a couple of the finance ministers um attempted to fix the loans (082) by getting other loans at higher interest (083) to pay for loans that had to be paid. (084) Thus, it just went on and on.

Tchr: (085) Right, so really they aggravated the financial situation.  
 (086) Right, well, (that's) that's one problem.  
 (087) The other thing, of course, is that many of the peasants lived in what kind of conditions?

Andy: (088) Pretty bad.

Tchr: (089) Right, not all of them (090) and it's also important to remember that uh probably some of the French peasants were better off than some of the peasantry in other European countries. (091) But we're not comparing France with the other countries (092) and the peasantry in France did see (093) that their conditions were poor enough for some kind of political action to be taken.  
 (094) By the 1780's the situation had become quite extreme.  
 (095) Alright, so we've got here financial problems [writing] (096) we've got the state of the peasantry. (097) What can we say about the monarchy?

Gary: (098) It was corrupt.

Rob: (099) Despotic.

Tchr: (100) Right, I think what we're more concerned about is the despotism in France rather than the corruption.

Greg: (101) Uh, uneven, uh supply, uh of money, um, like the wealth wasn't spread evenly; (102) there was only a small minority with all the wealth.

Tchr: (103) Right, so there's this unequal distribution of wealth.  
 (104) What was the other problem that went hand in hand with this unequal distribution of wealth?  
 Robert.

Rob: (105) All the peasants paid the money;  
 (106) nobody, no people of the nobles and that paid any taxes.

Tchr: (107) Right, we're mainly concerned with taxes, aren't we. (108) There was an imbalance in the taxation.  
[History Master knocks and enters the room]

Mast: (109) Sorry to interrupt.

Tchr: (110) You're on tape. [class giggles]

Mast: (111) I need (112) you to get a supply of ...  
(113) Mr R. rang ... (114) Sorry, Miss Gerot.

Gero: (115) You've made a guest appearance on several tapes I've made.

Mast: (116) Have I?

Tchr: (117) You want (118) us to stop it for a moment?  
[Gerot shakes her head 'no']

Mast: (119) Don't worry about the ... (120) I need those photographs <<(121) as soon as you can get them please, at least by the end of the period>>, any colour photographs of Waddell Cottage.  
[Master leaves the room; lesson resumes]

Tchr: (122) Right, what were we saying Robert?  
(123) Talking about taxation. (124) What did we say about taxation?

Rob: (126) That uh all the peasants paid high taxes  
(127) and didn't have much money to spend  
(128) and all the nobles and clergymen weren't made to pay taxes.

Tchr: (129) Right, so there was a taxation burden on those who could least afford to bear it.  
(130) Right, that's another important feature, or another factor. (131) We have [writing] unequal taxation. (132) Now there's another thing that we should consider that was important in fostering a revolutionary spirit amongst the French people  
(133) and it was only possible for this to develop with all of these factors operating in France.  
(134) Why do I always try and think (135) whether it's Paul or Mark? (136) It's Mark, isn't it?  
(137) Mark.

Mark: (138) The um philosophers.

Tchr: (139) Right, the Philosophes. (140) What do we know about the Philosophes?  
(142) What did they do? Darren.

Drrn: (143) They stated different views on things, what the Kings said and so on.

Tchr: (144) Right, (they argued) they questioned various institutions within France, didn't they?

Tchr: (145) Whether or not their continued existence could be justified. (146) That was important. (147) The Philosophes had spread their ideas to where?

Rob: (148) To America.

Tchr: (149) Right, to America. (150) Their ideas had been taken up by who? (151) Do you remember, Colleen?

Coll: (152) Huh uh.

Tchr: (153) You don't? (154) Which group of people had listened to the views of the philosophes?

Many: (155) Bourgeoisie, Jacobites.

Tchr: (156) Outside of France?

Lind: (157) The Americans.

Tchr: (158) Right, the Americans (159) who were seeking their independence from Britain. (160) They had listened to the words of the philosophes (161) and they had taken the philosophes' words and the revolution itself in America (162) and the reasons for the revolution were probably fairly clearly stated through the words of these philosophes or philosophers. (163) Right, their ideas had spread to other countries (164) but we're mostly concerned with the French Revolution. (165) What we're concerned with is the way that the French philosophes or the philosophers were able to bring into question lots of those institutions within France, (166) and in many cases, what did they conclude?

Warw: (167) The only way out is to revolt.

Tchr: (168) Did they?

Dave: (169) They didn't. [spoken with urgent voice]

Tchr: (170) Um, we really didn't consider this question (171) but I think it's worth while to side step here. (172) Mark.

Mark: (173) Um, (they) they said (174) that um the monarchy wasn't running properly (175) and that they'd have to have a constitution.

Tchr: (176) Right, the philosophes basically questioned all these different institutions. (177) They didn't encourage open revolt. (178) What they did was that they made the people think (179) and (it was then) it then became up to the people themselves to decide for themselves (what sorts of action) what sort of action they would take. (180) Now you remember the

Tchr: (cont.) political clubs that we talked about, that formed especially in which city?

Many: (181) Paris.

Tchr: (182) Right, in Paris. (183) Those clubs would have only formed with encouragement from those individuals who had listened to the words of the philosophes and who wanted to come together and question these various institutions. (184) Now (had) had they not been stirred up to question the various uh problems that had arisen in France (185) then maybe there wouldn't have been a Revolution. (186) It seems that all of these factors [glances at board] had to work together (187) to make the Revolution possible. (188) Right, to move along to the Revolution itself: there are other problems (189) and you remember that we talked about them. (190) The King himself, how did he feel about what was happening in France? ... (191) What did the King agree should be called together

Lind: (192) Estates General

Tchr: (cont.) after a long period I suppose in the in the wilderness? (193) What was to be called together?

Many: (194) The Estates General.

Tchr: (195) Right, a meeting of the Estates General (196) to discuss France's problems. (197) The Estates General was made up of who?

Dave: (198) Three Estates.

Tchr: (199) Right, from the Three Estates. (200) What were the Three Estates? Jane.

Jane: (201) Um, (... bourgeoisie ...) I can't think.

Elis: (202) Proletariat.

Tchr: (203) Right, there's the nobility,

Many: (204) Clergy.

Tchr: (205) The clergy, right.

Rob: (206) The peasants.

Tchr: (207) And?

Jane: (208) Third Estate.

Tchr: (209) The Third Estate. (210) The Third Estate remember was the great unwashed. (211) They were the great majority of the population.

Tchr: (212) Now, (what was the point of calling together the Third Estate? Sorry, not together this morning) what was the point of calling together the Estates General? Linda.

Lind: (213) So they could know (214) how everyone felt (215) and know (216) what the problems were (217) to try to make solutions that would help all the classes.

Tchr: (218) Right, the Estates General was originally intended to be like a forum for ideas, for criticisms of the way that the country was being run. (219) Now, the biggest problem was that the Estates General had seen the experience in Britain of the Parliament. (220) It had been brought into existence in the late 1600's (221) and the Estates General thought (222) that they should style themselves on the British Parliament (223) and that they should actually make decisions as well as discuss what the problems were. (224) So one of the problems here is that the Estates General, from the lesson of history and from observing what had happened in England, probably thought that they should be given more power than they had ever previously had. (225) David?

Dave: (226) I think (227) it was a last minute decision to bring them together (228) because before that they said (229) they brought together the Assembly of Notables

Tchr: (230) Right.

Dave: (231) and that failed as well. (232) And it was getting so close (233) and the people were beginning to get really agitated (234) so they brought together the Estates General (235) to try and like ease the tension between the Three Estates.

Tchr: (236) Right, but the important thing here to realise is that even if the Estates General was called spontaneously, once those people had been drawn together, with the experience of some of them from their political clubs, it was natural for a lot of the people who had been called together in the Estates General to think that they should be given more power than had ever previously been given the Estates General. (237) Now keep in mind (238) that it hadn't been called together for 150 years. (239) Uh prior to the 1780's there's no meeting of the Estates General in France anyway, (240) and with the precedent that had been set in the other country, they felt (241) that they should have more power of their own. (242) And you accept that?

Dave: (243) Yup.

Tchr: (244) Right, cause that in fact is what happens, isn't it? (245) What did the Estates General decide to call itself?

Gary: (246) National Assembly.

Tchr: (247) Right, the National Constituent Assembly.  
(248) Remember (249) that the Third Estate had been meeting for some weeks. (250) Remember also (251) that they had been locked out of their meeting room (252) because they had probably shown (253) that they expected too much.  
(254) Remember they met where?

Many: (255) Tennis court.

Tchr: (256) Right, on the tennis court.  
(257) Remember their Tennis Court Oath.  
(258) What did they decide? (259) What did they swear in that Tennis Court Oath? Peter.

Pete: (260) Never to disband (261) until France had a constitution.

Tchr: (262) Right, they weren't to disband (263) until France had a constitution. (264) Now, (the comp) the contradiction here of course is that Louis had no intention of doing anything that would limit his own authority. (265) So when we have the Third Estate declaring itself the National Constituent Assembly and saying that they're not going to disband until they have a constitution (266) and on the other hand we have a King saying that he's going to do nothing that will take away any of this authority (267) what seems inevitable?

Many: (268) War, conflict.

Tchr: (269) Right, conflict seems inevitable.  
(270) Just so [writes 'problems of the Estates General' on the board] we can keep this going.  
[erases earlier writing; writes anew]  
(271) Right, these problems then that existed in France led to the calling together of the Estates General. (272) We have <<(273) you can do this down the page>> the what? (274) What did they call themselves, again?

Gary: (275) National Constituent Assembly.

Tchr: (276) [writing] Right, they called themselves the National Constituent Assembly. (277) They met where?

Mark: (278) Royal Tennis Court.

Tchr: (279) Right, [writing] the Royal Tennis Court Oath, 20th of June, 1789. (280) Right, so if you'd write that down. (281) It was this group that probably

Tchr: (cont.) had the most to do with the actual outbreak of the revolution. (282) Right, remember (283) that Louis had no intention of doing anything that would uh take away his own power. (284) At that same time France was experiencing a rather acute food shortage because of a severe winter and spring. (285) So shortage of food helped to create a situation in France where there was unrest and unrest on probably quite a large scale. (286) I'll just read to you again from this little book (287) what the situation was like. (288) It says (289) that in country areas bands of peasants attacked lonely houses. (290) In Paris unemployed working men surged through the streets (291) to hear radical speakers. (292) They blamed the government for the country's problems. (293) The appearance of soldiers around the capitol hinted that the King was going to use force. (294) He conceded (295) discontent was swelling. (296) On the 11th of July, Louis dismissed his popular minister (297) who supported reform. (298) This dismissal led to riots in Paris. (299) Organised citizens' committees took over the government of the city by force. (300) The citizen army, the National Guard, was set up under the command of the Marquis Lafayette, hero of the American Revolution. (301) On the 14th of July the people of Paris began to look for arms (302) to defend the city against the King's troops. (303) Then a cry went up. (304) What was it?

Lind: (305) To arms.

Tchr: (306) To ....?

Many: (307) The Bastille.

Tchr: (308) The Bastille. (309) And the Bastille was taken. (310) It was the symbol of royalty; (311) it was the symbol of

Gary: (312) Power.

Tchr: (cont.) oppression. (313) And you'll remember (314) that the 14th of July stands as French Independence, French National Day. (315) Right, the Bastille was taken (316) and the other interesting thing is that the National Constituent Assembly then continued with government in France. (317) Now, just a few points there: [writes whilst talking] the National Constituent Assembly, the 20th of June 1789, the Tennis Court Oath, storming of the Bastille, 1789, following food shortages and hints of repression by the King. (318) Right, now, in the years that followed, where did a lot of the direction for the Revolution come from? (319) Which particular group of people?

Mark: (320) Peasants or mobs.

Tchr: (321) The mob within Paris. (322) What does the storming of the Bastille show? (323) It's a fairly clear example of ....?

Jane: (324) Mob power.

Tchr: (325) Right, it's the effect of the mob.  
(326) It's the effect of the mob working together  
(327) to achieve their political ends.  
(328) That's, I think, very important for you to remember.  
(329) Right, now going on with the National Constituent Assembly: probably (one of the most important achievements of that) [stops talking]

Rob: (330) Sorry. [had been talking quietly to friend]

Tchr: (cont.) one of the most important achievements of that National Constituent Assembly you'll remember was that Declaration of the Rights of Man and  
(331) The Declaration of the Rights of Man and Citizen rather clearly stated (332) that all men should be granted equality before the law.  
(333) What other things were promised or foreshadowed in that Declaration of Rights of Man? Mark.

Mark: (334) You were allowed to have your own views.

Tchr: (335) Right, you were allowed to have your own views.

Lind: (336) You're allowed to vote.

Tchr: (337) Right, the right to vote.

Mark: (338) Own property.

Tchr: (339) Right, ownership of property.

Rob: (340) Religion.

Tchr: (341) Right, freedom of religious observance.  
(342) Interesting how in some countries that call themselves democratic that is not observed.  
(343) What else? (344) Freedom of speech;  
(345) freedom of the press; (346) the right of the individual not to be interfered with by other individuals.

Dave: (347) Or be taxed.

Tchr: (348) Right, a fair taxation system.  
(349) Colleen.

Coll: (350) The right to private property.

Tchr: (351) Right, the right to private property.  
(352) I think that one might have been mentioned.

Tchr: (353) Right, there are more,  
(354) but the important thing is in those countries  
today that are truly democratic we find that all of  
these features exist. (355) Remember (356) at  
the start of the lesson I was talking about  
democracy. (357) I was talking about how many  
countries today have a lot to be thankful to the  
French Revolution for. (358) Now, it's a lot of  
these sorts of features that we find in the  
Declaration of the Rights of Man and Citizen that  
we find in most countries. (359) In Australia we  
would find (360) that the rights that all citizens  
have are probably very similar to those rights that  
were expressed in that Declaration 200 years ago.  
(361) The various rights have been redefined over  
the years in the different countries (362) but  
basically they are similar except in those countries  
of course that are represssive, that don't allow  
some of those freedoms. (363) Uh, right, so other  
reforms then followed from 1789 and into 1790.  
(364) Uh, just moving on: one of the other  
important changes that was brought about by the uh  
Assembly involved the clergy. (365) Can you  
remember (366) what that other major change was  
that involved the clergy?

Rob: (367) Subject to common law.

Beln: (368) Yeah.

Tchr: (369) Robert?

Rob: (370) Subject to the common law.

Tchr: (371) Right, they were subject to common law.  
(372) They were subject to the laws of the ....?

Many: (373) Land.

Tchr: (374) State. (375) What do we know about their  
payment?

Dave: (377) Paid by the government.

Tchr: (378) They'd be paid by the government (379) and  
that also involved a major change (380) and it  
brought the Revolution into dispute with who?

Lind: (381) The Pope.

Tchr: (382) Right, dispute with the Pope. (383) Remember  
(384) that (France at this ti, well) France is a  
Catholic country (385) and the Pope himself was not  
pleased with that (386) because it was taking away  
from the Church some of the powers it had long had.  
(387) The Church itself had always been  
conservative. (388) The clergy then were put in  
a dilemma; (389) they had to choose between the  
Church and the Revolution.

Tchr: (390) Now, just back stepping a little:  
it seemed to most people by the autumn of 1789 that  
the French Revolution had run its course;  
(391) the National Assembly was basically in a  
position where it could pass some laws;  
(392) the Monarch had now had his power restricted  
(393) and probably more importantly for the  
majority of the people, feudalism had been abolished.  
(394) And it just was then up to the Assembly to  
try and work out the details of the constitution  
(395) and implement that. (396) But of course we  
know (397) that that was not to be. (398) The  
Revolution became more extreme (399) because there  
were those in France who wanted to take the  
Revolution even further, who wanted to see  
established in France a republic. (400) Now, the  
establishment of a republic would mean the removal  
of who?

Many: (401) The King.

Tchr: (402) The King, right. (403) Uh, France would  
then have an independence of involvement with other  
European countries that were still monarchies.  
(404) So that would have actually set France apart  
from other countries. (405) The movement for a  
republic was supported most strongly by which  
group?

Many: (406) Girondists, Jacobins.

Tchr: (407) Right, well, there were two groups.

Beln: (408) The Girondists.

Tchr: (409) Right, the Girondists were in favour of a  
republic (410) but much more extreme in their  
support for a republic were the ....?

Many: (411) Jacobins.

Tchr: (412) The Jacobites. (And keep in mind that they  
are two ... Sorry, I've jumped ahead a bit too far  
there.) (413) Constitutional  
changes were foreshadowed [writing] in the  
Declaration of the Rights of Man and Citizen.  
(414) We just keep coming across here.  
(415) You're probably going down (416) so I'll  
start to go down the board. (417) Right, so France  
[again writing] was left in a situation would  
France become a constitutional monarch or a republic.  
(418) Right, the republican idea [writes] was  
supported by the Girondists and the Jacobins.  
(419) Which group of course became predominant?

Many: (420) The Jacobites.

Tchr: (421) The Jacobites. (422) Why did the Jacobites  
become predominant? Ken.

Ken: (423) Because they were more extreme.

Jane: (424) They got rid of the opposition.

Tchr: (425) Right, how did they manage to get rid of the opposition?

Elis: (426) They had the mob support.

Tchr: (427) Right, they had the support of the Paris mobs  
(428) who were very powerful, were very influential,  
(429) which is most unfortunate really.  
(430) Remember (431) that we said (432) that  
the Jacobins were the most powerful of the clubs,  
[bells rings, denoting end of lesson period]  
(433) and the leaders of the Jacobins were very  
capable of whipping up the support of the mobs.

(434) Now, we've been cut short. (435) Remember  
(436) that the test is going to be next Wednesday  
(437) so we can just continue with this revision  
on Monday (438) and I hope (439) I can finish  
this off fairly quickly. (440) Now, how many of  
you find (441) that this is sort of bringing it  
all back together?

Many: (442) Yeah.

Tchr: (443) I hope (444) that's what it's achieving  
(445) because I think you, like me, were tending  
to feel (446) that things were dragging out a  
little (447) and that we were sort of losing  
our perspective (448) and I think (449) that  
this might pull things back together again.

Tchr: (001) Righto Year 7, that'll do. (002) Remember (003) on Monday you have a test, (004) and we'll use the information that we go through now for that test. (005) This is an exercise as well in finding out what you know, not what you can read from a book (006) so I suggest (007) you don't have your workbook open (008) as it's not going to be a very valid test of your knowledge. (009) Alright, yesterday I gave you a topic summary that I asked you to have a look at. (010) It covered the main points that you need to know. (011) As I said (012) I'd prefer (013) that you didn't look at your books please. (014) Alright, just put your hand up (015) and answer in the normal way. (016) And we'll go through some of those points from the sections that we've done. (017) Alright, one of the first things that we had a look at was the differences between things that are living and non-living. (018) What are some of the characteristics or features of living things?

Gavn: (019) Something that breathes air.

Tchr: (020) Alright, living things sometimes breathe air. (021) Chris, what else?

Chrs: (022) Grow.

Tchr: (023) Alright, living things must grow (024) if they are alive. (025) Chris.

Chrs: (026) They respond to stimulus.

Tchr: (027) Alright, by respond to stimulus <<(028) can someone explain>> what that means? Luisa.

Luis: (029) Um, you respond to light and uh things like that.

Tchr: (030) Right, light's one of the stimuli that things may respond to. (031) What are some others? Shannon.

Shan: (032) Touch.

Tchr: (033) Right, they can respond to feel. (034) Deanna.

Dena: (035) Heat.

Tchr: (036) Heat's another one. (037) Morgan.

Morg: (038) Um (they have) they have to be able to reproduce.

Tchr: (039) Alright, that's another feature, being able to reproduce. (040) So, so far we've got responding

Tchr: (cont.) to stimulus; (041) we've got growing;  
(042) we've got reproducing. (043) Phil.

Phil: (044) Uh, water.

Tchr: (045) Can you expand that a little bit?  
(046) What's water got to do with it?

Phil: (047) They use that for food and to drink.

Tchr: (049) Alright, think about what the question is.  
(050) Water is necessary to living things in some  
respects (051) but you have to think about non-  
living things <<(052) [which] can respond to water in  
different ways>> as well, right? (053) Rocks can  
break down (054) if water runs over them. (055) That  
doesn't mean that they're alive. (056) Alright, so  
there are set things that we looked at.

Darl: (057) And they eat.

Tchr: (058) Right.  
(059) Rather than eat, what's another way we can  
describe that? Krista.

Kris: (060) Consume food.

Tchr: (061) Alright, consume is the word.

Alna: (062) They respond to what sort of material or  
substance they're planted in.

Tchr: (063) Alright if (a plant) something that's  
planted. (064) There's a word that we used to  
describe taking in and using food.

Kris: (065) Take [trails away] oh,

Tchr: (066) That was it. (067) Can anyone remember  
(068) what it is? Chris.

Chrs: (069) Assimulate.

Tchr: (070) Assimilate's the word, that's right.  
(071) Assimilate is the taking in and using of  
nutrients. (072) Remember (073) we can't say  
(074) that plants actually eat (075) so  
assimilate is a better word for that.  
(076) Alright, so we've covered the main points  
about what animals or plants need to be alive.  
(077) Alright, with that criteria you could tell  
(078) if something was dead or alive.

(079) Alright, living things are made up of little  
building blocks. (080) Those little building  
blocks are?

Luis: (081) Cells.

Tchr: (082) Right. (083) We looked at cells under the microscope (084) and we saw some of the features. (085) Alright, what sort of things are cells made of?

Audr: (086) Citroplasm.

Tchr: (087) Righto, citroplasm's close. (088) Luisa, you know (089) what the right term for that is? Yeah?

Heln: (090) Cytoplasm.

Tchr: (091) Cytoplasm. (092) That's a hard word (093) but it refers to part of the cell. (094) Which bit's called the cytoplasm? Krista.

Kris: (095) The stuff in the middle of it.

Tchr: (096) Right, it's stuff. (097) It's sort of a jelly-like material (098) and it makes up the body part of the internal bit of the cell. (099) What sorts of things happen in cytoplasm, (100) or why is it there? Morgan.

Morg: (101) It's got nucleus in it.

Gavn: (102) And it's there (103) cause it's all in the body (104) and (it makes) it's the blood that goes through.

Tchr: (105) Well, it's not actually blood as such (106) because cells make up blood. (107) But it does hold the nucleus. (108) That's one thing it does. (109) It's actually where the reactions take place, where processes in the cell go on. (110) Alright, so Morgan's mentioned the nucleus. (111) What does the nucleus actually do? Righto Morgan.

Morg: (112) Um (the brain) it's the brain of the cell,

Tchr: (113) Alright.

Morg: (114) and tells it (115) what to do.

Tchr: (116) It doesn't actually act as well as a human brain (117) but it does direct what goes on in the cell. (118) So we've got the nucleus; (119) we've got the fluid or substance that it's in. (120) What else does a cell need? (121) Helen, you might just know. (122) What else must cells have?

[no response from Helen]

Chrs: (123) A membrane to hold it in.

Tchr: (124) Right, a cell membrane that holds things in.

Tchr: (125) Right, that covers the three main things that all cells have got. (126) Now, plant cells are slightly different. (127) What have they got?  
Audra.

Audr: (128) A cell wall.

Tchr: (129) They have a cell wall, right.  
(130) Can anyone remember (131) why plants need cell walls on their cells? Helen.

Heln: (132) Save them from getting hurt.

Tchr: (133) Save it from being hurt. (134) Protection might be a better way of saying that.  
(135) What else? Gavin.

Gavn: (136) Keeps the moisture in.

Tchr: (137) Right, holds the moisture in.  
(138) Think about this: (139) plants and animals are very different in one way (140) and that's their internal support structure.  
(141) Right, think about the nature of animals  
(142) and they have bones; (143) plants don't.  
(144) So what do you think the cell wall might do there?

Morg: (145) Give it added strength, like hold it together.

Tchr: (146) Right, since there isn't any internal sort of structure to hold plants up (147) they have to have a stronger cell wall. (148) And that's what keeps the plant together. (149) So the main difference between cells of plants and animals is the cell wall. (150) There was one other thing that plants quite often have in their cells that animals didn't.  
(151) James.

Jame: (152) Vacuoles.

Tchr: (153) Vacuoles, that's right. (154) What do they do?

Jame: (155) They're just empty.

Tchr: (156) Right, they're just empty spaces.  
(157) They really don't know (158) what they do, right? (159) They think (160) water and air get transmitted through there. (161) So that's an important difference. (162) If you were to see two slides (163) you could tell the difference between plant and animal cells. (164) Alright, they're the basic structures of the cell. (165) What sorts of different cells can you have in animal bodies?  
(166) Alright, just some examples? Krista.

Kris: (167) Uh tissue cells and blood cells,

Tchr: (168) Alright,

Kris: (167 cont.) and brain cells.

Tchr: (168 cont.) all the different cells or the tissues of the body have different structures or different shapes, alright? (169) They adapt to different things. (170) Can anybody remember something that is special about blood cells? (171) We did have a look at some.

Jame: (172) There are two: white ones and red.

Tchr: (173) Right, two different sorts, white and red.  
(174) Morgan.

Morg: (175) Well, um white are usually used as anti-bodies; (176) they get the germs.

Tchr: (177) Right, white cells are anti-bodies.  
(178) What do the red ones do then?

Morg: (179) They uh carry the oxygen around through the body.

Tchr: (180) Right, that's one of the main functions of blood. (181) Alright, one of the things to remember about those red cells [that] is different to anything else is they don't have a nucleus. (182) Because they just travel along the stream of fluid (183) they don't need a nucleus; (184) they don't do anything (185) other than hold oxygen. (186) So that's one thing to remember that's special about those blood cells. (187) Alright, they're the basic building blocks. (188) We know (189) that they form different tissues (190) and those different tissues can form those different organisms. (191) Alright, we then looked at how we classify things. (192) Ainslie, put it down. (193) Alright, what is one of the reasons for classifying things into different groups? Helen.

Heln: (194) To know (what they) what type of animal they are.

Tchr: (196) Alright, if we're talking about animals (197) we can group them into different types. (198) Why might you want to classify them into different groups? Morgan.

Morg: (199) Like say you're eating a fish; (200) it was an invertebrate (201) which it wouldn't be; (202) you could just sort of bite into it (203) without worrying about bones or anything.

Tchr: (204) Alright, that's a bit unusual.  
(205) A little more technically orientated than that? Theresa.

Ther: (206) To find out their differences.

Tchr: (207) Alright, we can find out some different features. (208) Phil, what else?

Phil: (209) You can find out um ...

Tchr: (210) Chris.

Chrs: (211) If there's any relation between where they live.

Tchr: (212) Alright, we can look at relationships between the organism and where they live. (213) But the actual act of classifying is simply so that we can get an order and a grouping of organisms (214) so that you can find out and list some features, (215) and also be able to just catalogue information on them.  
(216) Alright, we had a very intense look at some animal classification. (217) What are the two basic groups that we classify animals into? Krista.

Kris: (218) Fish and amphibians.

Tchr: (219) No, before we get to that sort of classification. (220) The big broad ones?

Gina: (221) Vertebrates and invertebrates.

Tchr: (222) Right, vertebrates and invertebrates.  
(223) Briefly, Trenton, what is an invertebrate animal?

Tren: (224) Uh, an animal that has no bones.  
[class laughs]

Tchr: (225) Not exactly. (226) Luisa.

Luis: (227) An animal without a backbone.

Tchr: (228) Right, an animal with no backbone.

Tren: (229) That's what I meant to say.

Tchr: (230) Phil.

Phil: (231) And a vertebrate is one that does have a backbone.

Tchr: (232) Alright, one that has a backbone.  
(233) One of the things that is a little bit different that we didn't go into much detail on that some had in their projects

Phil: (234) The shark; (235) they have um cartilage or something.

Tchr: (236) That's right, cartilage is a tough tissue

Tchr: rather than bone (237) and fishes <<(238) even though they're grouped in that vertebrate group>> don't actually have true bones. (239) Alright, so that's a little bit different (240) that you may not have come across (241) unless you did a shark for your exercise.

Gavn: (242) Yeah, cause when you bite into like a fish, (243) (it's not really) you can't sort of go [mimes crunching action]; (244) when you eat it (245) you don't just hurt your teeth, (246) They go right through the bones.

Tchr: (247) Well, it depends on how big the fish is, I'd imagine. (248) Right, OK, so we've got our two basic groups of animals, vertebrates and invertebrates. (249) Which is the largest class? James.

Jame: (250) Invertebrates.

Tchr: (251) The invertebrates. (252) Of the invertebrates <<(253) can anybody remember>> which ones probably are the most numerous of all? Chris.

Chrs: (254) The arthropods (or anthropods, whatever it is.)

Tchr: (255) The arthropods, that's right.  
(256) Which are what?

Phil: (257) Uh, all animals that have a skeleton sort of formed.

Tchr: (258) Right, where's the skeleton though?

Phil: (259) On (the uh) their back, like a snail and a spider or a crab.

Tchr: (260) Alright, the term we use for that is an outside or exoskeleton, alright? (261) So arthropods are things with exoskeletons. (262) They also have jointed legs (263) (so they are things) some examples of arthropods would be what? Gavin.

Gavn: (264) Crustaceans.

Tchr: (265) Crustaceans. (266) Some examples of crustaceans? (267) We're getting very technical here.

Tren: (268) Snail.

Tchr: (269) No.

Adam: (270) Um, lobster.

Tchr: (271) Lobsters, alright, (272) that's a crustacean example. (273) What's another type of exoskeleton

Tchr: (273 cont.) animal or arthropod?

Gavn: (274) Prawn.

Tchr: (275) Alright, that's another crustacean.  
(276) James.

Jame: (277) Spider.

Tchr: (278) Spider's another group.  
(279) And?

Luis: (280) Uh, oh you have, uh no.

Tchr: (281) Alright, there's a really big group that we  
haven't mentioned yet (282) and a lot of people  
think (283) spiders belong to that group.  
(284) Gavin.

Gavn: (285) Arachnids.

Tchr: (286) That's what a spider is.  
(287) So one big group of insects we've missed out  
on, alright? (288) Therefore we can see (289) that  
even though they don't have an internal skeleton  
(290) they have some means of support. (291) And  
remember (292) that those invertebrates tend to be  
much, much smaller (293) because they can't support  
a large body weight without that internal skeleton.  
(294) Alright, there's big groups of invertebrates.  
(295) We looked in much more detail at the  
vertebrate animals, right? (296) And the five  
classes of vertebrates? (297) Ainslie, what are  
those five groups of vertebrate animals, any order?

[no response from Ainslie] (298) Anyone? Helen.

Heln: (299) Birds, fish, um ...

Tchr: (300) Righto, birds and fish we've got.  
(301) Luisa.

Luis: (302) Amphibians.

Tchr: (303) Amphibians. (304) Trenton.

Tren: (305) Reptiles.

Tchr: (306) Reptiles. (307) And Chris.

Chrs: (308) Mammals.

Tchr: (309) Right, they're our five groups.  
(310) Of those, the simplest is which one?

Kyli: (311) Mammals.

Tchr: (312) The simplest, Krista?

Kris: (313) Fish.

Tchr: (314) Fish are the simplest. (315) We then think about some of the features of fish.  
(316) Alright, what do you have to be or have to be a fish?

Nicl: (317) (Slimy, er) scaly sort of skin.

Tchr: (318) Scaly skin.

Gavn: (319) To be able to breathe under water.

Tchr: (320) Alright, to be able to breathe under water.  
(321) What do they use (322) to breathe under water? Alana.

Alna: (323) Gills.

Tchr: (324) Gills. (325) They take oxygen out of the water with gills.  
(326) So they've got scales; (327) they've got gills. (328) What else do fish generally have?

Phil: (329) Fins.

Tchr: (330) Fins for movement, alright.  
(331) And there's one feature lots of people left off of their assignments.

Chrs: (332) Streamlined body.

Tchr: (333) Alright, that's another part about its body.

Matt: (334) Cold-blooded.

Tchr: (335) Cold-blooded, alright.  
(336) Being cold-blooded means what problems do the animals actually have? Shannon.

Shan: (337) Well, when they change (their) to another place in their natural environment, (338) (their temp) their body temperature changes.

Tchr: (339) Alright, they actually respond to the environment around them (340) so for example if you've got tropical fish (341) and the heater goes off (342) that can very seriously affect them. (343) Our next group after fish is?

Many: (344) Amphibians.

Tchr: (345) Amphibians. (346) Right, some features of amphibians?

Phil: (347) They can live in water and on land.

Tchr: (348) Alright, they live in water and on land.  
(349) There's a feature that comes in

Tchr: (350) before we talk about that though.

Jame: (351) They breathe with lungs.

Tchr: (352) Alright, not all the time though.  
 (353) Right, there's one feature of amphibians  
 (354) and that's ...?

Jame: (355) Uh, one stage of their life they live in water.

Tchr: (356) Right. (357) Which stage of their life do they actually live in water? Theresa.

Ther: (358) First half.

Tchr: (359) Right, the first half. (360) Anybody remember (361) that word we used for that change that they go through?

Chrs: (362) Metamorphosis!

Tchr: (363) Very good; right, they go through a change or a metamorphosis. (364) They live in water for the first part of their lives. (365) When they're water dwellers (366) how are they going to breathe?

Jame: (367) Gills.

Tchr: (368) Right, they actually have gills.  
 (369) They then change (370) or go through that metamorphosis (371) and in the adult form they live on land (372) and breathe by ...?

Dena: (373) Lungs.

Tchr: (374) Lungs, alright. (375) So we've got a change. (376) That's one of the main features to tell whether something's an amphibian or not, in the vertebrate group. (377) Now, what's another physical feature, other than that?  
 (378) Alright, they go through a change.

Adam: (379) Have slimy skin.

Tchr: (380) Slimy skin, right.  
 (381) Those of you that did frogs for your exercise, how do frogs drink? Morgan.

Morg: (382) Through their skin.

Tchr: (383) Right, they don't drink like normal animals.  
 (384) They actually absorb water through their skin  
 (385) so they must be in wet places. (386) Phil.

Phil: (387) And um they have real, real long tongues  
 (388) attached in the front of their mouths.

Tchr: (389) Right, their tongues are actually attached

Tchr: to the front of their mouths (390) so they can flick it out (391) and that's how they eat.

Chrs: (392) Don't they sometimes have the remains of a tail?

Tchr: (393) Alright, occasionally you'll see the remains of a tail (394) uh depending on whether they're a frog or a toad; (395) there are little individual differences there. (396) OK, so they've got a slimy skin. (397) We didn't talk about our fish's reproduction. (398) How do frogs and other amphibians reproduce?

Crag: (399) Laying eggs.

Tchr: (400) Right, they lay eggs; (401) so do fish.  
(402) What's a feature of amphibian eggs?

Adam: (403) They lay externally.

Tchr: (404) Right, they have their eggs hatch externally.  
(405) What else?

Phil: (406) Fertilised externally.

Tchr: (407) Right, they're fertilised externally.  
(408) That means that the males and females don't actually mate. (409) The eggs are fertilised  
(410) after they leave the body.

Heln: (411) And they're in jelly like.

Tchr: (412) Right, they're in jelly. (413) They don't have a hard shell. (414) All that goes towards needing water, right? (415) So that's something to remember about amphibians; (416) they need water for reproduction. (417) Alright, and what sort of blood-systems do they have?

Kris: (418) Cold-blooded.

Tchr: (419) Right, again cold-blooded; (420) so they need to live in fairly warm places. (421) You don't often find amphibians in extremes of cold.  
(422) Audra.

Audr: (423) They don't look after their young.

Tchr: (424) Right, that's another feature we didn't bring up about our fish. (425) Amphibians as well as fish don't look after their young.  
(426) OK, we move on to our next group.  
(427) The next most advanced lot?

Luis: (428) Mammals.

Tchr: (429) No. (430) Theresa.

Ther: (431) Reptiles.  
 Tchr: (432) Reptiles are next. (433) Alright, if you  
 can think about what features they've got  
 (434) we're slowly advancing. (435) Alright,  
 some features of reptiles?  
 Kris: (436) Their body temperature varies.  
 Tchr: (437) That means another term where we've got  
 cold-blooded, that's good. (438) Gavin.  
 Gavn: (439) A hard, scaly skin.  
 Tchr: (440) Right, they've got a hard, scaly skin this  
 time (441) which indicates perhaps that they can  
 live away from water. (442) What else?  
 Audr: (443) Lay eggs.  
 Tchr: (444) Another egg-laying lot. (445) Alright, what  
 are their eggs like though?  
 Phil: (446) Soft-shell.  
 Tchr: (447) Yes, a lot of the time they are soft-shell  
 (448) but they don't actually occur in jelly.  
 (449) What else? Morgan.  
 Morg: (450) There are some that lay hard shells.  
 Tchr: (451) Right, occasionally you do get hard shell  
 eggs.  
 Phil: (452) The alligator.  
 Tchr: (453) Right, an alligator is an example.  
 (454) Things that have soft-shelled eggs  
 <<(455) probably you've all seen things on tele  
 about turtles laying eggs>> they tend to be  
 leathery on the outside. (456) Right, some other  
 features of reptiles?  
 Heln: (457) They mainly live in arid parts of the world.  
 Tchr: (458) Right. (459) When we talk about arid  
 (460) what does that actually mean?  
 Morg: (461) Local.  
 Tchr: (462) Chris.  
 Chrs: (463) Desert types.  
 Tchr: (464) Right, hot deserty type places.  
 (465) So we can already see (466) that they don't  
 need to be near water.  
 Gavn: (467) (Would they have to) so they'd have to go

Gavn: (cont.) to a waterhole (468) and then sort of come back (469) if they lived in the desert?

Tchr: (470) Alright, (they) a lot of them derive their water just from the plants and roots and things that are around (471) or when you burrow down into the soil (472) sometimes they get enough moisture to live. (473) But they do adapt to desert situations far better.

JimH: (474) Uh, when they lay their eggs, (475) they bury them in the ground, usually.

Tchr: (476) Alright, can anybody suggest (477) why you often find nests buried in those situations? Alana.

Alna: (478) Things try to eat them.

Tchr: (479) Right, a method of protection.  
(480) What else? Phil.

Phil: (481) Uh, keep them cool.

Tchr: (482) Right, keeps them cool. (483) OK, they're some adaptations that animals go through living in the desert. (484) Alright, again cold-blooded (485) so that's quite often why you see active uh lizards and snakes in warmer times rather than cold. (486) Alright, our next group along?

Audr: (487) Birds.

Tchr: (488) Birds. (489) Some features of birds? Helen.

Heln: (490) Feathers.

Tchr: (491) Right, most birds will have feathers on their bodies.

Matt: (492) A beak.

Tchr: (493) They will have a beak of some description.  
(494) Gavin.

Gavn: (495) They've got three toes.

Tchr: (496) Alright, they often have three toes.

Adam: (497) They care for their young.

Tchr: (498) Right, that's a bit more serious; (499) we get to that sort of thing, (500) they care for their young.  
(501) Could you possibly sit on those chairs properly? [to Gavin and Jim H.] (502) Put the desk down.  
(503) Right, they start to care for their young.  
(504) Chris.

Chrs: (505) A bit of their claws are called talons  
 (506) and they have a scaly skin on them  
 (507) so, a scaly skin.

Tchr: (508) Right, a scaly skin is most important  
 (509) because not always do they have talons.

Chrs: (510) They think (511) they're related to  
 reptiles.

Tchr: (512) They think (513) they may have evolved from  
 reptiles because of that.  
 (514) Right, another feature?

Adam: (515) They lay eggs.

Tchr: (516) Right. (517) What sort of eggs do most  
 birds lay?

Audr: (518) Hard shell.

Tchr: (519) Hard shell. (520) Matthew.

Matt: (521) Warm-blooded.

Tchr: (522) Right, big difference; (523) we've hit  
 warm-blooded. (524) Warm-blooded means what  
 exactly? Morgan.

Morg: (525) They can live in cold climates  
 (526) without dieing (527) cause they don't  
 [remainder drowned out by teacher]

Tchr: (528) It allows them to adapt to different  
 climates. (529) What does it physically mean to  
 be warm-blooded though? Deanna.

Dena: (530) Their temperature stays the same.

Tchr: (531) Right, you have constant body temperature  
 regardless of the outside environment.  
 (532) Alright, any other features?

Phil: (533) They have wings.

Tchr: (534) Alright, they quite often have wings;  
 (535) it's not a necessity (536) and there are  
 some don't have developed wings.

Luis: (537) When they feed their young (538) they sort  
 of cough up.

Tchr: (539) Righto, the word you're looking for is  
 regurgitate. (540) Quite often they bring up semi-  
 digested food, that's right. (541) Something else?

Dena: (542) They were all able to fly someday, like the  
 penguin.

Tchr: (543) That's right, they all

umS: (544) Cassowary.

Tchr: (cont.) <<(545) they think>> were once capable of flight (546) but they don't have to be able to.

Phil: (547) Little babies don't have proper feathers.

Tchr: (548) Alright, they are immature young;  
(549) they have to develop.

Audr: (550) And they're born with their eyes closed.

Tchr: (551) Alright, these are all things that necessarily don't make them birds as such as apart from other things. (552) There's one thing about their reproduction that's different from the first three groups that we haven't mentioned.

Heln: (553) It's internal.

Tchr: (554) Right, fertilisation is internal. (555) That means that the males and the females actually mate (556) and the fertilisation goes on inside the body. (557) One last point?

Matt: (558) Um, they've only got two legs.

Tchr: (559) Alright. (560) When an animal only has two legs (561) what do we call that?

Morg: (562) A bipod.

Tchr: (563) Biped actually; (564) so they are biped, that's right. (565) OK, our last and most important group, James, is what?

Jame: (566) Mammals.

Tchr: (567) Right. (568) We can divide mammals into three groups. (569) Melissa.

Lisa: (570) Monotremes, marsupials and placentals.

Tchr: (571) Right, they're our three groups, monotremes, marsupials and placentals. (572) Monotremes are which sort?

Morg: (573) Platypus and echidna (574) and they lay eggs (575) and they um care for them.

Tchr: (576) Alright, we'll just stop there.  
(577) Alright, their main point is that they lay eggs (578) as well as the other main feature that all mammals have?

Adam: (579) They have fur.

Tchr: (580) No.

Gavn: (581) They suckle their young.

Tchr: (582) Right, suckling. (583) That means they feed them with milk (584) so that they lay eggs (585) and they feed milk. (586) They're the monotremes, (587) and we saw in that film both the echidna and the platypus. (588) Right, marsupials are the next group. (589) Their unique feature? Krista.

Kris: (590) They have a pouch.

Tchr: (591) Alright, they have a pouch. (592) We saw the kangaroo being born (593) What sort of state is it in (594) when it's actually born? Chris.

Chrs: (595) Not very well developed; (596) it's very immature.

Tchr: (597) Right, it's very immature. (598) It crawls up

Phil: (599) Its eyes are closed (600) and it crawls up (601) so it can get some milk.

Tchr: (602) Right, crawls up (603) and attaches itself in the kangaroo's pouch. (604) Alright, it then goes through development inside there. (605) Simone.

Simn: (606) They're covered with fur or hair.

Tchr: (607) Alright, all mammals have that feature (608) so that's not totally unique to marsupials.

Luis: (609) They're warm-blooded.

Tchr: (610) Right, all mammals are warm-blooded, that's correct. (611) Alright, our last group of placentals: (what do you have to, or) what's the feature to make you a placental animal? Gavin.

Gavn: (612) You got to live in water.

Tchr: (613) No!

Morg: (614) You got a cord that goes into your stomach.

Gavn: (615) Yeah, from the mother to you (616) and you float around.

Tchr: (617) Right, that's the placenta (618) and they're attached to the womb inside the mother.

uS: (619) Umbilical cord.

Phil: (620) Do you have hair (621) if you're a placental?

Tchr: (622) Most, the main features of mammals go with all the groups, right? (623) They have fur or hair generally, if not all over, on some part of them. (624) They feed milk, right? (625) So those other things are just slight groupings within our mammal class, either the egg laying, or pouched, or having the placenta. (626) OK, so that's another division, (627) but they all have those basic features. (628) Something else? [directed at Helen who is showing something in her pencil case to her friend]

Heln: (629) No.

Tchr: (630) Alright, again we have internal fertilisation and warm-blood, alright? (631) So we've got our three groups, (632) and we looked at that in a fair bit of detail. (633) Alright, we had a brief look as well - Simone - at plants. (634) (What are some two) or what are the two broad groups that we divide plants into?

Simn: (635) Um, flowering and non-flowering.

Tchr: (636) Alright, we can say (637) that plants are flowering or non-flowering. (638) Alright, in plants that have flowers, what are these flowers actually for?

Heln/ Phil: (639) Reproduction.

Tchr: (640) Right. (641) That took a prompt from the back. (642) (How do non-flowering plants, or) what are some ways that non-flowering plants might reproduce? Phil.

Phil: (643) Drop a seed.

Tchr: (644) Alright, where did that seed come from?

Phil: (645) Um, inside it. [class laughs]

Tchr: (646) Alright, seeds are usually produced in flowers. (647) Helen, how else might they reproduce?

Heln: (648) They um, they're in little hollows in the um

Morg: (649) cone

Heln: (648 cont.) cone.

Tchr: (652) Is a cone a type of flower (653) or is a cone something separate?

Morg: (654) It's a fruit, isn't it?

Tchr: (655) Right, and a cone develops from a flower.  
 (656) Cone trees are actually types of flowering plants.  
 (657) They don't quite fit.

Kris: (658) They develop from splitting, budding or um spores.

Tchr: (659) Alright, they're our three ones that we listed.  
 (660) Splitting, they simply divide  
 (661) and parts of the plant drops off.  
 (662) Some examples of that are ferns and things like that.  
 (663) Budding is again splitting of cells  
 (664) and very simple organisms in things like yeasts and fungus can be reproduced that way.  
 (665) Alright, there's a big difference between the simple plants, the ones that have no flowers, and the more complex ones.  
 (666) Alright, we looked then at how animals and plants might adapt to their habitats.  
 (667) Right, what do we mean by that term habitat? Luisa.

Luis: (668) The environment in which an organism lives.

Tchr: (669) Right, it's an environment in which it lives.

Gavn: (670) Surroundings.

Tchr: (671) Or its surroundings. (672) Some examples of habitats?

Alna: (673) The vegetation around it.

Tchr: (674) Alright, it's not simply the vegetation;  
 (675) it's lots of other things. (676) What are some examples of habitats though?

Luis: (677) Aquatic, marine.

Tchr: (678) Whoa, whoa, whoa. (679) Alright, marine is an example. (680) What's that mean?

Luis: (681) Aquatic.

Tchr: (682) Aquatic is the first one you've used, or marine.

Chrs: (683) Arboreal.

Tchr: (684) Arboreal. (685) What do we

Chrs: (686) Trees.

Tchr: (687) Righto, arboreal is in trees. (688) What does marine or aquatic refer to?

Luis: (689) Marine is salt water (690) and aquatic is water.

Tchr: (691) Right, marine is more specifically salt water  
(692) and aquatic is just water. (693) Something  
else?

Phil: (694) In caves.

Tchr: (695) Right, they might live in caves.  
(696) Theresa.

Ther: (697) Arctic or Antarctic.

Tchr: (698) Alright, Arctic or Antarctic.

Tchr: (699) Usually snow dwellers or ones that actually  
live in the poles.

Kris: (700) In the ground.

Tchr: (701) Alright, something might actually live in  
the ground. (702) Alright, there are a number of  
different habitats. (703) To cope with those  
habitats, (704) things need to adapt.  
(705) Alright, can someone suggest some adaptations  
that an animal might have for an Arctic situation?

Gavn: (706) They might have plenty of fur (707) to keep  
them warm.

Tchr: (708) Alright, they might have fur.

Chrs: (709) They might have a warm-blooded system.

Tchr: (710) Alright, they'd need to be warm-blooded,  
you'd imagine.

Phil: (711) They'd have heaps of fat.

Tchr: (712) Alright. (713) What do we call that fat  
that's on things like

Many: (714) Blubber.

Tchr: (cont.) whales?

Chrs: (715) Blubber.

Gavn: (716) Walruses.

Tchr: (717) We have a layer of blubber on the animal.

Ther: (718) And fur on the soles of their feet.

Tchr: (719) Right, if you are a land dwelling Arctic  
animal, (720) you might have fur on the soles of  
your feet (721) which normal bears don't tend  
to have.

Phil: (722) And if you hibernate, (723) you live off  
the fat that you have.

Tchr: (724) Right, animals that hibernate tend to exist in areas where it gets colder and hotter.  
 (725) Arctic tends to be cold all the time  
 (726) so you don't often find hibernating.

Gavn: (727) They say (728) they eat off the fat.  
 (729) Does that mean they come out skinnier than when they went in?

Tchr: (730) Quite a few actually lose weight, (731) yes, (732) because they don't eat. (733) They have to live off the fat. (734) There's one other thing they do. (735) That is, they slow down their body function rate or metabolism, (736) so they don't burn up the fat as fast as they would if they were running around.  
 (737) Right, I want (738) you to hold it there for a second. (739) There are some people that need to leave. (740) (If you are playing games this afternoon) OK, netball players and football players quietly make your way out please.  
 [15 seconds elapse]  
 (741) Alright, [there is] one that we didn't talk about before (742) but we might get some suggestions from you now. (743) What are some adaptations of animals that live mostly at night?  
 Chris.

ChrS: (744) Nocturnal.

Tchr: (745) They're called nocturnal. (746) What might they have though?

Luis: (747) Their eyes are bigger.

Tchr: (748) Alright, they have larger eyes.  
 (749) Why would you need larger eyes at night?

Luis: (750) Um, to see things better in the dark.

Tchr: (751) Alright, see things better in the dark.  
 (752) What else? Krista.

Kris: (753) It's not really their eyes that are bigger;  
 (754) it's their pupils.

Tchr: (755) Alright, if you think of a cat, a cat is a nocturnal animal.  
 (756) What shape do they have in their eyes?

Heln: (757) A slit type.

Tchr: (758) Right, rather than a dot like day dwelling animals. (759) Nocturnal animals tend to have slit pupils (760) which allows more light in (761) so they can see better.

Ther: (762) How can they go a different colour?

Tchr: (763) Right, if you shine a light on night dwelling animals (764) you quite often get that red colour. (765) That's a reflection back from the inside of the eye.

Ther: (766) Cat's eyes go green.

Tchr: (767) Yeah, that's a reflection from the back of their eyes. (768) It's just because you can see so much of it that it appears that shiny colour.

Luis: (769) Humans have round pupils; (770) they haven't got the same dark [remainder drowned out by teacher]

Tchr: (771) You couldn't see nearly as well in the dark as what a nocturnal animal can. (772) It's a physical possibility but

Adam: (773) Can dogs?

Phil: (774) Get a torch.

Tchr: (775) Dogs are not as good.  
(776) Right, there are some other ones that we looked at. (777) We looked mostly at the water dwellers. (778) Alright, how <<(779) did we say>> that water dwelling plants got things into and out of their systems?

Luis: (780) By osmosis.

Tchr: (781) Right, it's a process that we need to know the name of. (782) We need to know a little bit about it, alright, just a first introduction.  
(783) Osmosis is a process where things move into plants. (784) Can anybody remember (785) why that movement takes place? Simone.

Simn: (786) Oh, can I ask a question? (787) If frogs don't need to see at night (788) why do they have such big eyes?

Tchr: (789) Frogs are nocturnal animals much of the time too. (790) OK, back to our other one.

Luis: (791) It gives it oxygen and nutrients.

Tchr: (792) Right, that's why the process takes place  
(793) because there's oxygen and nutrients to move.  
(794) Can anybody remember (795) what actually happens though? (796) You need to remember  
(797) what osmosis does.

Luis: (798) There's movement over the tissues.

Tchr: (799) Alright, solutions move through the tissues.  
(800) Where do they go from? (801) Why does the water go into the plant instead of the other way?  
Krista.

Kris: (802) They go through the roots.

Tchr: (803) Alright, (think about what) the thing that I'm after is the amount of stuff outside and inside.  
 (804) The thing you need to remember is that there's movement from a high concentration. (805) Helen, you don't know this (806) so how bout you listen.  
 (807) Alright, [there is] movement from a high concentration like in salt water or out there in the soil into the plant inside. (808) Alright, from a high to a low concentration. (809) That's something you need to remember; (810) you need to know (811) what it's for, (812) that's osmosis (813) and you need to know the definition of it, just a simple definition.  
 (814) Alright, we talked a little bit about our fish before. (815) How do the gills actually work?

Heln: (816) They um take in the water (817) and they take out the oxygen (818) and they let out the water.

Tchr: (819) Alright. (820) Where does that oxygen go to? Krista.

Kris: (821) Um, into their blood cells.

Tchr: (822) Alright, the same system that lungs work on.  
 (823) They actually take oxygen out of the water (824) and put it into the blood in the gill area.  
 (825) Alright, can anybody tell me (826) what's different about sharks and sharks' gills?

Kris: (827) Sharks have more gills; (828) instead of just one they have

Tchr: (829) Alright, they have a row of gills.

Tren: (830) They have six.

Tchr: (831) Alright. (832) Something else? Chris.

ChrS: (833) They're wider, longer.

Tchr: (834) Alright, fish can move their gills;  
 (835) sharks can't, (836) so sharks usually have to keep swimming (837) to make the water circulate. (838) So that's a point that's a little bit different in these sorts of animals, alright? (839) They're slightly less developed than normal fish. (840) Remember (841) they've only got cartilage and not bone (842) and they don't have moveable gills. (843) Alright, so that's another slight adaptation. (844) Alright Chris <<(845) before he left>> mentioned arboreal (846) which are tree dwelling animals. (847) What are some adaptations that they are going to have?

Tchr: (847 cont.) Krista.

Kris: (848) Uh, hands or four limbs (849) so they can hang on.

Tchr: (850) Right, they have hands or grasping fingers on all four limbs.

Luis: (851) Things on their palms (852) to make them (853) so they won't fall.

Tchr: (854) Right, they usually have good grip on their palms (855) so they won't fall.  
(856) And something else? Theresa.  
[bell rings, denoting end of lesson period]

Ther: (857) Things to make their homes.

Tchr: (858) Alright, they have the ability to make homes.  
(859) One point before you leave: they usually have a grasping tail (860) so that's something else to remember.  
(861) Alright, if you're collecting your lunch  
(862) you have to wait [until the lunch monitor brings them] (863) before you start [to leave the room].

- Tchr: (001) Now, so far we've been through the various sections on classification, the vertebrates, invertebrates, procaryotes and eucaryotes, and the various plant groups. (002) There were a few basic ideas that people need to understand. (003) Firstly, uh who can tell me (004) why we bother to classify? (005) It was one of the guide questions out of chapter one, I think. (006) Who got a reasonable answer for why we bother to classify things?
- Jodi: (007) Oh, uh, hold on, I had it (008) but I forgot.
- Sara: (009) To put them in patterns.
- Tchr: (010) Sorry?
- Sara: (011) To put things in a pattern.
- Tchr: (012) Put things in a pattern. (013) If you think about it, science is mostly just looking for patterns. (014) There's very little that science does that isn't involved with patterns (015) whether it's the study of radioactivity or satellites or whatever. (016) We're looking for various patterns (017) so we can predict future information. (018) What were some of the patterns that we came up with, the major groupings?
- Some: (019) What do you mean?
- Tchr: (020) Come on, there were quite a few major groups that we discovered.
- Joan: (021) Procaryotes and eucaryotes.
- Tchr: (022) Ok, (the obvious) the biggest jump is from procaryotes to eucaryotes. (023) Someone like me <<(024) who is probably more concerned with the chemistry of what's going on in the plants>> is going to notice this difference more than a person who just looks at the external features. (025) In fact, it wasn't until about 200 years ago that they realised there was such a thing as procaryotes. (026) What are the major differences?
- Joan: (027) Single cell or multi-cell.
- Tchr: [writes 'single cell' after 'procaryotes' and 'multi-cell' after 'eucaryotes'] (028) That right?
- Sall: (029) Cellular membranes.
- Tchr: (030) Pardon?

Sall: (031) No, (032) they've got to be multi-cellular membrane for eucaryotes and single cellular membrane for eu, procaryotes.

Tchr: (033) Now, there's quite a few eucaryotes that aren't multi-cellular, (034) so that's not a very good distinction between the two groups.  
(035) Come on, who can think of a better

Sall: (036) Double layer membrane and single layer membrane.

Trac: (037) What do we do now, Mr D., just summarise?

Tchr: (038) Just going through it again.

Sara: (039) Eucaryotes have organelles.

Mari: (040) They have organised plastids, DNA.

Tchr: (041) The, part of this is lack of (organisation within, or) apparent organisation within the cell.  
(042) (Can anyone think how these procaryote cells could ever survive) if you think about all the different reactions that occur (043) there must still be a lot of organisation going on inside it.  
(044) How could it arrange to separate all these organisations and chemicals (045) without having individual organelles inside?

Sall: (046) They've got DNA.

Tchr: (047) The DNA is floating around like everything else too.  
(048) Who can think of a way you might arrange it?

Trac: (049) What?

Tchr: (050) Look, if we had a school with no specific rooms, (051) how could we arrange (052) for teachers to find the kids, for the lessons to ever go on (053) without it being a great jumbled mess?

Mark: (054) Huh?

Tchr: (055) If we had no definite rooms for the people accumulating for various lessons.

Mari: (056) Nobody would find the teachers;  
(057) they'd be everywhere.

Tchr: (058) Right, it (would be) should be a mess.  
(059) Can anyone think (060) without any definite rooms how you could

Sall: (061) Yeah (062) you could meet in the corners, the different parts.

Tchr: (063) Ok, now go back to your procaryotes.

Tchr: (064) How could you possibly work some sort of organisation (065) without having specialised little compartments or organelles?

Mari: (066) Just put em in different parts.

Tchr: (067) Ok, how would you get different parts  
(068) without having actually little sacs?

Sara: (069) Throw them into different rooms.

Tchr: (070) No, (we're not)... by definition these things don't have little organelles.

Sara: (071) So?

Tchr: (072) But there must be some way you can get certain reactions going in the various parts.

Neil: (073) Make it possible for it to happen in all the parts of it.

Tchr: (074) Ok, but it would be like a school with no specific rooms. (075) You'd end up with it in an absolute schroomozle supposedly. (076) Someone made the comment about arrange for various people to meet in little corners.

Sall: (077) DNA would instruct them (078) to arrange to meet in little corners.

Tchr: (079) Well, apparently within the procaryote cell there's lots of bits of membrane floating around (080) and most of the reactions occur actually on the membranes, (081) so if that's meant to be a cell [draws on board], (082) within it there's sheets of membranes that don't actually make individual compartments (083) and along these membranes are the various enzymes. (084) So that if we imagine that's one particular enzyme [drawing] with some chemical function (085) it occurs on a particular part of the membrane (086) and when it's involved in the reactions (087) whatever it wants first will come in at one end (088) and will be processed by this series of enzymes - (089) maybe it's to get energy out of a particular bacteria that um breaks down alcohol (090) to make vinegar. (091) As the alcohol comes into the cell (092) it doesn't get shoved into a special compartment (093) but it gets more or less put into a certain area where these enzymes might be on the inside membrane of the cell (and) or on one of the extensions that flow into the middle. (094) Same with DNA. (095) They say (096) that it's just generally spread through the cell (097) but in actual fact, often the DNA will be held in certain parts of the cell (098) by being attached to the membranes. (099) So although it doesn't qualify as being as complicated as eucaryotes

Tchr: (100) these things often have quite a deal of internal organisation (101) because the various chemicals and enzymes and whatever are attached to the membranes, (either the outside of the cell) (102) and sometimes the membrane has little folds inside (103) which gives it a three dimensional structure.  
 (104) Now, that's an obvious difference for those two.  
 (105) How could you divide them up from there?  
 (106) Come on... how would you divide up eucaryotes?  
 (107) They're the easiest.

ufs: (108) Phylum.

Tchr: (109) Ok, what are (the main or) the two main groups or kingdoms?

John: (110) Animals.

Jodi: (111) Plants and animals.

Tchr: (112) Good, plants and animals.  
 (113) What's the complication?

Neil: (114) Uh, bacteria and fungus have those little tiny doovers that photosynthesise and eat things.

Tchr: (115) Ok, obviously (there's a)

Neil: (116) What are they?

Tchr: (117) Euglena is usually the one.  
 (115 cont.) there's some groups that are hard to classify as plants or animals.  
 (118) Ah, what's the main difference between plants and animals?

Neil: (119) Food: (120) one eats food (121) and the other makes it.

Tchr: (122) Yes, what are the correct terms?

John: (123) Autotroph and heterotroph. [tchr writes]

Tchr: (124) What's an automatic car do?

Trac: (125) It changes gears itself.

Neil: (126) Changes its own gears.

Tchr: (127) Right, it changes gears itself.  
 (128) And supposedly 'auto' means self.  
 (129) Therefore plants make their own food supply.  
 (130) How do we divide plants, generally?

fs: (131) Vascular and non-vascular.

Tchr: (132) Ok, vascular and non-vascular.

Tchr: (133) Some of the non-vascular ones?

Mari: (134) Mosses and lichens.

Tchr: (135) Usually we start with the various algae groups; (136) some of them are single-cell.  
(137) Who can think of a single cell group of algae?

Joan: (138) Um, blue-green algae.

ms: (139) Blue-green.

Tchr: (140) Uh, complication. (141) They rate down here with the procaryotes. (142) So, procaryotes, the bacterias and the blue-green algae. [writes while speaking]

fs: (143) Gold.

Jodi: (144) Gold algae or green algae.

Joan: (145) Diatoms.

Tchr: (146) Ok, diatoms are the best

dfs: (147) Green algae.

Tchr: (146 cont.) example of single-celled algae.  
(148) Uh, green algae includes multi-cellular ones.

ufs: (149) Brown algae.

Tchr: (150) Brown's also do.  
(151) The things they make (io, uh) the agar we used uh last week.

Trac: (152) That's seaweed.

Tchr: (153) Ah, what you know as seaweed sometimes isn't an algae. (154) Sometimes it's not an algae.  
(155) Anyone ever been prawning?

Many: (156) Yeah.

Mari: (157) Yeah, but you said (158) that our agar (comes) came from seaweed.

Tchr: (159) Yes, a particular type of brown algae.  
(160) Has anyone ever been prawning, in Tuggerah Lakes?

Many: (161) Yeah.

Tchr: (162) What's that lovely stuff that wraps all round your ankles?

Many: (163) Seaweed.

fs: (164) Weed.

Sara: (165) Uh, that's the wild stuff [unintelligible]

Mari: (166) It's seaweed. [insistently]

ms: (167) Kelp.

Tchr: (168) Yes, [resignedly]  
 (it's) unfortunately, (it should be or) you'd expect  
 it to be algae (169) but it's not. (170) It's  
 actually a flowering plant (171) and has evolved  
 from a land plant. (172) It's got roots;  
 (173) it's got flowers; (174) it's vascular  
 (175) and at some stage it was related to a land  
 plant the same way dolphins they think have evolved  
 from a land animal. (176) It's actually evolved  
 on to land as a vascular plant (177) and has gone  
 back into the water (178) so that, (the thing is,  
 oh yea) you'd expect it to be an algae (179) but  
 it's not. (180) It's actually a flowering plant  
 (181) stuck in with long, strap-like weeds you find  
 in lakes. (182) There's two sorts: (183) there's  
 posidonia (184) and something else, (185) and  
 (they're actually) they live around here.  
 (186) Why is it so important, by the way?

fs: (187) What?

Tchr: (188) Why are the strap-weeds stuff you find in  
 lakes so important?

Mari: (189) Feed the fish.

Tchr: (190) Well, firstly, it doesn't feed the fish.  
 (191) What would it feed?

mS: (192) The little

fs: (193) Bacteria.

Joan: (194) The little things that [remainder drowned  
 out by multiple, competing voices]

Tchr: (195) The little things, yes, exactly.

Jodi: (196) Prawns.

Tchr: (197) Prawns and whatever else, various larvae  
 stages. (198) So we get up to the diatoms.  
 (199) Green and brown algae are multi-cellular,  
 the larger marine ones. [adds to notes on board]  
 (200) What happens (201) when you start getting  
 onto the land?

Sall: (202) They start getting tubes.

Tchr: (203) Pardon?

Sall: (204) They get tubes.

Tchr: (205) Right, they start getting tubes.  
(206) Uh, do they get tubes (207) because they're on the land?

Neil: (208) They had tubes before.

fs: (209) Yeah.

dfs: (210) No.

Tchr: (211) Come on which came first: the chicken or the egg? (212) Did they get tubes (213) because they came onto the land (214) or did they go onto

Jodi: (215) What happened was God put on the earth two chickens (216) like they're from two, two, (217) oh I don't know.

Many: [multiple voices compete (218) Adam and Eve ...  
(219) Mr D. said (220) the cell ...  
(221) always created every animal (222) so there was a male and a female of the species ...  
(223) no, the chicken came first (224) cause if you reckon (225) the egg came first ...  
(226) that's what I said (227) the chicken came first ... (228) the egg came first ...  
(229) then how'd the egg keep warm (230) and hatch ... (231) they both came at the same time ..  
(232) no, they couldn't ...

Trac: (233) What came first, the chicken or the egg?

Many: (234) The egg!

Tchr: (235) My personal opinion is that it's the egg  
(236) because an egg is a cell.

Jodi: (237) Where'd the egg come from?

fs: (238) Yeah? [multiple arguments ensue]

Tchr: (239) If you want to go right back to the origin of the procaryotes three and a half thousand million years ago (240) (they think) <<(241) there's no way of ever proving (242) and no one's ever been able to make life in a test tube or whatever>>

Mari: (243) They didn't have chooks in the ice-age.  
[general laughter]

Tchr: (240 cont.) (what they think) <<(244) couldn't have been the ice age; (245) it was a long, long time before then>> (240 cont.) what they think is that there were various chemicals around. (246) The atmosphere supposedly contained ammonia and sulphur and molecules with carbon in it, (247) that

Tchr: (247 cont.) automatically, even today, will form a certain size of a globule, like a drop of fat.  
 (248) If the fat droplet gets too large  
 (249) it will break into two. (250) It just happens to be a nice, convenient size (251) so without ever being alive (252) you can make a thing that behaves like a cell.

Jodi: (253) (If that's what you believe, you're saying all these things, I mean I'm not ...) scientists think that way (254) but there are other people who think it might be another way.

Tchr: (255) Some do; (256) some people who believe in God see all this junk as being directed by Him.

Sara: (257) If it's junk (258) why are we learning it?

Mari: (259) Yeah, if it's junk (260) why are we learning it?

Tchr: (261) I didn't say (262) it was junk!

Many: (263) You did! [laughter]

Tchr: (264) No, I refuse to be quoted! [good naturedly]  
 (265) The obvious problem is that we can't definitely say this happened. (266) All we can do is make some reasonable predictions.  
 (267) Lots of people who believe in the Bible word for word claim (268) that it happened as Genesis says. (269) Lots of people who believe in God see the whole idea of evolution as directed (270) and other people believe (271) that it just happens uh almost spontaneously. (272) The last two don't necessarily clash. [said emphatically]  
 (273) Depends on how much influence you believe God has. (274) So back to this. [glances at board]

Mari: (275) Are you an atheist then?

Tchr: (276) Um, probably an agnostic; (277) I don't know.

Mari: (278) [jokingly] If you're doubtful (279) you won't go to heaven.

Tchr: (280) Maybe not; (281) it's a problem I'll have to face.

Neil: (282) Mr D., Dr Leakey or whatever his name is over in Africa, (he reckons) <<(283) he's a confirmed atheist>> he reckons (284) that man has made up God for his own uses,

Tchr: (285) He might have.

Neil: (cont.) for his own well being. (286) He likes to think (287) there's something looking over him.

Tchr: (288) He might have. (289) Then again, a surprising number of different cultures that are totally unrelated believe in God,

Neil: (290) Yeah.

Tchr: (291) and have very similar views on it. (292) So maybe there's some evidence.  
(293) Now, back to the plants.  
(294) The (ones, er) plants uh first of all uh [that] survived on the land were very, very closely tied in with water supplies mostly because of the necessity of the gametes to swim. (295) They couldn't survive without a large supply of water (296) to move around (297) (to meet) uh to meet the other gametes. (298) They're basically the mosses. [writes 'mosses' on the board] (299) It was an enormous step to start having specialised cells that could carry water up to the top of the plant.  
(300) Then you end up with ferns [writes 'ferns']  
(301) and then the various tracheophytes.  
(302) Which would have come first: the ability to grow tall or the ability to make tubes?

Sall: (303) The ability to make tubes.

Tchr: (304) Right, (the evolution of) the evolution of water carrying tubes would have come first in much the same way that for us to survive on land the biggest step was the ability to use an air supply. (305) It was only probably 300 or 400 million years ago <<(306) it may even be less, about four hundred>> that any animal survived efficiently on land as opposed to in the water.  
(307) Even most of the insects that we know have a stage that requires almost complete saturation in water. (308) (So) ants don't (309) but lots of things like dragonflies have a (lymph) nymph stage that lives in water with gills, the whole bit.

(310) Now, animals. (311) How do we divide them up?

Jodi: (312) Um, by

ms: (313) Invertebrates and vertebrates.  
[teacher writes this on the board]

Tchr: (314) Which is the most important?

Jodi: (315) Vertebrates.

Sara: (316) Invertebrates.

Jodi: (317) Vertebrates.

Many: (318) Vertebrates.

Tchr: (319) It depends (320) on whether you regard us as

Tchr: (320 cont.) the ultimate creation, doesn't it?

Jodi: (321) Yes, I do.

Tchr: (322) In that case, vertebrates is probably rated as the most important,

Jodi: (323) Yes.

Mari: (324) Yes.

Tchr: (325) just as people in that category probably rate mammals, placental mammals and us as the most important, (326) whereas in terms of numbers, which groups are most important?

Many: (327) Invertebrates.

Tchr: (328) E.g.?

Mari: (329) Paramecium.

Jodi: (330) Insects.

Joan: (331) Us! Us! [laughter]

dfs: (332) Protozoa.

Tchr: (333) In terms of actual numbers, it's probably the insect groups. (334) In terms of actual species it's also insects. (335) There's something like a million different species of insects supposedly around the world. (336) There's probably about two million types or species of everything. (337) (How) how do we divide up invertebrates?

Sall: (338) Arthropods.

Tchr: [writes 'arthropods'] (339) Main features?

fS: (340) Hard skin.

Sall: (341) Hard shell.

Mari: (342) It's got a soft body.

Neil: (343) Hard exoskeleton.

Tchr: [writes 'jointed legs' after 'arthropods'] (344) It means jointed legs.

Neil: (345) Pod, that means

Tchr: (346) Pedestrian, feet.

Joan: (347) Pardon?

Tchr: (348) Pedestrian, something with feet, right? a pedestal. (349) It comes from the Latin [sic] pod.

Tchr: (350) Artic comes from the Latin (351) uh, you'd probably know [to researcher who disclaims knowledge]  
 (352) ah, oh well, what's an articulated vehicle?

dfs: (353) Pardon?

Tchr: (354) Anyone know (355) what an articulated vehicle is? [multiple voices compete, no one intelligible] (356) One with joints in it  
 (357) so it can bend.

Neil: (358) Like those buses.

Tchr: (359) Yeah, hence that end of the word.  
 [points to 'arthro']

Neil: (360) You mean like a semi-trailer?

Tchr: (361) Yes, (362) it's called an articulated vehicle.

Neil: (363) One of those buses with the funny thing  
in the middle.

Tchr: (364) Joint in the middle, yes.

Sara: (365) They don't bend, do they?

Neil: (366) Yeah, (367) they've got those new ones.  
 (368) They've got two ends and a thing in the middle.

Sara: (369) I don't understand that.

Neil: (370) They go around corners really well.

Tchr: (371) Now, we've got half a dozen groups with the arthropods that are divided up according to different features. (372) Centipedes and millipedes get chomped up according to how many legs per segment. (373) Spiders and ticks and whatever supposedly rate eight pairs of legs. (374) The insects rate six, (375) the crustaceans have usually ten or more pairs of legs. (376) And they're all divided up according to the differences. (377) The other groups of invertebrates like the molluscs, the various worm groups and whatever according to the main features.  
 (378) When you get up to the vertebrates  
 (379) how do we divide them up?

Sara: (380) Types, levels.

Tchr: (381) No, not what do we divide them into.  
 (382) How's the main differences

Jodi: (383) Their structural features.

Tchr: (384) Is it so much structural, all the time?

Jodi: (385) No.

Mari: (386) What they do.

Sara: (387) No.

Tchr: (388) OK, what structural features then?

Jodi: (389) Uh, their physical structural features.  
[laughter]

Tchr: (390) Come on, keep going.

Jodi: (391) Uh, their backbone.

Tchr: (392) By definition they've all got a backbone.

Jodi: (393) Yeah, well, um

dfs: (394) Their covering.

Tchr: (395) So reptiles and fish have both got scales,  
(396) therefore they're both in the same group.

Jodi: (397) No.

Sara: (398) Reptiles have dry scaly skin (399) and  
amphibians have moist, scaly skin (400) and  
they're all cold-blooded, (401) they're all uh  
changeable.

Mari: (402) Variable blood temperature.

Tchr: (403) So we have two groups, cold-blooded and warm-  
blooded.

Mari: (404) Oh, you told us (405) not to say that!

Tchr: (406) You can use it (407) but not in a test.

Mari: (408) What do you use in a test then?

Tchr: (409) Constant body temperature or variable, or  
poikilothermic or homiothermic.

Jodi: (410) But just because you don't like cold-blooded  
and warm-blooded, (411) we're not allowed to use  
it in a test.

Tchr: (412) You can (413) as long as you explain  
what it means. (415) You can write  
(416) reptiles are cold-blooded (417) [and put]  
in brackets variable body temperature.

Sara: (418) Doesn't the marker look for that kind of  
thing?

Tchr: (419) Yes, he does. (420) He probably wouldn't  
take marks off (421) but if he had one mark to

Tchr: (cont.) give out for that little bit of information  
 (422) you'd probably get it right. (423) If he  
 had two marks to give out (424) he'd probably  
 give one mark for each (425) in which case it  
 just might be worth one extra mark for putting in  
 the bit of extra information.  
 (426) So, how do we divide up these things, come  
 on, the various vertebrates?

Mari: (427) Fish, hard boned fish and soft boned fish.

Tchr: (428) Yes, you've got groups.

Jodi: (429) Their skeleton.

Tchr: (430) You were right (431) when you said  
 physical features (432) but which physical  
 features?

Jodi: (433) Their body covering.

Neil: (434) Their skeleton.

us: (435) External, uh, external

Trac: (436) Whether they live in water.

Mari: (437) But there's nothing much else to their  
 physical features.

dfs: (438) Whether they breed, whether they um...

Sall: (439) Appendages.

fs: (440) How they give birth.

Jodi: (441) Their hair covering.

Sall: (442) How many appendages they have.

Mari: (443) How many number of parts of the heart.

Sara: (444) Yeah, how many chambers.

Trac: (445) How many stomachs.

Tchr: (446) Alright, make a dichotomous key for the  
 vertebrates.

Some: (447) Aw no! They take ages.

Tchr: (448) Come on, we'll do it on the board.

Jodi: (449) Yeah, that's better.

Joan: (450) A what?

Tchr: (451) I want a dichotomous key for the main groups  
 of vertebrates.

Jodi: (452) OK, you've got um...

Sall: (453) Appendages.

Mari: (454) Soft bone and hard bone.

Sall: (455) Appendages.

ufs: (456) Feathers or no feathers.

Sall: (457) Body covering.

[teacher writes 'terrestrial' and 'aquatic']

Tchr: (458) Is that a reasonable way to divide them up, to begin with?

Neil: (459) Yeah.

Jodi: (460) I suppose. [laughter]

Tchr: (461) Do we get someone who doesn't fit either?

Mari: (462) No, it's not.

Tchr: (463) Why?

Mari: (464) Dolphin, (465) he's a mammal (466) but he's aquatic.

Tchr: (467) Excellent. (468) Good, we'll scrap it. (469) Think of an alternative.

Mari: (470) Soft bone and hard bone [emphatically]

[teacher writes:

	chondrichthyes
soft bone	
	agnaths
	terrestrial
hard bone	
	aquatic

Tchr: (471) Good, we're up to there [pointing to aquatic]. (472) Where do we go from there?

Mari: (473) Uh, we don't know what else to put, other than their body covering and whether they're warm-blooded or cold-blooded.

Sara: (474) No, they're mixed up.

Mari: (475) Now put aquatic.

Trac: (476) No, no, no.

Tchr: (477) Now, we've been through half a dozen dichotomous keys for the various groups of plants and animals. (478) We all know the main features

Tchr: (cont.) of the vertebrates (479) so work out some information that'll split them up. (480) If necessary (481) do it (482) so you take one out at a time.

Sall: (483) Whether they have gills or not.

Joan: (484) If they uh got a jaw bone.

Tchr: (485) Uh, what's the complication about amphibians (486) when you talk about gills?

Some: (487) They have some (488) then they don't.

Tchr: (489) Right, they have two stages. (490) The whole idea of a dichotomous key is to get two answers, not three.

Neil: (491) Mr D., aren't the agnaths the ones with jaws?

Tchr: (492) Pardon?

Neil: (493) Jaws?

Tchr: (494) Yeah. (495) How bout laying eggs? (496) Does that help?

Trac: (497) We said that.

Joan: (498) No,

Tchr: (499) Too many groups lay

Joan: (498 cont.) it doesn't help (500) because (mammals lay, or) some do (501) and some don't.

Tchr: (502) Yeah.

Mari: (503) We haven't done reptiles yet.

Tchr: (504) Internal versus external fertilisation?

Neil: (505) Yeah, what about those sea horses?

Tchr: (506) The male does the reproducing. (507) Now, (the main) the main method of differentiating between groups is on reproduction (508) so it is a structural feature (509) as someone suggested (510) but it doesn't always work (511) for separating these. [points to 'hard bone'] (512) Uh, let's see, what can we do (513) to get the hard bone fish out? (514) Now, (we divided) if we divided (those) the rest up into that



Neil: (553) They lay eggs.

John: (554) They care for their young.

Tchr: (555) Come on, think of all the animals that lay eggs. (556) What's usually the main thing they require around the outside of the egg?

Some: (557) Shell, hard shell.

Tchr: (558) Therefore?

Mari: (559) They require a shell.

Joan: (560) Some have soft shells.

Tchr: (561) Right. (562) Therefore, what is the complication for your amphibians?

John: (563) Soft shell.

Joan: (564) I've lost you.

Sara: (565) So have I.

Tchr: (566) The problem is that the eggs will dry out  
(567) if they're on the land.  
(568) Where do reptiles

Mari: (569) But they're not; (570) they put them in the water.

Tchr: (571) Right, good, no one has mentioned that yet.

Mari: (572) Aw, ... but other, some ...

Jodi: (573) Some reptiles lay their eggs in the water, don't they?

Tchr: (574) Near water (575) but usually not in water.  
(576) So crocodiles lay in mud beside the river.

Trac: (577) Well, all you've got to say is whether they lay eggs with hard or soft shells.

Mari: (578) Membranous shells or whatever that word is.

Tchr: (579) Um

Mari: (580) Jelly shells.

Trac: (581) Leather shells.

Sall: (582) Soft shell, hard shell, there you go.

Tchr: (583) Uh no, because reptiles have got soft-shelled eggs.

Mari: (584) Well, jelly shells and normal shells.

Tchr: (585) [writes 'eggs with no shells'] and the rest.  
(586) That takes out amphibians.  
(587) The reptiles?

Mari: (588) Ah, now you go to hard shell or

Tchr: (589) No; reptiles all have soft rubbery shells;  
(590) that takes out reptiles.  
(591) Of the remaining groups, you would just have  
lay eggs. (592) Ah, it doesn't work, does it?  
(593) I was thinking (594) we could have lay eggs  
versus not lay eggs (595) but um the monotremes  
muck that up. (596) How would you divide (birds  
and humans, um, sorry) birds and mammals?

Some: (597) Feathers and fur.

Tchr: (598) OK.

Sall: (599) And number of appendages.

Trac: (600) And what about their skeleton?

Tchr: (601) Very similar.

Neil: (602) I thought (603) that birds sort of had,  
full of air

Mari: (604) Oh, chambers of the heart.

Tchr: (605) Oh yes, but our bones have holes down the  
middle. (606) That's where the marrow fits;  
(607) but birds have it much, much larger  
(608) and it tends to be completely filled with  
air spaces,

Mari: (609) Heart chambers.

Tchr: (610) so you could work it out with skeleton,  
(611) but you wouldn't always be able to tell.  
(612) Sorry?

Mari: (613) Heart chambers for birds and mammals.

Tchr: (614) Both have four.

Mari: (615) We don't. (616) You said birds and humans.  
(617) We don't have four chambered hearts.

Tchr: (618) Right atrium, left atrium, right ventricle,  
left ventricle.

Mari: (619) That's five. [with wounded good humour]

Tchr: (620) Glad (621) I can't count like you.

[bells rings, denoting end of lesson period;  
teacher writes 'birds' and 'mammals' on the  
board, then 'feathers' after birds]

Tchr: (622) How do we divide up the three groups of mammals, quickly?

Joan: (623) Egg pouch.

Sara: (624) Babies born alive.

Trac: (625) Have placenta.

Tchr: [writes: 'egg pouch', 'young born immature' and 'have placenta' on board]  
(626) Ah, you couldn't use pouch (627) to divide them up (628) because two groups of mammals have pouches, (629) and the last one would be uh have placenta and young born underdeveloped.

## Appendix Two: Coded Data

For each transcript coding of the triadic database and the raw database is provided. The triadic database is comprised of question - answer - evaluation sequences abstracted out of the raw database. (See Section 5.2, Chapter Five, page 113). In some cases the message numbering is slightly altered in the triadic database to handle implicitly reinstated questions.

In the coding sheets:

Speaker 87 = Year 7 History teacher  
Speaker 88 = Year 11 History teacher  
Speaker 97 = Year 7 Science teacher  
Speaker 99 = Year 11 Science teacher

### Key:

no.	= message number
sp	= speaker
labcdefghjk	= options taken up from the Interpersonal system network
D	= options taken up from the Role Assignment network
Eabcdejmmm	= options taken up from the Experiential system network
Fabcde	= options taken up from the Logical system network
N	= number of messages involved in the occasion of questioning, answering or evaluating (triadic database only)

# Appendix 2.1

## Year 7 History: Triadic Database

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N	
023	87	B	1	1	1	3	1						1		42	4	14							2222						1	
024	01	C	1	2				1	1	2	1	1	2		42		4							221	1					2	
-----																															
026	87	B	1	2				23					2		21		4							2122						2	
032	01	C	2	2				22	11				2		21		4							221	5					5	
035	87	C	1	1	1	2							1	2																1	
-----																															
038	87	B	1	1	1	4	1						1		21	1	4	6	2					2222						1	
039	04	C	1	2				12	11				2		21	1	4	4						2212						2	
041	87	C	1	1	3	2	1						2	2				4						2222						1	
-----																															
043	87	B	1	1	1	5	1						1		21	4	4	6						1222						2	
044	04	C	1	2				11	11	1			2				4							2212						2	
046	87	C	1	1	1	2							2	2																1	
-----																															
049	87	B	1	1	1	4	1						1		11		4	6						2222						1	
050	05	C	1	2				11	11	2			2				4							2222						1	
051	87	C	1	1	3	2	1						2	2				4						2222						1	
-----																															
055	87	B	1	1	1	4	1						1		42	6	5	1						2222						1	
056	02	C	1	2				11	11	2			2				4							2222						1	
-----																															
057	87	B	1	1	1	4	1	3					2		22	1	4	6						2222						1	
059	19	C	2	2				2					2				4							222	4					2	
060	87	C	1	1	3	2	1						2	2				4						2222						1	
-----																															
062	87	B	1	1	1	5	1						1		42	4	1							2212						2	
064	06	C	1	2				11	11	2			2				1							2222						1	
065	87	C	1	1	3	2	1						2	2				1						2222						1	
-----																															
066	87	B	1	1	1	4	1						1		21		4	6						2222						1	
067	07	C	1	2				12	12				2		21		4	4						2222						1	
068	87	C	1	1	3	2	1						1	2				4						2212						2	
-----																															
070	87	B	1	1	1	5	1						1		21	4	4	6						2222						1	
071	03	C	1	2				11	11	1			2				4							2212						2	
-----																															
073	87	B	1	1	1	5	1	3					2		21	4	4	6						2222						1	
074	03	C	1	2				12	11				2		21	4	4	4						2212						3	
078	87	C	1	1	1	2							2	2																1	
-----																															
079	87	B	1	1	1	5	1						1		21		4	3						2212						2	
081	06	C	1	2				12	11				2		21		4							2212						3	

no.	sp	I a b c d e f g h j k			D	E a b c d e j k m m			F a b c d e	N
084	87	B12	21		2	22244			2222	1
085	08	C12	12 11		2	11 4			2122	3
088	87	C1112		2	2					1
-----										
089	87	B11111			1	42 462			2222	1
090	09	C12	11 12		2	42 4			2222	1
091	87	C11321		2	2	42 4			2222	1
-----										
092	87	B11151			1	42 441			2222	1
094	19	C12	11112		2		1		2222	1
095	87	C1112		2	2					1
-----										
097	87	B11141			1	22146			2222	1
099	03	C22		2	2	22244			222 4	2
100	87	C1112		2	2					1
-----										
104	87	B11151			1	42 441			2212	2
111	04	C12	11112		2		1		2222	1
112	87	C11321		1	2		1		2212	3
-----										
118	87	B11141			1	21 461			2222	1
119	13	C12	12 12		2	21 441			2222	1
120	87	C1112		2	2					1
-----										
124	87	B11151			1	42 4 12			2222	1
125	14	C12	11112		2		1		2222	1
126	87	C1111		2	2					1
-----										
127	87	B11151	1			42 4 12			2222	1
128	15	C12	11112		2		1		2222	1
129	87	C1133		2	2		1		2222	1
-----										
130	87	B11151	1		2	42 4 12			2222	1
131	19	C12	11112		2		1		2222	1
132	87	C11321		2	2		1		2222	1
-----										
133	87	B11141			1	11 62			2122	2
135	13	C12	11211		2	42 4 1			221 1	3
138	87	C1121		2	2	224 24			2222	1
-----										
139	87	B11141	1		2	11 62			2122	2
140	01	C12	11212		2	42 4 12			2222	1
141	87	C11321		1	2	42 4 12			2212	2
-----										
144	87	B11141			1	22146			2222	1
145	01	C12	11112		2		4		2222	1
146	87	C11321		2	2		4		2222	1
-----										
147	87	B11111			1	42 46			2212	3
154	01	C22		2	2	42 441			222 2	5
155	87	C11321		2	2	42 441			2222	1
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156	87	B11151			1	22446			2212	2
160	03	C12	12 11		2	223441			2212	3
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no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
165	87	B	2	2									2		4	2									1	2	2	2		2
166	19	C	1	2									2																	1
167	87	C	1	1	3	2							2																	1
168	87	B	1	1	1	4							1		1										2	2	2	2		1
169	13	C	1	2									2		1										2	1	2	2		3
172	87	C	1	1	1	2							2																	1
173	87	B	1	1	1	4							1		1										2	2	2	2		1
174	01	C	1	2									2												2	2	1	2		2
176	87	C	1	1	2								2												2	2	1	2		2
178	87	B	1	1	1	5							1		4	2									2	2	2	2		1
179	08	C	1	2									2												2	2	2	2		1
180	87	B	1	1	1	5	3						2												2	2	2	2		1
181	04	C	1	2									2												2	2	2	2		1
182	87	C	1	1	3	2							2												2	2	2	2		1
183	87	B	1	1	1	1							1		1	2									2	2	2	2		1
185	03	C	2	2									1	2	1										2	2	1	5		11
197	87	C	1	1	2								1	2											2	2	1	2		3
200	87	B	1	1	1	5							1		4	2									2	2	1	2		2
203	16	C	1	2									2												2	2	2	2		1
204	87	C	1	1	3	2							1	2											2	2	2	1		2
206	87	B	1	1	1	4							1		2	1									2	2	2	2		1
207	08	C	1	2									2												2	2	1	2		2
215	87	C	1	1	1	2							2																	1
216	87	B	1	1	1	4							1												2	2	2	2		1
217	09	C	1	2									2												2	2	2	2		1
218	87	C	1	1	1	2							2																	1
220	87	B	1	1	1	5							1		4	2									2	2	2	2		1
221	08	C	1	2									2												2	2	2	2		1
222	87	C	1	1	3	2							2												2	2	2	2		1
223	87	B	1	1	1	4							1												2	2	2	2		1
224	08	C	1	2									2		4	1									2	2	1	2		2
226	87	C	1	1	2								2												2	2	2	2		1
236	87	B	1	1	1	4							1		1										2	2	2	2		1
237	01	C	1	2									2												2	2	2	4		5
243	87	C	1	1	2	1							2												2	2	2	2		1
244	87	B	1	1	1	4	1						2		1										2	2	2	2		1
245	03	C	1	2									2		1										2	2	1	2		3
249	87	C	1	1	1	2							2																	1
254	87	B	1	1	1	4	1						2		1										2	2	2	2		1
255	13	C	1	2									2		1										2	2	1	2		5
261	87	C	1	1	1	2							2																	1

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	N
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268	14	C	1	2				1	1	1	1		2				4							2	2	1	2		3	
272	87	C	1	1	1	2							2	2															1	
273	87	B	1	1	1	4	1						1		1	1		4	6	5				2	2	2	2		1	
274	06	C	1	2				1	1	1	2		2				4							1	2	2	2		1	
275	87	C	1	1	3	2	2						2	2			2	2	2	4	4			2	2	2	2		1	
276	87	B	1	1	1	4	1						1				2	1	1	4	6			2	2	2	2		1	
278	18	C	1	2				1	1	1	2		2				4							2	2	2	2		1	
279	87	C	1	1	1	1							2	2															1	
280	97	B	1	1	1	4	1						2				2	1	1	4	6			2	2	2	2		1	
281	03	C	1	2				1	1	1	2		2				4							2	2	2	2		1	
282	87	C	1	1	3	2	2						2	2				4						2	2	2	2		1	
284	87	B	1	1	1	4	1						1		1	1		4	6					2	2	2	2		1	
285	01	C	1	2				1	2	1			2		1	1		4						2	1	2	2		4	
289	87	C	1	1	1	2							2	2															1	
293	87	B	1	1	1	3	1						1				2	2	4	4	6			2	2	2	2		1	
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296	87	C	1	1	3	2	2						2	2		1	1		7					2	2	2	2		1	
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301	06	C	1	2				1	2	1			2		1	1		4						2	1	2	2		2	
305	87	B	1	1	1	4	1						2				2	1	1	4	6			2	2	2	2		1	
306	06	C	1	2				1	1	2	1		2				2	2	2	4	4			2	2	2	2		1	
307	87	C	1	1	1	2							2	2															1	
318	87	B	4	1	1	4	1						1				2	2	1	4	6	1		2	2	2	2		1	
319	07	C	1	2				1	2	1			2		1	1		4	5					2	2	1	2		3	
324	87	C	1	1	3	2	1						1	2		1	1		5					2	2	1	2		2	
327	87	B	1	2									1				2	2	2	4	4			2	2	2	2		1	
328	03	C	1	2				2	1	1	2		2																1	
329	87	B	1	1	1	3	1						2				2	2	2	4	4	4		2	2	2	2		1	
330	03	C	1	2				1	1	2	1		2				4	2	4	4				2	2	1	2		5	
336	87	B	2	2									2				4	2	4	4				1	2	2	2		2	
339	03	C	1	2				2	2	1			2				4	2	4	4				2	2	1	2		4	
345	87	B	1	2									2				4	2	4					2	2	2	2		1	
350	03	C	1	2				2	2	1			2				2	2						2	2	1	2		2	
358	87	C	1	1	2	2							2	2			4	2	2	4				2	2	2	2		1	
394	87	B	1	1	1	4	1						1				2	2	1	4	6			2	2	2	2		1	
395	13	C	1	2				1	1	1	2		2				4							2	2	2	2		1	
396	87	C	1	1	3	2	1						2	2				4						2	2	2	2		1	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
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398	13	C	1	2				1	2				2		4	2			4	2	5			2	2	1	2		2	
399	87	C	1	1	1	2							2		2														1	
412	09	B	1	2									1		2	1	3	4	4					2	2	2	2		1	
413	87	C	1	2				2	1	1			2																1	
419	04	B	1	2									1		2	2			3	5				2	2	2	2		1	
420	87	C	1	2				2	2	1	2		2		2	2			2	4				2	2	2	2		1	
421	06	B	1	2									1		2	2			7	4				2	2	1	2		2	
423	87	C	1	2				2	2	1	2		2		2	2			7	4				2	2	2	2		1	
424	03	B	1	2									1		1	2			2	1				2	1	2	2		2	
426	87	C	1	2				2	2	1	2		2		2	2			2	4				2	2	2	2		1	
427	03	B	1	2				2	1				2		1	2			2	1				2	1	2	2		3	
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433	87	B	3	1	1	4							1		2	1	1	4					2	2	2	4		1		
434	19	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
435	87	C	1	1	3	2	1						2		2				4					2	2	2	2		1	
438	87	B	1	1	1	4	1						1		2	1	1	4	6	2				2	2	2	2		1	
439	19	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	

# Year 7 History: Database

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	
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024	01	C	1	2				1	1	2			2		4	2		4						2	2	1	1			
025	01	C	2	2						2	2				4	2		4						2	2	2	1			
026	87	B	1	2					2	3			2		2	1		4						2	1	2	2			
027	87	B	1	1	1	4	1			3			2		4	2		4	6					1	2	2	2			
028	01	C	1	2					2	1	1	2																		
029	01	C	2	2									1	2	2	1		4	4					2	2	1	2			
030	02	C	1	2					2	1	1	2																		
032	01	C	2	2					2	2	1	2			2	1		4						2	2	1	5			
033	01	C	2	2									1	2		4	2	4	4					2	2	1	4			
034	03	C	2	2									2	2		4	2	4	4					2	2	2	4			
035	87	C	1	1	1	2							1	2																
037	87	C	2	1	3	2	2						2	2		4	2	4	4					2	2	2	2			
038	87	B	1	1	1	4	1						1			2	1	1	4	6	2			2	2	2	2			
039	04	C	1	2					1	2	1	2				2	1	1	4	4				2	2	1	2			
040	03	C	2	2									2	2					4				2	2	2	4				
041	87	C	1	1	3	2	1						2	2					4				2	2	2	2				
042	87	B	2	2					2	2			1		2	2		2					2	1	2	2				
043	87	B	1	1	1	5	1						1			2	1	4	4	6				1	2	2	2			
044	04	C	1	2					1	1	1	1	2						4				2	2	1	2				
045	03	C	2	2									2	2					4				2	2	2	4				
046	87	C	1	1	1	2							2	2																
049	87	B	1	1	1	4	1						1		1	1		4	6				2	2	2	2				
050	05	C	1	2					1	1	1	2	2						4				2	2	2	2				
051	87	C	1	1	3	2	1						2	2					4				2	2	2	2				
052	18	C	1	2					1	1	1	1	2						4				2	2	1	2				
053	05	C	2	2									2	2		4	2						2	2	2	1				
054	87	C	1	1	1	2							2	2																
055	87	B	1	1	1	4	1						1			4	2	6	5	1			2	2	2	2				
056	02	C	1	2					1	1	1	2	2						4				2	2	2	2				
057	87	B	1	1	1	4	1			3			2			2	2	1	4	6			2	2	2	2				
058	02	C	1	2					1	1	1	1	2						4				2	2	1	2				
059	19	C	2	2									2	2					4				2	2	2	4				
060	87	C	1	1	3	2	1						2	2					4				2	2	2	2				
062	87	B	1	1	1	5	1						1			4	2	4	1				2	1	2	2				
063	87	B											1			4	2	4	4				2	2	2	2				
064	06	C	1	2					1	1	1	2	2						1				2	2	2	2				
065	87	C	1	1	3	2	1						2	2					1				2	2	2	2				
066	87	B	1	1	1	4	1						1			2	1		4	6			2	2	2	2				
067	07	C	1	2					1	2	1	2	2			2	1		4	4			2	2	2	2				
068	87	C	1	1	3	2	1						1	2					4				2	2	1	2				
069	87	C	2	1	2	2							2	2					2	2	1	4	4	2	2	2	4			
070	87	B	1	1	1	5	1						1			2	1	4	4	6			2	2	2	2				
071	03	C	1	2					1	1	1	1	2						4				2	2	1	2				
072	02	C	2	2									2	2					4				2	2	2	4				
073	87	B	1	1	1	5	1			3			2						2	1	4	4	6	2	2	2	2			
074	03	C	1	2					1	2	1	1	2						2	1	4	4	4	2	2	1	2			
075	02	C	1	2					1	1	1	1	2						4				2	2	2	2				
076	03	C	2	2									1	2					4	1	7	2		2	2	2	1			
077	03	C	2	2									2	2					2	1	4	7	4	2	2	1	5			
078	87	C	1	1	1	2							2	2																
079	87	B	1	1	1	5	1						1			2	1		4	3			2	2	1	2				
080	87	B											1			2	1		4	4			2	2	2	2				
081	06	C	1	2					1	2	1	1	2						2	1		4		2	2	1	2			

082	06	C22	1	2	11		212	5
083	06	C22	2	2		42 4 3	1222	
084	87	B12	21	2		22244	2222	
085	08	C12	12	11	2	11 4	2122	
086	08	C22	1	2		42 4	1212	
087	08	C22	2	2		42 4	122 5	
088	87	C1112	2	2				
089	87	B11111	1			42 462	2222	
090	09	C12	11	12	2	42 4	2222	
091	87	C11321	2	2		42 4	2222	
092	87	B11151	1			42 441	2222	
093	10	C12	11112	2		1	2222	
094	19	C12	11112	2		1	2222	
095	87	C1112	2	2				
097	87	B11141	1			22146	2222	
098	03	C12	11211	2		42 4	2212	
099	03	C22	2	2		22244	222 4	
100	87	C1112	2	2				
101	04	C12	11212	2		222445	2212	
103	87	C1122	2	2		4	2222	
104	87	B11151	1			42 441	2212	
105	87	B	1			42 44	222 1	
106	04	C12	11111	2		1	2212	
107	04	C22	2	2		42 44	222 1	
108	11	C12	11112	2		1	2222	
110	04	B22	22	2		42 44	222 1	
111	04	C12	11112	2		1	2222	
112	87	C11321	1	2		1	2212	
113	87	C2122	1	2		22244	222 1	
114	87	C2122	2	2		22244	221 5	
115	12	C12	11111	2		1	2212	
116	12	C22	2	2		42 41	222 1	
117	87	C1112	2	2				
118	87	B11141	1	21		461	2222	
119	13	C12	12	12	2	21 441	2222	
120	87	C1112	2	2				
124	87	B11151	1			42 4 12	2222	
126	14	C12	11112	2		1	2222	
127	87	C1111	2	2				
129	15	C12	11112	2		1	2222	
130	87	C1133	2	2		1	2222	
131	19	C12	11112	2		1	2222	
132	87	C11321	2	2		1	2222	
133	87	B11141	1	11		62	2122	
134	87	B	1			21244	1222	
135	13	C12	11211	2		42 4 1	221 1	
136	13	C22	1	2		42 44	221 2	
137	13	C22	2	2		42 41	222 5	
138	87	C1121	2	2		224 24	2222	
140	01	C12	11212	2		42 4 12	2222	
141	87	C11321	1	2		42 4 12	2212	
142	87	C2122	2	2		22444	222 1	
144	87	B11141	1			22146	2222	
145	01	C12	11112	2		4	2222	
146	87	C11321	2	2		4	2222	
147	87	B11111	1			42 46	2212	
148	87	B	1	11		44	212 2	
149	87	B	1			42 44	1222	
150	01	C12	12	11	2	42 4 1	2212	

151	01	C22	1	2	42	44	221	5
152	01	C22	1	2	42	41	221	5
153	01	C22	1	2	11	44	221	4
154	01	C22	2	2	42	441	222	2
155	87	C11321	2	2	42	441	2222	
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157	87	B	1		42	44	222	2
158	09	C12	12	11	2	22244	2212	
159	09	C22	2	2	22244		222	5
160	03	C12	12	11	2	223441	2212	
162	03	C22	1	2	22244		221	5
163	03	C22	2	2	4		222	4
164	87	B12	23	2	2224		2122	
165	87	B22	22	2	42	4	1222	
166	19	C12	21	12	2			
167	87	C11321	2	2				
168	87	B11141	1	11	46		2222	
169	13	C12	12	11	2	11	4	2122
170	13	C22	1	2	42	44	1212	
171	13	C22	2	2	222445		122	5
172	87	C1112	2	2				
173	87	B11141	1	11	465		2222	
174	01	C12	11211	2	22244		2212	
175	01	C22	2	2	42	444	222	5
176	87	C1122	1	2	22244		2212	
177	87	C2122	2	2	21	444	222	4
178	87	B11151	1		42	441	2222	
179	08	C12	11112	2	1		2222	
180	87	B11151	3	2	1		2222	
181	04	C12	11112	2	1		2222	
182	87	C11321	2	2	1		2222	
183	87	B11111	1	12	61		2222	
184	03	C12	12	11	2	42	4	2212
185	03	C22	1	2	11	44	221	5
186	03	C22	1	2	11	44	212	5
187	03	C22	1	2	22244		1212	
188	02	C22	1	2	222445		121	5
190	01	C22	1	2	11	44	212	5
191	01	C22	1	2	42	442	1212	
193	01	C22	1	2	42	44	121	5
194	03	C22	1	2	4		212	4
195	03	C22	1	2	42	442	1212	
196	03	C22	2	2	22244		122	5
197	87	C1122	1	2	22444		2212	
198	87	C2122	1	2	21	4	212	1
199	87	C2122	2	2	22244		1222	
200	87	B11151	1		42	4	1	2212
202	87	B	1		42	44	222	2
203	16	C12	11112	2	1		2222	
204	87	C11321	1	2	1		2212	
205	87	C2122	2	2	42	4	222	2
206	87	B11141	1	21	465		2222	
207	08	C12	11211	2	22244		1212	
208	08	C22	2	2	22244		122	4
209	87	C1122	1	2	22344		2212	
210	87	C2122	2	2	4		222	2
212	09	C12	12	11	2	11	4	2122
213	09	C22	1	2	22244		1212	
214	09	C22	2	2	22244		122	5

215	87	C1112	2	2			
216	87	B11141	1		21146	2222	
217	09	C12	11212	2	22244	2222	
218	87	C1112	2	2			
220	87	B11151	1		42 4 1	2222	
221	08	C12	11112	2	1	2222	
222	87	C11321	2	2	1	2222	
223	87	B11141	1		21146	2222	
224	08	C12	11211	2	41 4 1	2212	
225	08	C22	2	2	41 4	222 5	
226	87	C1122	2	2	22244	2222	
236	87	B11141	1	11	46	2222	
237	01	C12	12 11	2	222441	2212	
238	01	C22	1 2	11	4	212 5	
239	01	C22	1 2		42 42	1212	
241	01	C22	1 2		42 44	121 5	
242	01	C22	2	2	22244	122 5	
243	87	C1121	2	2	22244	2222	
245	03	C12	12 11	2	11 4	2122	
246	03	C22	1 2		42 4 41	1212	
247	03	C22	1 2	11	4	212 5	
248	03	C22	2	2	22144	1222	
249	87	C1112	2	2			
250	17	C12	12 11	2	22144	2212	
251	17	C22	2	2	22444	222 5	
252	87	C11321	2	2	22444	2222	
254	87	B11141	1	2	11 46	2222	
255	13	C12	12 11	2	11 4	2122	
256	13	C22	1 2	11	44	1122	
257	13	C22	1 2		42 442	1212	
259	13	C22	1 2		42 4	121 5	
260	13	C22	2	2	42 44	122 1	
261	87	C1112	2	2			
267	87	B11141	1		22146	2222	
268	14	C12	11111	2	4	2212	
269	87	C22	1 2		22244	221 4	
270	14	C22	1 2		4	212 5	
271	14	C22	2	2	42 4 41	1222	
272	87	C1112	2	2			
273	87	B11141	1	11	465	2222	
274	06	C12	11112	2	4	1222	
275	87	C11322	2	2	22244	2222	
276	87	B11141	1		21146	2222	
277	04	C12	11112	2	4	2222	
278	18	C12	11112	2	4	2222	
279	87	C1111	2	2			
280	03	C12	11112	2	4	2222	
281	04	C12	11112	2	4	2222	
282	87	C11322	2	2	4	2222	
284	87	B11141	1	11	46	2222	
285	01	C12	12 11	2	11 4	2122	
286	01	C22	1 2		42 4 1	1212	
287	01	C22	1 2		42 4	121 5	
288	01	C22	2	2	42 441	122 5	
289	87	C1112	2	2			
293	87	B11131	1		22446	2222	
294	01	C12	11211	2	12 7	2122	
295	01	C22	2	2	22244	1222	
296	87	C11322	2	2	11 7	2222	

300	87	B11141	1	11	46	2222
301	06	C12	12	11	2 11 4	2122
302	06	C22	1	2	22244	1212
303	87	C22	2	2	4	122 4
305	87	B11141	3	2	21146	2222
306	06	C12	11212	2	22244	2222
307	87	C1112	2	2		
318	87	B41141	1		221461	2222
319	07	C12	12	11	2 11 45	2212
320	07	C22	1	2	11 45	221 5
321	07	C22	1	2	42 443	221 5
322	03	C22	1	2	42 43	221 4
324	87	C11321	1	2	11 5	2212
325	18	C22	2	2	3	222 4
326	87	C21322	2	2	42 43	222 5
327	87	B12	2	1	22244	2222
328	03	C12	21	12	2	
329	87	B11131	3	2	222444	2222
330	03	C12	11211	2	42 44	2212
331	03	C22	1	2	22244	221 5
332	03	C22	1	2	42 44	222 1
333	03	C22	1	2	22 2	212 5
334	03	C22	2	2	42 44	1222
335	87	B12	23	2	22 2	2122
336	87	B22	223	2	42 4 4	1222
337	19	C12	21	12	2	
339	03	C12	22	11	2 42 44	2212
340	03	C22	1	2	22144	221 5
341	03	C22	1	2	42 4	221 5
342	03	C22	1	2	22174	222 4
343	09	C22	2	2	4	222 4
344	87	C11321	2	2	4	2222
345	87	B12	23	2	42 4	2222
346	06	C12	22	12	2 42 44	2222
347	87	C11322	1	2	42 44	2212
348	87	C1122	2	2	2224 5	221 4
349	87	B12	21	2	42 43	222 1
350	03	C12	22	11	2 22 2	2212
351	03	C22	2	2	22244	222 5
352	87	B22	222	2	6	2222
353	03	C12	21	12	2	
354	13	C12	22	12	2 42 4	2222
355	03	C12	21	11	2 4	2212
356	03	C22	1	2	4	221 5
357	03	C22	2	2	22244	222 4
358	87	C1122	2	2	42 24	2222
360	07	C12	12	11	2 42 44	222 2
361	07	C22	1	2	42 44	2212
362	07	C22	1	2	42 44	221 5
363	07	C22	1	2	42 4	221 5
364	07	C22	1	2	11 3	212 5
365	07	C22	1	2	22344	1212
366	07	C22	1	2	22344	121 5
367	07	C22	1	2	42 1	121 5
368	07	C22	1	2	42 2	121 5
369	07	C22	1	2	22244	121 5
370	07	C22	1	2	42 1	121 5
371	07	C22	2	2	42 44	122 5
372	87	B11141	2	2	12 26	2222

373	07	C12	12	11	2	12	2	2122
374	07	C22		2	2	42	4	1222
394	87	B11141		1		22146		2222
395	13	C12	11112	2		4		2222
396	87	C11321		2	2	4		2222
397	87	B11141		1		21146		2222
398	13	C12	12	11	2	42	425	2212
399	87	C1112		2	2			
401	03	C22		2	2		2	222 4
402	19	C1121		2	2		2	2222
403	87	C1121		2	2	21444		2222
412	09	B12		2	1	21344		2222
413	87	C12	21	11	2			
414	87	C22		2	2	21144		222 4
417	87	B12		2	1	32 4		2212
418	87	B				42 34		222 2
419	04	B12		2	1	22 3 5		2222
420	87	C12	22	12	2	22 24		2222
421	06	B12		2	1	22 74		2212
422	04	B12		2	1	4		222 4
423	87	C12	22	12	2	22 74		2222
424	03	B12		2	1	12 21		2122
425	03	B11151		1		21444		1222
426	87	C12	22	12	2	22 24		2222
427	03	B12		2	1 2	12 21		2122
428	03	B11151		2		21444		1212
429	03	B11151		2		2144 2		122 4
430	87	C12	22	11	2	42 4		2212
431	87	C22		1	2	2114		221 1
433	87	B3114		1		2114		222 4
434	19	C12	11112	2		4		2222
435	87	C11321		2	2	4		2222
438	87	B11141		1		211462		2222
439	19	C12	11112	2		4		2222

## Appendix 2.2

### Year 11 History: Triadic Database

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	N	
041	88	B	1	1	1	1	1	1					1		1	2	6			2	2	1	2		2	2	1	2		2	
044	52	C	1	2					1	2	2		2		4	2	4								2	2	2	2		1	
045	88	C	1	1	2	3							1	2		2	2	1	4						2	2	1	2		2	
047	88	B	1	1	1	4	1		4				2		1	2			3	6	5	2			2	2	2	2		1	
048	53	C	1	2									2			2	2	2	4						2	2	2	2		1	
049	88	B	4	1	1	2	1		3				2			2	2	2	4	4	3				2	2	2	2		1	
050	54	C	1	2						1	1		2			4	2	4	4						2	2	2	2		2	
052	88	C	1	1	3	2	2						1	2			4	2	4	4					2	2	2	2		2	
054	88	B	3	1	1	4			4				2			2	2	2	4						2	2	2	2		1	
057	55	C	1	2						1	1	1	2	2					4						2	2	2	2		1	
058	88	C	1	1	3	2	1						1	2					4						2	2	1	2		7	
068	88	B	1	1	2	3							1			2	2	1	4	6					1	2	2	2		2	
070	56	C	1	2						1	1	2	1	2			2	2	2	4					2	2	2	2		1	
071	88	B	3	1	1	5			4				2		1	2			3	5					2	2	2	2		1	
072	51	C	1	2						1	1	1	2	2					5						2	2	2	2		1	
073	88	C	1	1	3	2	2						2	2					5						2	2	2	2		1	
074	88	B	4	1	1	4	1						1						6						2	2	2	2		1	
075	57	C	1	2						1	1	1	2	2			4	2	4						2	2	2	2		1	
076	88	C	1	1	1	2							2	2																1	
077	88	B	1	1	1	3	1						1			2	2	3	4	4	4				2	2	2	2		1	
078	54	C	1	2						1	1	1	2	2					4						2	2	2	2		1	
079	88	C	1	1	3	2	2						2	2			2	2	4	4	4				2	2	2	2		1	
080	88	B	1	1	1	3	1		5				2			2	2	3	4	4	4				2	2	2	2		1	
081	58	C	1	2						1	2	1	1	2	2			4	2	4	4					2	2	1	2		4
085	88	C	1	1	2	2							2	2			4	2	4	4					2	2	2	2		1	
087	88	B	4	1	1	5	1						1			4	2	4	1	1					2	2	2	2		1	
088	59	C	1	2						1	1	1	2	2					1						2	2	2	2		1	
089	88	C	1	1	3	3							1	2					4						2	2	1	1		6	
097	88	B	1	1	1	4	1						1		1	2			3	6	5				2	2	2	2		1	
099	51	C	1	2						1	1	1	2	2					4						2	2	2	2		1	
100	88	C	1	1	2	2							2	2			2	2	1	4	4				2	2	2	2		1	
101	88	B	1	1	2	3			5				2			2	2	1	4	6					2	2	2	2		1	
102	60	C	1	2						1	1	2	1	1	2			4	2	4	3					2	2	1	2		2
103	88	C	1	1	2	2							2	2			3	2	4						2	2	2	2		1	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	N
104	88	B	1	1	1	4	1						1		2	2	1	4	6					2	2	2	2		1	
106	51	C	2	2									2	2	4	2	4	4					2	2	2	4		2		
108	88	C	2	1	2	2							2	2	3	2	4						2	2	2	4		2		
124	88	B	1	1	1	4	1	1					2		1	2		3	6	5				2	2	2	2		1	
126	51	C	1	2				1	1	2	1		2		4	2	4	4					1	2	1	2		3		
129	88	C	1	1	2	2							2	2	3	2	4							2	2	2	2		1	
132	88	B	1	1	1	4	1						1		2	2	1	4	6					2	2	2	2		1	
138	61	C	1	2				1	1	1	2		2					4						2	2	2	2		1	
139	88	C	1	1	3	2	2						2	2				4						2	2	2	2		1	
142	88	B	1	1	1	1	1						1		4	2	4	6						2	2	2	2		1	
143	62	C	1	2				1	2	1	2		2		1	1		4	4	5				2	2	2	2		1	
144	88	C	1	1	3	2	2						1	2	1	1		4	4					2	2	1	2		3	
147	88	B	4	1	1	5	1						1		4	2	4	4	1					2	2	2	2		1	
148	51	C	1	2				1	1	1	2		2						1					2	2	2	2		1	
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181	67	C	1	2				1	1	1	2		2						1					2	2	2	2		1	
182	88	C	1	1	3	2	1						2	2					1					2	2	2	2		1	
191	88	B	1	1	1	4	1						1		2	1		4	6	2	1			2	2	2	2		1	
194	67	C	1	2				1	1	1	2		2						4					2	2	2	2		1	
195	88	C	1	1	3	2	1						1	2					4					2	2	1	2		2	
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199	88	C	1	1	3	2	1						2	2					4					2	2	2	2		1	
200	88	B	1	1	2	4							1				2	2	1	4	6				2	2	2		1	
201	88	C	1	2				1	2	1	2		2		3	2		4						2	2	2	2		1	

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320	61	C	1	2				1	1	1	2		2					4						2	2	2	2		1	
321	88	C	1	1	3	2	2						2		2			4						2	2	2	2		1	
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337	53	C12	11212		2		42 7		2222	1
338	88	C11322	2	2			4		2222	1
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340	61	C12	11112		2		223 4		2222	1
341	88	C11322	2	2			4		2222	1
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343	51	C12	11112		2		4		2222	1
344	88	C11322	1	2			4		2212	2
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345	88	B1124	5		2	11	61		2222	1
346	88	C12	11112		2		4		222 5	3
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347	88	B1124	5		2	11	61		2222	1
348	58	C22		2	2		4		222 5	1
349	88	C11322	2	2			4		2222	1
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351	63	C12	11112		2		4		2222	1
352	88	C11321	1	2			4		2212	2
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366	88	B11141			1		22146		1222	2
370	51	C12	11112		2		42 4		2222	1
371	88	C11321	2	2			42 44		2222	1
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372	88	B3114			1		42 46		2222	1
373	67	C12	11112		2		4		2222	1
374	88	C1121	2	2			4		2222	1
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375	88	B11141			1	22	365		2222	1
377	58	C12	11212		2		42 4		2222	1
378	88	C11321	1	2			42 44		2212	2
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380	88	B41151			1		42 4415		2222	1
381	53	C12	11112		2		5		2222	1
382	88	C11321	1	2			15		2212	8
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405	88	B41141			1		42 643		2222	1
406	67	C12	11112		2		4		2222	1
407	88	C1123	2	2			32 4		2222	1
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410	88	B3114	1		2		222641		222 1	1
411	67	C12	11112		2		4		2222	1
412	88	C11322	2	2			4		2222	1
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419	88	B11141			1		22264		2222	1
420	67	C12	11112		2		4		2222	1
421	88	C11321	2	2			4		2222	1
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422	88	B11131	1	222444	2222	1
424	64	C12 11212	2	42 44	222 1	1
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425	88	B11121 3	2	42 443	2222	1
426	55	C12 12 12	2	22344	2222	1
427	88	C11322 1	2	22344	2212	7
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# Year 11 History: Database

no. sp Iabcde fghjk D Eabcde jkmm Fabcde

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043	51	C12	12	12	2	22244	2222
044	52	C12	12	12	2	42 4	2222
045	88	C1123		1	2	22144	2212
046	88	C2123		2	2	42 4	222 4
047	88	B11141	4	2	12	3652	2222
048	53	C12	12	12	2	22244	2222
049	88	B41121	3	2		222443	2222
050	54	C12	12	11	2	42 44	222 2
051	54	C22		2	2	21 44	2212
052	88	C11322		1	2	42 44	222 2
053	88	C21322		2	2	21 44	2212
054	88	B3114	4	2		2224	2222
055	88	B11141	4	2		21146	2222
056	88	B3114	4	2		4	2222
057	55	C12	11112	2		4	2222
058	88	C11321		1	2	4	2212
059	88	C2122		1	2	22244	221 4
060	88	C2122		1	2	42 4	221 2
061	88	C2122		1	2	42 4	221 5
062	88	C2122		1	2	42 4 2	222 5
063	88	C2122		1	2	42 4 3	221 4
064	88	C2222		2	2	42 4	222 5
065	88	B11131		1		221 6	2222
068	88	B1123		1		22146	2222
070	56	C12	11212	2		22244	2222
071	88	B3115	4	2	12	3 5	2222
072	51	C12	11112	2		5	2222
073	88	C11322		2	2	5	2222
074	88	B41141		1		6	2222
075	57	C12	11112	2		42 4	2222
076	88	C1112		2	2		
077	88	B11131		1		223444	2222
078	54	C12	11112	2		4	2222
079	88	C11322		2	2	22444	2222
081	58	C12	12	11	2	42 44	2212
082	58	C22		1	2	42 4	221 3
083	58	C22		1	2	42 4	221 1
084	58	C22		2	2	42 4	222 4
085	88	C1122		2	2	42 44	2222
087	88	B41151		1		42 4 1	2222
088	59	C12	11112	2		1	2222
089	88	C1133		1	2	4	221 1
090	88	C2123		1	2	22244	221 5
091	88	C2123		1	2	42 34	221 5
092	88	C2122		1	2	21 4	212 5
093	88	C2122		1	2	22244	1212
094	88	C2122		2	2	222442	222 5
097	88	B11141		1	12	365	2222
098	57	C12	12	12	2	22244	2222
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107	88	C1122	1	2	22434		2212		
108	88	C2122	2	2	32	4	222	4	
124	88	B11141	1	2	12	365	2222		
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127	51	C22	1	2	223	4	121	5	
128	51	C22	2	2	42	44	122	5	
129	88	C1122	2	2	32	4	2222		
132	88	B11141	1		22146		2222		
138	61	C12	11112	2	4		2222		
139	88	C11322	2	2	4		2222		
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146	88	C2122	2	2	22244		222	5	
147	88	B41151	1		42	441	2222		
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151	88	B12	2	1	22	2	2222		
152	63	C12	23	12	2				
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162	88	C2122	1	2	11	4	3	221	5
163	88	C2122	2	2	42	4	1	222	4
166	88	B11141	1	11	46		2222		
167	54	C12	11212	2	22144		1222		
168	88	B12	23	2	11	4	2222		
169	58	C12	21	12	2	11	4	2222	
173	61	C12	12	11	2	11	4	2122	
174	61	C22	1	2	42	4	3	1212	
175	61	C22	2	2	22344		122	5	
176	88	C1122	1	2	11	44	2212		
177	88	C2131	1	2	42	44	221	5	
178	88	C2122	1	2	22144		221	4	
179	88	C2122	2	2	22244		222	5	
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181	67	C12	11112	2	1		2222		
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210	88	C2122	1 2	22244	221 4
211	88	C2122	2 2	22244	222 4
212	88	B11131	1	22146	2222
213	53	C12	11211 2	21 4	212 1
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215	53	C22	1 2	21	212 5
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217	53	C22	2 2	42 4	222 1
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226	58	C12	12 11 2	22 2	2122
227	58	C22	1 2	22244	2212
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237	88	C2123	1 2	22	212 5
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254	88	B41151	1	42 4 1	2222
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256	88	C11321	2 2	1	2222
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263	88	C21321	2 2	22344	222 2
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268	67	C12	11112 2	4	2222
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374	88	C1121	2 2	4	2222
375	88	B11141	1 22	365	2222
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378	88	C11321	1 2	42 44	2212
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383	88	C2122	1 2 22		212 5
384	88	C2122	1 2	21244	1212
385	88	C2122	1 2 21	44	121 5
386	88	C2122	1 2	42 441	121 1

387	88	C2122	1	2	22244	221	5
388	88	C2122	1	2	42 41	221	5
389	88	C2122	2	2	42 44	222	4
400	88	B41141	1		22146	2222	
401	67	C12	11112	2	4	2222	
402	88	C11321	1	2	4	2212	
403	88	C2122	1	2	22344	221	5
404	88	C2122	2	2	42 44	222	4
405	88	B41141	1		42 643	2222	
406	67	C12	11112	2	4	2222	
407	88	C1123	2	2	32 4	2222	
408	65	C12	11112	2	4	2222	
409	88	C11322	2	2	21 44	2212	
410	88	B3114	1	2	222641	222	1
411	67	C12	11112	2	4	2222	
412	88	C11322	2	2	4	2222	
419	88	B11141	1		22264	2222	
420	67	C12	11112	2	4	2222	
421	88	C11321	2	2	4	2222	
422	88	B11131	1		222444	2222	
423	66	C12	11212	2	22244	222	1
424	64	C12	11212	2	42 44	222	1
425	88	B11121	3	2	42 443	2222	
426	55	C12	12 12	2	22344	2222	
427	88	C11322	1	2	22344	2212	
428	88	C2122	1	2	22244	221	4
429	88	C2122	1	2	22244	221	4
430	88	C2122	1	2	22	2122	
431	88	C2122	1	2	12 3	1122	
432	88	C2122	1	2	22144	1212	
433	88	C2122	2	2	22244	1222	5

# Appendix 2.3

## Year 7 Science: Triadic Database

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
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019	21	C	1	2		1	1	1	1	2			2				4							2	2	2	2		1	
020	97	C	1	1	3	3							2	2		4	1	4	4					2	2	2	2		1	
021	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
022	22	C	1	2		1	1	1	1	2			2			4	1							2	2	2	2		1	
023	97	C	1	1	3	2	1						2			4	1	4						2	2	1	2		2	
025	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
026	22	C	1	2		1	1	2	1	2			2			4	1	4	4					2	2	2	2		1	
027	97	B	1	1	1	4	1						2			2	1	1	4	6				1	2	2	2		2	
029	23	C	1	2		1	1	2	1	2			2			4	1	7	4					2	2	2	2		1	
030	97	C	1	1	3	2	2						2	2		2	1	1	4	4				2	2	2	2		1	
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033	97	C	1	1	3	2	2						2	2		4	1	4	4					2	2	2	2		1	
034	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
035	25	C	1	2		1	1	1	2				2				4							2	2	2	2		1	
036	97	C	1	1	3	2	1						2	2		2	1	1	4	4				2	2	2	2		1	
037	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
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039	97	C	1	1	3	2	1						2	2		2	1	1	4	4				2	2	2	2		1	
043	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
044	27	C	1	2		1	1	1	2				2				4							2	2	2	2		1	
046	97	B	1	1	1	5	1						2			2	2	2	4	4	3			2	2	2	2		1	
047	27	C	1	2		1	2		1	2			2			4	1	4	4	4				2	2	2	2		1	
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058	97	C	1	1	1	2							2	2															1	
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062	97	B	1	1	2	4							2			2	1	1	4	6				2	2	2	2		1	
063	30	C	1	2		1	1	2	1	2			2			4	1	4	4					2	2	2	2		1	
064	97	C	1	1	2	3							2	2			4							2	2	2	1		1	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	N
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066	29	C	1	2				1	3	1	2		2																1	
067	97	C	1	1	2	1							2	2	1	1	4	4						2	2	2	2		1	
068	97	B	1	1	1	4	1						2		2	1	1	4	6					1	2	2	2		2	
069	22	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
070	97	C	1	1	3	2	2						1	2		2	1	1	4	4				2	2	1	2		6	
080	97	B	3	1	1	4							1		2	1	1	4	6					2	2	2	2		1	
081	23	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
082	97	C	1	1	1	2							2	2															1	
085	97	B	1	1	2	4							1		2	1	1	4	6					2	2	2	2		1	
086	31	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
087	97	C	1	1	1	3							2	2															1	
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090	32	C	1	2				1	1	1	1	2	2						4										1	
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094	97	B	1	1	1	4	1						1		2	1	1	4	6					2	2	2	2		1	
095	29	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
096	97	C	1	1	3	2	2						1	2					2	1	2	4	4		2	2	1		3	
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104	21	C	2	2									2	2					2	1	2	4			2	2	5		3	
105	97	C	1	1	3	1							1	2					2	1	1	4			2	2	1		2	
106	97	B	1	1	1	3	1	5					2		2	1	1	4	4	4	4			2	2	2	5		1	
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111	97	B	1	1	1	1	1						1		2	4	1	4	6					2	2	2	2		1	
112	26	C	1	2				1	2		1	1	2						2	1	1	4			2	2	1		3	
116	97	C	1	1	2	2							1	2					4	1	4	3			2	2	1		2	
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123	22	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
124	97	C	1	1	3	2	2						2	2					4					2	2	2	2		1	
127	97	B	1	1	2	4							1		2	2	1	3	4	6				2	2	2	2		1	
128	31	C	1	2				1	1	1	1	2	2						4					2	2	2	2		1	
129	97	C	1	1	3	2	1						2	2					2	1	3	4			2	2	2		1	
131	97	B	1	1	1	3	1						1		2	2	1	3	4	4	4	1			1	2	2		2	
132	32	C	1	2				1	1	2	1	2	2						4	1		4	1			2	2		1	
133	97	C	1	1	3	2	1						1	2					4	1		4	1			2	2	1	2	
135	97	B	1	1	2	3							2		2				6					2	2	2	2		1	
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137	97	C	1	1	3	2	1						2	2					4	1		4	1			2	2	2	1	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
144	97	B	1	1	1	1	1	1	1	1	1	1	2		4	1	4	6	1					2	2	2	2		1	
145	26	C	1	2				1	1	2	1	2	2		4	1	4							2	2	2	2		1	
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153	97	C	1	1	3	2	1						2	2			4							2	2	2	2		1	
154	97	B	1	1	1	1	1						1		4	1	4	6						2	2	2	2		1	
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167	29	C	1	2				1	1	1	1	2	2				4							2	2	2	2		1	
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173	97	C	1	1	3	2	2						2				4							2	2	2	2		1	
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179	26	C	1	2				1	2	1	2	2	2			4	1	4	4	1				2	2	2	2		1	
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181	97	B	1	2				2	5				2		2	2		2	6	5				2	2	2	2		1	
182	97	C	1	2				1	2	1	1	2	2			2	1	1	4	4				2	2	1	2		6	
193	97	B	1	1	1	3	1						1		2	1	1	4	6					2	2	2	2		1	
194	32	C	1	2				1	1	2	1	2	2		2	1		4						2	2	2	1		1	
197	97	C	2	1	3	3							2			4	1	4	4	3				2	2	1	2		2	
198	97	B	1	1	1	3	1						2		4	1	7	4	4	3				2	2	2	2		1	
199	26	C	1	2				1	2	1	1	2	2			4	2	7	4					2	2	1	1		5	
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206	34	C	1	2				1	1	2	1	2	2		2	1		4						2	2	2	1		1	
207	97	C	1	1	3	2	2						2		2	2		3	4					2	2	2	2		1	
208	97	B	1	1	1	3	1						2		4	1	7	4	4	3				2	2	2	2		1	
209	27	C	1	2				1	3	1	2	2	2																1	
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211	22	C	1	2				1	1	2	1	2	2			2	1	3	4										1	
212	97	C	1	1	3	2	2						2		2	2		3	4					2	2	1	2		1	
213	97	B	1	1	1	3	1						2		4	1	7	4	4	3				2	2	2	2		1	
214	97	C	2	2				1	2	1	2	2	2			2	1	1	4	4				2	2	1	1		3	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
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218	29	C12	1	1	1	1	2						2				4							2	2	2	2			1
219	97	C1121					2	2					2		4	2	3	1						2	2	2	2			1
220	97	B1124		1									2				6							2	2	2	2			1
221	35	C12	1	1	1	1	2						2				4							2	2	2	2			1
222	97	C11321					2	2					2				4							2	2	2	2			1
223	97	B11141											1		2	1	4	6						2	2	2	2			1
224	36	C12	1	1	1	1	2						2				4							2	2	2	2			1
225	97	C1111					2	2					2																	1
226	97	B11141		1									2				2	1	4	6				2	2	2	2			1
227	23	C12	1	1	1	1	2						2				4							2	2	2	2			1
228	97	C11321					2	2					2				4							2	2	2	2			1
230	97	B11141											1		2	1	4	6						2	2	2	2			1
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233	97	B3114											1		2	1	4	6						2	2	2	2			1
235	27	C22					2	2					2				2	1	3	4	4			2	2	2	4			2
236	97	C1122					1	2					2				2	1	4	4				2	2	2	2			6
249	97	B11141											1		2	1	4	6						2	2	2	2			1
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251	97	C11321					2	2					2				4							2	2	2	2			1
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256	97	B11141											1		2	1	4	6						2	2	2	2			1
257	27	C12	1	1	1	1	2						2				4							2	2	2	2			1
258	97	B11151		3									2				2	1	4	4	6			2	2	2	2			1
259	27	C12	1	1	1	1	2						2				4							2	2	2	2			1
260	97	C1122					1	2					2				2	1	4	4				2	2	2	2			3
263	97	B4124											1		2	1	4	6						2	2	2	2			1
264	21	C12	1	1	1	1	2						2				4							2	2	2	2			1
265	97	C11321					2	2					2				4							2	2	2	2			1
266	97	B1124											1		2	1	4	6						2	2	2	2			1
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271	37	C12	1	1	1	1	2						2				4							2	2	2	2			1
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273	97	B1124		5									2				2	1	4	6				2	2	2	2			1
274	21	C12	1	1	1	1	2						2				4							2	2	2	2			1
275	97	C1122					2	2					2				2	1	4	4				2	2	2	2			1

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	F	a	b	c	d	e	N
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278	97	C	1	1	3	2	2						2				2	1	1	4				2	2	2	2		1
279	97	B	1	1	2	4		5					2				2	1	1	4	6			2	2	2	2		1
280	23	C	1	2				1	3		1	2	2																1
281	97	B	1	1	1	4	1	4					2				2	1	1	4	6			2	2	1	2		3
285	21	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
286	97	C	1	1	2	1							2					2	1	1	4			2	2	2	2		1
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303	97	C	1	1	3	2	1						2					4						2	2	2	2		1
304	97	B	1	1	2	4		5					2				2	1	1	4	6			2	2	2	2		1
305	36	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
306	97	C	1	1	3	2	1						2					4						2	2	2	2		1
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309	97	C	1	1	2	2							2					2	1	1	4			2	2	2	2		1
310	97	B	4	1	1	4	1						1				2	1	1	4	6			2	2	2	2		1
311	38	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
312	97	B	4	1	1	4	1	1					2				6							2	2	2	2		1
313	29	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
314	97	C	1	1	3	2	1						2					2	1	1	4			2	2	2	2		1
315	97	B	1	1	2	4							1				2	1	3	4	6			2	2	2	2		1
316	39	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
317	97	C	1	1	3	2	1						2					4						2	2	2	2		1
318	97	B	1	1	2	4		5					2				2	1	3	4	6			2	2	2	2		1
319	21	C	1	2				1	1	2	1	2	2				4	1		1				2	2	2	2		1
320	97	C	1	1	3	2	1						2				4	1		1				2	2	2	2		1
321	97	B	1	1	1	4	1						1				4	1		4	6			2	2	1	2		2
323	30	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
324	97	C	1	1	3	2	1						2					4						2	2	1	2		2
328	97	B	1	1	2	4		5					2				2	1	3	4	6			2	2	2	2		1
329	27	C	1	2				1	1	1	1	2	2					4						2	2	2	2		1
330	97	C	1	1	3	2	2						2					4	4					2	2	2	2		1

no.	sp	Iabcde fghjk			D	Eabcde jkmm			Fabcde	N
331	97	B1124	5		2	21146			2222	1
332	22	C12	11112		2	4			2222	1
333	97	C1122	2		2	21144			2222	1
-----										
334	97	B1124	5		2	21146			2222	1
335	40	C12	11112		2	4			2222	1
336	97	C11321	2		2	4			2222	1
-----										
337	97	B1124			1	21146			2222	1
338	24	C22		2	2	41 4			2212	2
339	97	C1122		1	2	41 44			2212	4
-----										
343	97	B3114			1	21146			2222	1
344	47	C12	11112		2	4			2222	1
345	97	C11321	2		2	4			2222	1
-----										
346	97	B1124			1	21146			2222	1
347	27	C12	11212		2	41 4 1			2222	1
348	97	C11321	2		2	41 4 1			2222	1
-----										
349	97	B1124	5		2	21146			2212	2
351	33	C12	11212		2	41 4 3			2222	1
352	97	C1123	2		2	2			222 1	1
-----										
354	97	B3114	1		2	21146			2222	1
355	33	C12	11212		2	41 4 12			2222	1
356	97	C1112	2		2					1
-----										
357	97	B11151			1	41 4 21			2222	1
358	34	C12	11112		2	2			2222	1
359	97	C11321	2		2	2			2222	1
-----										
361	97	B11141			1	21146			1222	2
362	22	C12	11112		2	4			2222	1
363	97	C11322	1		2	41 44			2212	2
-----										
366	97	B11151			1	41 4 3			2212	2
367	33	C12	11112		2	3			2222	1
368	97	C11322	1		2	21344			2212	5
-----										
372	97	B3115			1	41 3			222 5	4
373	25	C12	11112		2	3			2222	1
374	97	C11321	2		2	3			2222	1
-----										
377	97	B1124	5		2	21146			2222	1
379	37	C12	11112		2	213 4			2222	1
380	97	C11321	2		2	4			2222	1
-----										
381	97	B11121			1	41 4 3			2222	1
382	26	C12	11112		2	3			2222	1
383	97	C1122		1	2	41 4 3			2212	3
-----										
392	22	B12	2		1	21344			2222	1
393	97	C12	22 1		2	21 74			2212	3
-----										

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
398	97	B	1	1	1	2	1						1	4	1		4		3					2	2	2	2		1	
399	41	C	1	2			1	1	1	1	2		2	4			4							2	2	2	2		1	
400	97	C	1	1	3	2		1					2	4			4		4					2	2	1	2		2	
402	97	B	1	1	1	4	1						1	2	1	1	4	6						2	2	2	2		1	
403	37	C	1	2			1	1	2	1	2		2	4			4		3					2	2	2	2		1	
404	97	C	1	1	3	2		2					2	4			4		3					2	2	2	2		1	
405	97	B	1	1	1	4	1	5					2	2	1	1	4	6						2	2	2	2		1	
406	27	C	1	2			1	1	1	1	2		2	4			3							2	2	2	2		1	
407	97	C	1	1	3	2		1					2	4			4		3					2	2	1	2		4	
410	97	B	1	1	1	4	1	5					2	2	1	1	4	6						2	2	2	2		1	
411	32	C	1	2			1	1	2	1	2		2	2	1	4	4	4						2	2	2	2		1	
412	97	C	1	1	3	2		1					2	2	1	4	4	4						2	2	2	1		5	
417	97	B	1	1	1	4	1						1	2	1	3	4	6						2	2	2	2		1	
418	29	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
419	97	C	1	1	3	2		1					2				4							2	2	2	1		3	
422	97	B	1	1	2	4	1	5					2	2	1	1	4	6						2	2	2	2		1	
423	31	C	1	2			1	1	2	1	2		2	4			4	4						2	2	2	2		1	
424	97	C	1	1	2	2		1					2	2	1	1	4	4						2	2	2	1		2	
427	97	B	1	1	1	4	1						1	2	1	1	4	6						2	2	2	2		1	
428	23	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
429	97	C	1	1	1	1		2					2																1	
430	97	B	1	1	1	4	1	1					2	2	1	1	4	6						2	2	2	2		1	
431	34	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
432	97	C	1	1	3	2		2					2				4							2	2	2	2		1	
435	97	B	1	1	2	4	1						1	2	1	1	4	6						2	2	2	2		1	
436	29	C	1	2			1	1	2	1	2		2	4			4							2	2	2	2		1	
437	97	C	1	1	2	2		2					2	2	1	1	4	4						2	2	2	2		1	
438	97	B	1	1	2	4	1						1	2	1	1	4	6						2	2	2	2		1	
439	21	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
440	97	C	1	1	3	2		1					2	2	1	3	4	4						2	2	2	1		2	
442	97	B	1	1	2	4	1	5					2				6							2	2	2	2		1	
443	31	C	1	2			1	1	2	1	2		2	4			4							2	2	2	2		1	
444	97	C	1	1	3	2		2					2				4							2	2	2	2		1	
445	97	B	1	1	1	5	1						1	2	1	4	4	6						2	2	2	2		1	
446	27	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
447	97	C	1	1	3	2		1					2	2	1	2	4	4	2					2	2	2	1		2	
456	97	B	1	1	2	4	1	5					2	2	1	1	4	6						2	2	2	2		1	
457	32	C	1	2			1	1	2	1	2		2	4			4		1					2	2	2	2		1	
458	97	C	1	1	1	2		2					2																1	
460	97	B	1	1	1	4	1						1	2	1	1	4	6						2	2	2	1		2	
463	22	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
464	97	C	1	1	3	2		1					2				4							2	2	2	1		3	

no.	sp	I a b c d e f g h j k			D	E a b c d e j k m m			F a b c d e	N
467	21	B22	22		1	41	4	1	2212	3
470	97	C12	22	11	2	41	443		2212	4
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473	97	B1124	5		2	21146			2222	1
474	42	C12	12	12	2	41	441		2212	2
-----										
477	97	B11131			1	41	4	14	1222	2
478	30	C12	11212		2	41	44		222 1	1
479	97	C11322		2	2		4		2222	1
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480	97	B1123	5		2		6		2222	1
481	27	C12	11212		2	41	4		222 1	1
482	97	C11321		2	2	41	4		2222	1
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486	97	B11141			1	21146			2222	1
487	31	C12	11112		2		4		2222	1
488	97	C11321		2	2		4		2222	1
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489	97	B1124			1	21146			2222	1
490	32	C12	11112		2		4		2222	1
491	97	C11322		2	2	213441			2222	1
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492	97	B1124	5		2	21146			2222	1
493	40	C12	11112		2		4		2222	1
494	97	C11322		2	2	21344			2222	1
-----										
495	97	B1124	5		2	21146			2222	1
496	21	C12	11212		2	21344			2222	1
497	97	C11322		2	2	21344			2222	1
-----										
498	97	B1124	5		2	21146			2222	1
499	37	C12	11212		2	41	44		2222	1
500	97	C21321		2	2	41	44		2222	1
-----										
504	97	B1124	5		2	21146			2222	1
507	22	C22		2	2		4		222 1	3
508	97	C11322		1	2	21244			2212	2
-----										
514	97	B11141	5		2	21146			2222	1
515	37	C12	11212		2	41	44		2222	1
516	97	C1112		2	2					1
-----										
517	97	B11141			1	41	46		2222	1
518	31	C12	11112		2		4		2222	1
519	97	C11321		2	2		4		2222	1
-----										
520	97	B1124	5		2	21146			2222	1
521	40	C12	11112		2		4		2222	1
522	97	C1122		2	2		4		2222	1
-----										
524	97	B41141			1	21146			2222	1
525	26	C12	11211		2	41	4	1	2212	3
528	97	C1122		2	2	41	44		2222	1
-----										

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
529	97	B	1	1	1	4	1						2		2	1	1	4	6						2	2	2	2		1
530	25	C	1	2				1	1	2	1	2	2		4	1	4	3							2	2	2	2		1
531	97	C	1	1	3	2							2		2	1	3	4							2	2	2	2		1
532	97	B	1	1	2	4							2		1	2	2	4	6						2	2	2	2		1
533	27	C	1	2				1	1	2	1	2	2		2	1	3	4							2	2	2	2		1
534	97	C	1	1	3	3							1		2	2	1	3	4						2	2	1	2		3
536	97	B	1	1	2	4							2		2	2	1	4	6						2	2	2	2		1
538	23	C	2	2									2		2		4	1	4						2	2	1	2		2
539	97	C	1	1	2	2							1		2		2	1	4						2	2	1	2		2
541	97	B	1	1	2	4							2		2	2	2	1	4	6					2	2	2	2		1
542	25	C	1	2				1	1	2	1	2	2		4	1	4	1							2	2	2	2		1
543	97	C	1	1	3	2							1		2		4	1	4						1	2	1	2		3
546	97	B	1	1	2	4							2		2	2	2	1	4	6					2	2	2	2		1
547	27	C	1	2				1	1	2	1	2	2		2	1	3	4							2	2	2	2		1
548	97	C	1	1	2	2							1		2		2	1	2	4					2	2	1	2		2
549	97	B	1	1	2	4							2		2	2	2	1	4	6					2	2	2	2		1
550	31	C	1	2				1	1	2	1	2	2		4	1	4	3							2	2	2	2		1
551	97	C	1	1	2	3							2		2		2	1	2	4	4	5			2	2	2	2		1
552	97	B	1	1	1	4	1						1		2	1	2	6	4	5					2	2	2	2		1
553	32	C	1	2				1	1	2	1	2	2		2	1	2	4							2	2	2	2		1
554	97	C	1	1	3	2	1						1		2		2	1	2	4					2	2	1	2		3
557	97	B	1	1	2	4							2		2	2	2	1	4	6					2	2	2	2		1
558	40	C	1	2				1	1	2	1	2	2		2	1	3	4							2	2	2	2		1
559	97	C	1	1	1	2							2		2															1
561	97	B	1	1	1	4	1						1		2	2	2	1	4	6					2	2	1	2		2
562	47	C	1	2				1	1	1	2	2	2				4								2	2	2	2		1
564	97	C	2	1	3	2	2						2		2		2	1	2	4					2	2	2	4		2
565	97	B	4	1	1	4	1						1		2	2	2	1	4	6					2	2	2	2		1
566	33	C	1	2				1	1	1	2	2	2				4								2	2	2	2		1
567	97	C	1	1	1	2							2		2															1
568	97	B	1	1	2	4							1		2	2	2	1	4	6					2	2	2	2		1
570	43	C	1	2				1	1	1	2	2	2				4								2	2	2	2		1
571	97	C	1	1	3	2	2						2		2		2	1	4						2	2	2	2		1
572	97	B	4	1	1	4	1						1		2	2	2	1	4	6					2	2	2	2		1
574	26	C	2	2									1		2		4	1	4						2	2	1	5		3
577	97	C	1	1	3	2	2						2		2		2	1	4						2	2	1	2		1
578	97	B	3	1	1	4	1						1		2	2	2	1	4	6					2	2	2	5		1
579	37	C	1	2				1	1	2	1	2	2		2	1	3	4							2	2	2	2		1
580	97	C	1	1	1	1							2		2															1
581	97	B	3	1	1	4	1						2		2	2	2	1	4	6					2	2	2	2		1
582	21	C	1	2				1	1	2	1	2	2		4	1	4	4							2	2	2	2		1
583	97	C	1	1	3	2	2						1		2			4							2	2	1	2		5

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
589	97	B	1	1	1	4	1						1		2	1	1	4	6					2	2	2	2		1	
590	29	C	1	2			1	1	2	1	2		2		2	1	3	4						2	2	2	2		1	
591	97	C	1	1	3	2	1		2				2		2	1	2	4						2	2	2	2		1	
593	97	B	1	1	1	5	1						1		2	1	4	4	6					2	2	1	2		2	
596	22	C	2	2				2		2			2		2	1	4	4	4					2	2	2	4		2	
597	97	C	1	1	3	2	1		1				2		2	2	1	4	4					2	2	1	2		2	
605	97	B	1	1	1	4	1	5					2		2	2	1	4	6					2	2	2	2		1	
606	44	C	1	2			1	1	2	1	2		2		4	1	4	3						2	2	2	2		1	
607	97	C	2	1	2	3			2				2		2	1	2	4	4	5				2	2	1	2		2	
680	97	B	1	1	1	4	1	5					2		2	2	1	4	6					2	2	2	2		1	
609	23	C	1	2			1	1	2	1	2		2		2	1	2	4						2	2	2	2		1	
610	97	C	1	1	3	2	2		2				2		2	2	1	2	4					2	2	2	2		1	
611	97	B	1	1	1	4	1						1		2	2	1	4	6					2	2	2	2		1	
612	21	C	1	2			1	1	2	1	2		2		4	1	7	1						2	2	2	2		1	
613	97	C	1	1	1	1			2				2																1	
614	97	B	1	1	1	4	1	1					2		2	2	1	4	6					2	2	2	2		1	
615	21	C	1	2			1	1	2	1	1		2		2	1	3	7	4					2	2	2	2		1	
617	97	C	1	1	2	2			1				2		2	2	1	4						2	2	1	2		2	
620	27	B	1	2				2					1		2	1	3	7	4					2	2	1	2		2	
622	97	C	1	2			2	2	1	1			2		2	1	3	4						2	2	1	2		6	
634	97	B	1	1	2	4							1		2	2	1	4	6					2	2	2	2		1	
635	44	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
637	97	C	2	1	3	2	1		2				2		2	2	1	4						2	1	2	2		2	
638	97	B	1	1	1	3	1						1		2	1	4	4	6					2	2	2	2		1	
639	32	C	1	2			1	1	1	1	2		2				4							2	2	2	2		1	
640	97	C	1	1	1	2			2				2		2														1	
642	97	B	1	1	2	2							1		2	2	1	4	6					2	2	2	2		1	
643	27	C	1	2			1	1	2	1	2		2		4	1		4						2	2	2	2		1	
644	97	B	1	1	1	5	1	3					2		4	1	4	1						2	2	2	2		1	
645	27	C	1	2			1	1	1	1	2		2				1							2	2	2	2		1	
646	97	C	1	1	2	1			2				2		4	1	4	1						2	2	2	2		1	
647	97	B	1	1	1	2	1	1					2		4	1	4	3						2	2	2	2		1	
648	32	C	1	2			1	1	2	1	2		2		2	1	4	4						2	2	2	2		1	
652	97	B	1	2			2	3					2		2	1	2	4						2	2	1	2		2	
654	26	C	1	2			2	2	1	1	2		2		2	1	2	4						2	2	2	2		1	
655	97	C	1	1	2	1			1				2		4	1	4	3						2	2	1	2		3	
657	97	B	1	1	1	2	1	1					2		4	1	4	3						2	2	2	2		1	
658	29	C	1	2			1	2	1	2			2		4	1	4	3						2	2	2	2		1	
659	97	C	1	1	2	2			1				2		2	1	4							2	2	1	2		7	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
667	97	B	1	1	1	4							1		2	1	1	4	6					2	2	2	2		1	
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669	97	C	1	1	3	2	2						2		2	1	1	4	4					2	2	2	2		1	
672	97	B	1	1	2	4							1		2	1	1	4	6					2	2	2	2		1	
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715	47	C	1	2			1	1	1	1	2		2					4						2	2	2	2		1	
717	97	C	1	1	3	2	2						2					3	1	4	1			2	2	2	2		1	

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	n	F	a	b	c	d	e	N
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721	97	B	1	1	2	4							5	2																1
722	27	C	1	2									11211	2																2
726	97	C	2	1	2	1							2	2																3
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743	97	B	1	1	2	4								1																1
744	45	C	1	2									11112	2																1
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746	97	B	1	1	2	4							1	2																1
747	23	C	1	2									11212	2																1
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756	97	B	1	1	1	4	1							1																1
757	32	C	1	2									11112	2																1
758	97	C	1	1	2	2							1	2																4
762	34	B	1	1	1	2	1							1																1
765	97	C	2	2									2	2																3
778	97	B	1	1	1	2	1							1																2
780	23	C	1	2									11112	2																1
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785	97	B	1	1	1	3	1							1																2
791	23	C	1	2									11212	2																1
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795	97	B	1	1	1	1	1						1	2																2
798	23	C	1	2									11212	2																1
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802	29	C	1	2									12 12	2																1
803	97	B	1	1	1	3	1						1	2																1
804	97	C	1	2									12 11	2																3
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816	32	C	1	2									12 11	2																3
819	97	C	1	1	1	2							2	2																1

no.	sp	I a b c d e f g h j k	D	E a b c d e j k m m	F a b c d e	N
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822	97	C1122 1	2	4	2212	3
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826	97	B11141	1	212645	1222	2
827	29	C12 11211	2	21344	2212	2
829	97	C11322 2	2	21344	2222	1
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832	97	B1124 5	2	212645	2222	1
833	45	C12 11212	2	21244	2222	1
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834	97	B1124 1	2	212645	2222	1
835	97	C22 1	2	41 4	221 5	9
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847	97	B1124	1	21146	2222	1
848	29	C12 11111	2	4	2212	2
850	97	C11322 2	2	213441	2222	1
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851	97	B1124 5	2	21146	2222	1
852	23	C12 11111	2	41	2212	3
854	97	C11321 1	2	213441	2212	2
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856	97	B1124 5	2	21146	2222	1
857	34	C12 11112	2	4	2222	1
858	97	C11322 2	2	21344	2222	1
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860	97	C12 11 12	2	21344	2222	1
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Year 7 Science: Database

no. sp Iabcde fghjk D Eabcde jkmm Fabcde

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022	22	C12	11112	2		41		2222
023	97	C11321		1	2	41	4	2212
024	97	C2122		2	2	21244		222 1
026	22	C12	11212	2		41	44	2222
027	97	B11141		3	2	21146		1222
028	97	B12		2	2	12	2	2122
029	23	C12	11212	2		41	74	2222
030	97	C11322		2	2	21144		2222
031	97	B1124			1	21146		2222
032	24	C12	11112	2			4	2222
033	97	C11322		2	2	41	44	2222
035	25	C12	11112	2			4	2222
036	97	C11321		2	2	21144		2222
038	26	C12	11212	2		41	4	2222
039	97	C11321		2	2	21144		2222
044	27	C12	11112	2			4	2222
045	97	B12		22	2	42	243	2222
046	97	B11151		3	2	222443		2222
047	27	C12	12	12	2	41	444	2222
050	97	C1121		1	2	212444		2212
051	97	C2121		1	2	21	7 5	221 5
052	97	C2121		1	2	41	444	221 4
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054	97	C2121		1	2	41	441	221 1
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068	97	B11141			2	21146		1222
069	22	C12	11112	2			4	2222
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071	97	C2122		1	2	21144		221 4
072	97	C2122		1	2	22		212 4
073	97	C2122		1	2	12	3	1122
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087	97	C1113	2	2			
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091	97	C11321	1	2		4	2212
092	97	C2122	1	2		21244	221 4
093	97	C2122	2	2		21144	222 5
094	97	B11141	1			21146	2222
095	29	C12	11112	2		4	2222
096	97	C11322	1	2		21244	2212
097	97	C2122	1	2		21244	221 4
098	97	C2122	2	2		21144	222 5
099	97	B1121	1		11	61	2212
100	97	B11131	1			214444	222 5
101	26	C12	12 11	2		213441	2212
102	21	C22	1	2		21444	221 5
103	21	C22	1	2		21444	221 1
104	21	C22	2	2		21144	222 5
105	97	C1131	1	2		21144	2212
106	97	C2121	1	2		21144	221 1
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109	97	C12	12 12	2		21444	2222
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115	26	C22	2	2		41 4	1222
116	97	C1122	1	2		41 4 3	2212
117	97	C21322	2	2		41 44	222 1
122	97	B1124	5	2		21346	2222
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131	97	B11131	1			2134441	1222
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133	97	C11321	1	2		41 41	2222
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146	97	C1122	1	2		31 4	222 1
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157	97	C2122	1	2	21	4	212 5
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170	97	B12	2	1	22	265		2222
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176	26	C22	2	2	41	44		223 4
177	97	C11322	2	2	21144			2222
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182	97	C22	1	2	41	4	1	222 1
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184	97	C22	1	2	41	44		221 1
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186	97	C22	2	2	22144			222 4
193	97	B11131	1		21146			2222
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196	97	C1123	1	2	12	3	5	222 1
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201	26	C22	1	2	2124			222 4
202	26	C22	1	2	42	7	1	2212
203	26	C22	2	2	21	5		222 5
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208	97	B11131	5	2	6			2222
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220	97	B1124	1	2	6			2222
221	35	C12	11112	2	4			2222
222	97	C11321	2	2	4			2222
223	97	B11141	1		21146			2222
224	36	C12	11112	2	4			2222
225	97	C1111	2	2				
227	23	C12	11112	2	4			2222
228	97	C11321	2	2	4			2222
231	27	C12	12	22	2	21144		2222
232	97	C11321	2	2	4			2222
233	97	B3114	1		21146			2222
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279	97	B1124	5	2	21146	2222	
280	23	C12	13	12	2		
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286	97	C1121	2	2	21144	2222	
287	97	C12	12	12	2	41	34
288	97	C22	1	2	22	3	212
289	97	C22	1	2	21344	122	1
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293	97	C22	2	2	41	443	122
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306	97	C11321	2	2	4	2222	
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322	97	B		1	41	1	222 1
323	30	C12	11112	2		4	2222
324	97	C11321	1	2		4	2212
325	97	C2122	2	2	41	4413	222 4
328	97	B1124	5	2	21346		2222
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333	97	C1122	2	2	21144		2222
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336	97	B1124		1	21146		2222
337	24	C12	12	11	2	41 4 1	222 2
338	24	C22	2	2	41	4	2212
339	97	C1122	1	2	41	44	2212
340	97	C2122	1	2	21374		221 1
341	97	C2122	1	2	41	4	222 5
342	97	C2122	2	2	41	44	221 5
343	97	B3114		1	21146		2222
344	47	C12	11112	2		4	2222
345	97	C11321	2	2		4	2222
346	97	B1124		1	21146		2222
347	27	C12	11212	2	41	4 1	2222
348	97	C11321	2	2	41	4 1	2222
349	97	B1124	5	2	21146		2212
350	97	B		2	12	3 5	222 2
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356	97	C1112	2	2			
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361	97	B11141		1	21146		1222
362	22	C12	11112	2		4	2222
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364	97	C2122	2	2	41	4 12	222 4
365	97	B		1	21144		222 2
366	97	B11151		1	41	4 3	2212
367	33	C12	11112	2		3	2222
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369	97	C2122	1	2	41	4 2	221 2
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372	97	B3115		1	41	3	222 5
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377	97	B1124	5	2	21146		2222
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384	97	C21322		1	2	41 443	221 5
385	97	C2122		2	2	41 4 1	222 1
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394	97	C22		1	2	21144	221 1
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398	97	B11121		1		41 4 3	2222
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402	97	B11141		1		21146	2222
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413	97	C2122		1	2	21344	221 4
414	97	C2122		1	2	21144	221 4
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416	97	C2122		2	2	213444	222 4
417	97	B11141		1		21346	2222
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420	97	C2122		1	2	41 4 1	221 1
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423	31	C12	11212	2		41 44	2222
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425	97	C21322		2	2	41 44	222 4
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432	97	C11321		2	2	4	2222
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441	97	C2122		2	2	21144	222 4
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444	97	C11322		2	2	4	2222
445	97	B11151		1		21446	2222
446	27	C12	11112	2		4	2222
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448	97	C2122		2	2	21444	222 4
456	97	B1124		5	2	21146	2222
457	32	C12	11212	2		41 4 1	2222
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465	97	C2122	1	2	22	3	212 4
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467	21	B22	22	1		41 4 1	2212
468	21	B		1		41	222 5
469	21	B		1		41 4 1	222 1
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477	97	B11131		1		41 4 14	1222
478	30	C12	11212	2		41 44	222 1
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489	97	B1124		1		21146	2222
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506	22	C22		1	2	213441	221 5
507	22	C22		2	2	4	222 2
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509	97	C2122	2	2		21344	222 1
514	97	B11141	5	2		21146	2222
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527	26	C22		2	2	41 4	222 1
528	97	C1122		2	2	41 44	2222
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532	97	B1124	5	2		6	2222
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537	23	C12	11211	2		41 44	222 2
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545	97	C2122	1 2	21 7	2122
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557	97	B1124	5 2	6	2222
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561	97	B11141	1	21146	2212
562	47	C12	11112 2	4	2222
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564	97	C21322	2 2	21244	222 4
565	97	B41141	1	21146	2222
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572	97	B41141	1	21146	2222
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574	26	C22	1 2	41 44	221 5
575	26	C22	2 2	41 44	222 5
577	97	C11322	2 2	21144	2212
578	97	B31141	1	21146	222 5
579	37	C12	11212 2	21344	2222
580	97	C1111	2 2		
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582	97	C11322	1 2	4	2212
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611	97	B11141	1		21146	2222
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615	21	C22	1	2	1	221 4
616	21	C22	2	2	41 7 1	222 5
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620	27	B12	2	1	21374	2212
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624	97	C22	2	2	41 44	222 5
634	97	B1124	1		21146	2222
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644	97	B11151	3	2	41 4 1	2222
645	27	C12	11112	2	1	2222
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647	97	B11121	1	2	41 4 3	2222
648	32	C12	11212	2	21444	2222
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653	97	B12	23	2	21244	222 5
654	26	C12	22112	2	21244	2222
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656	97	C2121	1	2	21244	221 4
657	97	C2121	2	2	41 4	222 1
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659	97	C1122	1	2	21144	2212
660	97	C2122	1	2	21144	221 4
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662	97	C2122	1	2	21144	221 4
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665	97	C2122	2	2	31 4	222 4
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671	97	C11321	2	2	4	2222
672	97	B1124	1		21146	2222
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676	97	B1124	1	2	21146	2222
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690	23	C22	2	2	21144	222	5		
691	97	C11321	1	2	21144	2212			
692	97	C21321	2	2	21144	222	5		
693	97	B1124	5	2	6	2222			
694	27	C12	11112	2	1	2222			
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714	47	C12	11112	2	4	2222			
715	22	C12	11112	2	4	2222			
717	97	C11322	2	2	31	4	1		
718	34	C12	11112	2	41	2222			
719	97	C1122	1	2	21174	222	1		
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721	97	C2122	2	2	2134	222	4		
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723	27	C22	2	2	41	7	3		
724	97	C1121	1	2	21444	2212			
725	97	C2121	1	2	212442	221	5		
726	97	C2121	2	2	31	4	222	1	
729	21	B12	2	1	21144	2222			
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732	97	C22	1	2	41	4	221	1	
733	97	C22	1	2	41	4	3	221	5
734	97	C22	1	2	31	4	221	5	
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743	97	B1124	1		21146	2222			
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788	44	B11131	1		213444	2212	
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794	97	B12	2	1	22 2	2122	
795	97	B11111	1		11 6	1222	
798	23	C12	11212	2	31 4 1	2222	
799	97	C11322	2	2	41 4 1	2222	
800	97	B11151	1		41 4 2	2222	
801	97	B11131	1		41 4 14	2222	
802	29	C12	12 12	2	41 4 1	2222	
804	97	C12	12 11	2	31 4 1	2212	
807	97	C22	2	2	31 4 13	222	4
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817	32	C22	1	2	41 44	221	5
818	32	C22	2	2	41 44	222	5
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821	29	C12	11112	2	1	2222	
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824	97	C21322	2	2	41 41	222	5
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830	36	C22	11212	2	21344	222	4
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836	97	C22	1	2	41 4	221	1
837	97	C22	1	2	41 4	221	1
838	97	C22	1	2	21144	221	4
839	97	C22	1	2	21244	221	4
840	97	C22	1	2	22	212	4
841	97	C22	1	2	21344	1212	

842	97	C22	1	2	21344	121	5
843	97	C22	2	2	21144	222	4
847	97	B1124	1		21146	2222	
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849	29	C22	2	2	41 4	222	1
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851	23	C12	11111	2	41	2212	
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853	23	C22	2	2	41 4	222	1
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855	97	C21321	2	2	41 4	222	1
856	97	B1124	5	2	6	2222	
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## Appendix 2.4

### Year 11 Science: Triadic Database

no.	sp	I	a	b	c	d	e	f	g	h	j	k	D	E	a	b	c	d	e	j	k	m	m	F	a	b	c	d	e	N
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011	72	C	1	2				1	1	2	1	2	2		4	1	4	1						2	2	2	1			1
012	99	C	1	1	3	2	1						2		4	1	4	1						2	2	1	2			6
020	99	B	1	1	1	2	4						2		2	1	1	4	6					2	2	2	2			1
021	73	C	1	2				1	1	1	1	2	2					4						2	2	2	2			1
022	99	C	1	1	1	2	2						2		2	1	4	4	4					2	2	1	2			4
026	99	B	1	1	1	2	4						1		2	1	1	4	6					2	2	2	2			1
027	73	C	1	2				1	1	1	1	2	2					4						2	2	2	2			1
028	99	B	1	2				2	3				2		2	1	2	4	4					2	2	2	2			1
032	74	C	2	2				2					2		2	1	2	4	4					2	2	2	4			2
033	99	C	1	1	2	1							2		3	1	4							2	2	1	2			2
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Year 11 Science: Database

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013	99	C2122		1	2	2114	221 4
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120	78	C22		1	2	41	44	221 4
121	78	C22		2	2	41	44	222 5
122	99	B1124	3	2		21146		2222
123	79	C12	11112	2			4	2222
124	99	B11111	3	2		41	46	2222
125	75	C12	12	12	2	41	443	2222
126	78	C12	11212	2		41	4	2222
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141	99	C2121	1	2	21244		221	4	
142	99	C2121	2	2		4	222	4	
143	81	C12	11112	2		4	2222		
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148	99	C1121	2	2	21344		2222		
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151	99	B11141	1		21146		2222		
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162	99	B11141	1		21146		2222		
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166	76	C12	12	12	2	21144	2222		
167	81	C12	11112	2		4	2222		
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213	99	B		2		41 4 2	221 1
214	99	B12	2	2		41 4 2	222 5
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217	71	C12	13	12	2	22 2	222 5
233	75	B11142	11	2		21464	2222
234	82	C12	11112	2		4	2222
235	99	C12	12	11	2	21144	2212
236	99	C22		2 2		21244	222 1
237	71	B11151		1		41 4 2	2222
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248	99	C22		1 2		21244	222 1
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252	99	C22		2 2		41 74	221 4
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303	74	C12	11112	2		4	2222
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305	99	C2122		1 2		21444	221 4
306	99	C2122		1 2		21444	221 4
307	99	C2122		1 2		21344	221 4
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314	99	B11141		1		21264	2222
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334	99	C2122		1 2		211445	221 5

335	99	C2122	1	2	31	4	2	221	4
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337	99	B11121	1		41	343		2222	
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339	99	B1124	1		21146			2222	
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362	99	C22	2	2	21144			222	4
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387	72	C1111	2	2				2222	
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434	78	C12	11112	2		4		2222	
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440	81	C12	11212	2		4		2222	
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445	75	C12	11112	2		4		2222	
446	99	A111	2		42	45		2222	

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455	74	C12	11	12	2	4		2222	
456	81	C12	11	12	2	4		2222	
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465	76	C22		1	2	21244		221	4
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470	76	C12	11112	2		4		2222	
472	99	B11151		1		41	3 2	2222	
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474	72	C1121		2	2	21244		2222	
475	76	C12	12	12	2	41	4	2222	
476	75	C1111		2	2				
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485	99	B11141	3	2		211465		2212	
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526	73	B11121	3	2			3	2222	
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530	99	C22		1 2	21214	212 5
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532	74	B12	23	2	41 44	2222
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551	99	C1122		2 2	41 44	2222
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563	79	C12	11112	2	4	2222
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567	99	C22		2 2	21444	222 1
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597	82	C12	11112	2	4	2222
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624	72	C12	11212	2	41 4 3	2222

625	75	C12	11212	2	213	4	2222
626	99	C1121	1	2	12	74	2212
627	99	C2121	1	2	41	4	221 1
628	99	C2121	1	2	21344		221 1
629	99	C2122	12	12	2	21144	222 5

## **Appendix Three: Curriculum Documents**

Extracts from Australia-wide, New South Wales (N.S.W.) Department of Education (state), school, and departmental curriculum documents are provided as a means of situating the lessons included in this case study. The individual lessons included in the case study comprising this research are realisations of this curricula.

**Curriculum: Australia Wide**  
**Curriculum Development Centre, 1980**

**Aims:**

1. To promote the personal development of students by giving opportunities for them to realise their fullest potential;
2. To facilitate the entry of students into the group life of their society;
3. To provide opportunities for students to develop critical or discriminatory attitudes, so that they do not merely fit into existing society, but are able to recognise its short comings and to be concerned for its betterment.

**Learning Experiences/Processes:**

- \* learning and thinking techniques such as problem solving, lateral thinking, organised study habits, systematic recording of information, memorisation and recall, reaching decisions and making judgments;
- \* ways of organising knowledge such as the use of themes and topics and ways of gathering and interpreting evidence, e.g. in science and social studies;
- \* dispositions and values such as truth-telling, honesty, regard for others, etc.
- \* skills or abilities such as those found in reading, speech, the conduct of scientific experiments, elementary statistics, the use of tools, and ways of organising and completing learning tasks in groups;
- \* forms of expression such as story writing, music and film making, movement, graphic communication, etc.,;
- \* workshops, field excursions and other practical performances in both mental and manual spheres;
- \* interpersonal and group relationships as in-group work, field trips, etc.

**Content/Areas of Knowledge and Experience:**

Social, cultural and civic studies  
Science and technology  
Moral reasoning and values  
Environmental studies  
Work, leisure and life style

Health education  
Arts and crafts  
Communication  
Mathematics

Connell (1985:87-88) suggests that Australia wide, the curriculum is hegemonic, that is, a 'competitive academic curriculum' characterised by the following five features:

1. The knowledge that is to be taught is derived mainly from university based disciplines. This connection guarantees both its reliability or truth, and its status as significant knowledge, worthy to be taught and learned. School knowledge retains the academic form of a self-referring, abstract body of knowledge. This strongly separates what is learned from the personal and social experiences of the learner.
2. This knowledge is organised hierarchically, from less difficult to more difficult, from basic principles to later elaborations and refinements, from introductory approximations to later precisions, from more concrete to more abstract. Broadly speaking, there is one, and only one, path through the material, which all pupils should follow.
3. The teaching is basically transfer learning. Something that the teacher already knows is to be transferred to the mind of the pupil, who does not yet know it. In principle the whole course of learning can be laid down in advance, with, in practice, variations to accord with the aptitudes and enthusiasm of the pupil.
4. The pupil's learning is organised as the individual appropriation of bits of this knowledge. The fact that a whole class is usually taught as a unit does not affect this in the least, as the pupils are learning in competition with each other. When the learning is being assessed, it is how much each of them can reproduce as an individual, not what they can do with it together, that is measured.
5. The knowledge acquired is regularly tested through competitive examination, to determine who of a cohort of students has acquired most and who least.

## Aims of Secondary Education in N.S.W.

Directorate of Studies  
N.S.W. Department of Education, 1973

### Aims:

The central aim of education, which with home and community, the school pursues is  
to guide individual development  
in the context of society  
through recognisable stages of development  
towards perceptive understanding, mature judgment, responsible self-direction and moral autonomy.

### Learning Experiences/Processes:

#### Cognitive:

- \* understanding the ways of thinking and modes of inquiry underlying a subject and the content to be learned;
- \* learning both by inquiry processes and by exposition;
- \* using data in illustrating or testing a statement, argument, assumption, hypothesis or conclusion;
- \* solving problems;
- \* applying facts, principles, theories or skills in new situations;
- \* identifying fact, opinion, supporting or contradicting evidence, bias, assumption, proof, propaganda, fallacy;
- \* critically appraising;
- \* synthesising;
- \* forming an original theory or generalisation;
- \* being creative;
- \* making judgments on the basis of clear evidence.

**Personal-Interpersonal:**

- \* examine, clarify and formulate values;
- \* suggest reasons for the existence of a problem, issue or conflict;
- \* understand the ideas, values, feelings, goals and concerns of others who may be involved in some way in the issue;
- \* make inferences about the consequences of holding particular values and beliefs in different situations;
- \* recognise situations when judgment should be withheld pending further evidence;
- \* determine a course of action being aware of the possible alternatives and consequences of each alternative.

**Content/Areas of Knowledge and Experience:**

**Communications: through**

language and languages,  
mathematics,  
the arts.

**Society and Culture: through**

the social sciences,  
science and technology,  
arts and crafts,  
morality and religion.

**The Natural Environment: through**

the physical and biological sciences  
and studies of Man's interaction with  
the natural environment.

## **Galston High School**

### **School Advisory Council, 1979**

The School Advisory Council was made up of delegates from the Parent and Citizens Association, the School Staff, the Student Council and a representative of Galston Rotary Club. The Principal and Deputy Principal were ex-officio members.

#### **Aims:**

The central aim of Galston High School is to  
guide the development of individual students  
by providing educational experiences  
which foster intellectual, physical, moral and social development.

The central aim of the school is seen as being made up of the following specific aims:

1. To achieve a level of performance consistent with the inherent ability of the individual student.
2. To equip the student with those skills which are essential for living.
3. To assist the individual to achieve self-understanding, personal fulfilment and a sense of identity.
4. To promote the worth of sustained endeavour and the pursuit of excellence.
5. To encourage the individual to contribute to society.
6. To develop within the individual the skills to analyse and to make decisions.
7. To prepare the individual to adapt comfortably to change.
8. To promote education as a life-long process.
9. To make students aware of the existence of other cultures and other value systems.

## **Modern History Syllabus**

**Board of Senior School Studies, 1982**

### **Option B: Revolutions in the Modern World**

#### **Aims:**

The fundamental aim of this syllabus is to emphasise the development of historical perspective, to encourage an understanding of the present through its roots in the past, to facilitate the interpretation of past and present together as continuous development, to develop an understanding of the concept of change and to examine historical concepts.

#### **Revolution in the Modern World:**

##### **Preamble:**

Since the 18th century, revolution has become an important means of attempting to bring about change in the social and political order. The object of the Option is to provide students with an opportunity to examine particular revolutions and at the same time to explore some of the broader issues associated with the phenomenon of 'revolution'.

#### **Content/Areas of Knowledge and Experience:**

##### **Introduction: Revolution - A Brief Outline of the Concept**

##### **Section 1: Revolution in France 1789-1815**

- (a) The growth of new ideas and of the middle class; the political and economic bankruptcy of the old regime.
- (b) The revolt of the aristocracy, moderate reform (Lafayette).
- (c) Extremism (Robespierre and the Jacobins; Reign of Terror).
- (d) Napoleon and the Revolution.

## **Galston High School History Department**

Courses are designed to comply with and fulfill State level requirements/guidelines.

Year 11:            Revolution in the Modern World:

                         Revolution in France 1789-1815

**Topic 1: Europe to 1815**

1.        Overview of course
  - (a)      discussion of historical process, terminology
  - (b)      brief look at the inter-relationship of social, economic and political issues
2.        Europe in 1789
  - (a)      conditions in major European countries on the eve of the French Revolution
3.        French Revolution
  - (a)      causes
    - (i)       long term
    - (ii)      short term
    - (iii)     precipitating events
  - (b)      course of the Revolution
    - (i)       work of National Assembly
    - (ii)      main events of 1789-1795 period - briefly
  - (c)      rise and fall of Napoleon
  - (d)      significance of revolutionary period

## **History in NSW Secondary Schools: Years 7-10**

Secondary Schools Board, 1984

### **Aims:**

History aims to promote personal development of students by helping them to realise their fullest potential.

History aims to facilitate students' development as effective citizens.

History aims to assist students to develop their own values through their study of its subject matter, and through their development of critical and discriminating attitudes based on the cultivation of balance, judgment and objective enquiry.

History aims to development students' awareness of their human heritage; an understanding of the contributions made by past and present cultures other than their own to mankind's development; a recognition of the unique nature of individual people and events; and a sense of historical perspective to guide their interpretation of the world around them.

### **Learning Experiences/Processes:**

#### **Investigating and Researching:**

- \* identifying and clarifying issues
- \* locating information or data
- \* recognising and recalling information
- \* summarising data
- \* classifying, analysing, comparing and contrasting

#### **Communicating Results:**

- \* communicating ideas, arguments and conclusions orally
- \* communicating ideas, arguments and conclusions logically, clearly and concisely in written form, for example, short answers to set questions, written reports on library research, and essays of various kinds, handling the terminology and conventions of history.
- \* ability to communicate historical understanding through a variety of creative activities
- \* ability to work effectively in group situations

#### **Making Judgments:**

- \* forming an hypothesis or generalisation as part of inductive lesson
- \* formulating a logical argument: in essays, oral reports, discussions
- \* formulating alternative solutions
- \* making judgments based on available evidence

#### **Processing and Evaluating:**

- \* using data to illustrate or test a statement, argument, assumption, hypothesis, conclusion. Citing evidence for these
- \* distinguishing facts from opinions
- \* detecting relationships: causal, chronological, concurrent

- \* test data for relevance and consistency
- \* distinguishing between supporting and conflicting evidence
- \* recognising motive, attitude, prejudice, bias, assumption, propaganda, fallacy, exaggeration.

**Content/Areas of Knowledge and Experience:**

**Years 7-8:**

The main emphasis in these years should be on the enjoyment of history, together with the need to give students the opportunity to see that:

History is the story of people.

History involves the search for evidence and clues about those people in the past.

Historical evidence is composed of primary and secondary sources.

History involves asking questions.

This might best be achieved by detailed studies of people, personalities, exciting events, different ways of living and local case studies.

**Galston High School History Department**

The Year 7 Course is comprised of the following units:

What is History?

The Egyptians

Australia Last Century: Waddell Cottage

Killer Kelly

## **Science Syllabus: Form V and Form VI**

Board of Senior School Studies, 1974

### Aims:

1. To develop a knowledge and understanding of the content of science: facts, concepts, laws, theories  
the processes of science: observation, definition, discovering laws, suggesting hypotheses, testing hypotheses by observation, propounding theories  
the impact of science on man and his culture.
2. To maintain and develop interest in science and to develop scientific attitudes.
3. To develop skills in carrying out experiments and in making and recording other observations using unaided senses, involving the manipulation of scientific equipment and recording data.
4. To develop pupil's skills of communication  
writing: reports, summaries, plans  
speaking: answering questions, lecturettes, group discussions, teaching others, making tape recordings  
non-verbal: outline diagrams, drawings, still and movie photographs, display boards, models, demonstrating equipment.

### Content/Areas of Knowledge and Experience:

Physics, Chemistry, Geology, General Science, Biology

## **Science Syllabus 2 Unit Course - Biology**

Board of Senior School Studies 1979

### Content/Areas of Knowledge and Experience:

Organisms are formed of cells  
Flowering plants and their requirements  
Mammals and their requirements  
Reproduction and genetics  
Diversity and evolution  
Ecology

#### **(e) Diversity and Evolution**

After studying this unit students should understand the ways in which classification facilitates our study of the diversity of living things. They should realise that studies of fossils and changes in populations in time and space

provide evidence that evolution has occurred and is occurring. Students should understand how natural selection provides an explanation of the mechanisms of these changes.

1. The diversity of living organisms is so great that classification schemes within a kingdom are needed to simplify the ways in which various groups can be described.
2. Animals are classified into phyla on the basis of their structure.
3. Plants are classified into major groups (algae, bryophytes, pteridophytes, gymnosperms, angiosperms) on the basis of their structure and reproductive mechanisms.
4. Similarities within groups of plants and animals, and the existence of transitional forms, suggest origins from common ancestral stocks, and a transition in evolution from aquatic to terrestrial habitats.
5. Study of fossils shows that the types and abundance of organisms have changed over long periods of time. Dating of fossils is sometimes possible, though there are difficulties in the procedures used and gaps in the fossil record.
6. Darwin postulated a theory of evolution and suggested an explanation of the mechanism of evolution. Natural selection is a means of explaining changes in populations which occur over time.

**Practical work:** During this topic students must:

1. investigate the principles and problems of developing a system of classification
2. examine examples of some major groups of animals
3. examine examples of some major groups of plants
4. examine fossils, and compare with present day forms.

## **Galston High School Science Department**

### **Year 11 Biology**

#### **Core Unit: Diversity and Evolution**

After studying this unit students should understand the ways in which classification facilitates our study of the diversity of living things. They should realise that studies of fossils and changes in population in time and space provide evidence that evolution has occurred and is occurring. Students should understand how natural selection provides an explanation of the mechanism of these changes.

1. The diversity of living organisms is so great that classification schemes within the kingdom are needed to simplify the ways in which various groups can be described.
2. Animals are classified into phyla on the basis of their structure.
3. Plants are classified into major groups (algae, bryophytes, pteridophytes, gymnosperms, angiosperms) on the basis of their structure and reproductive mechanisms.
4. Microorganisms - difficulties in classifying bacteria, fungi, cyanobacteria, viruses.
5. Scientific method.

#### **Practical work:**

During this topic students must:

1. Investigate the principles and problems of developing a system of classification.
2. Examine examples of some major groups of animals.
3. Examine examples of some major groups of plants.

#### **Aims to be incorporated with content:**

1. development by discovery
2. observation skills
3. critical thinking development - postulating hypotheses
4. the development of scientific method is stressed

## Revised Science Syllabus: Years 7-10

Secondary Schools Board, 1984

The basic aim of the Science Syllabus Years 7-10 is to provide experiences in Science which contribute to the development of children.

To achieve this, teachers should design learning experiences which enable children to develop specific skills, interests, attitudes, knowledge and understanding as follows:

### 1. Interests and attitudes:

- \* To develop a lively interest in understanding the nature and behaviour of mankind and the environment.
- \* To develop an appreciation of the value of: thinking critically, Science in solving problems, persisting with a difficult task to a reasonable end point, personal and community health and safe procedures in learning situations, wise management of natural resources.

### 2. Knowledge and understanding:

- \* To establish a store of facts, ideas and laws which are important in understanding the nature and behaviour of mankind and the environment.
- \* To develop the ability to:  
think critically, e.g. by seeking evidence for claims, applying cause and effect relationships, being honest in reporting observations, considering all available data and suspending judgment in the absence of evidence, recognise a problem which may be solved by Science.
- \* To develop an understanding of:  
the importance of recognising patterns;  
generalising, formulating hypotheses, observing, experimenting and establishing controlled situations where possible; how to use stored knowledge to solve problems by recalling, extracting, organising, interpreting and evaluating information and ideas; the use of models (including mathematical ones) to make predictions; the impact of scientific discoveries on society.

### 3. Psychomotor Skills:

- \* To develop skills in communicating by:  
reading, writing, speaking and listening, drawing, tabulating information, graphing, photographing, tape recording, using symbolic expressions (including mathematical expressions);
- \* To develop skills in general and detailed observation with our basic senses by:  
being aware of objects, scenes, situation and group behaviour; looking at recorded information; listening to live and recorded language and other sounds;
- \* To develop skills in observing using instruments to extend our basic senses by:  
measuring devices; other devices, e.g. cameras, microscopes, recorders, projectors, etc.
- \* To develop skills in manipulating laboratory, field and other equipment such as audio-visual apparatus, simple tools and calculating machines.

### Content/Areas of Knowledge and Experience:

Content must be selected from each of the following six areas, and in such a way as to give all students experience in each of Biology, Chemistry, Geology and Physics, keeping in mind that the environment does not present information as separate disciplines:

1. The things around us - within and beyond our local experience.
2. Natural changes.
3. Changes caused by people.
4. Processes of living.
5. Relationships between living things and the Earth.
6. Interactions.

#### 1. The things around us

Studies related to this section should be regarded primarily as providing a concrete base of knowledge and experience on which studies in other sections can be founded.

Topics: life forms, the earth around us; materials; machines and devices; the universe

#### Life Forms:

Commencing with an investigation of the life forms within the local experience of students, content should be chosen to extend each student's knowledge and understanding of the:

- \* diversity of life forms
- \* structures of life forms
- \* habitats of life forms
- \* behaviour of life forms
- \* cellular nature of living matter

so that meaningful groupings and generalisations can be made.

## **Galston High School Science Department**

### **Year 7 Science Course**

The course is designed to comply with and fulfill State level requirements/guidelines.

The course is made up of the following units/topics:

Scientists' World and Work; What Things are Made Of; Energy; Astronomy; Changing Face of Our Local Area; Water; Weather; World Round Us; Living Things.

#### **Looking at Living Things:**

##### **Objectives:**

1. Understand the difference between living and non-living.
2. Requirements for life.
3. The cell as the unit of life.
4. Be able to describe the main difference between animal and plant cells.
5. Understand that broad classification schemes usually have problems - virus, bacteria.
6. Describe various habitats.
7. Be able to describe what an adaptation is, and give specific examples.
8. Aquatic animals and plants and their relationship to their habitat.
9. Osmosis.
10. No standard classification to be done in this unit (except where specified).

##### **Experiences:**

1. Comparison of living things.
2. Observation and recording living things.
3. Keeping rats.
4. Work stations set up for observations, 3 classes and hand lenses.
5. Observation of protozoans.
6. Observation of water animals.
7. Experiments: examples of plants and animals in habitats they are not adapted for.

##### **Resources:**

1. Zoo excursion.

##### **Assignments:**

1. Choose an animal or plant and describe its adaptation to its habitat.
2. Zoo assignment.

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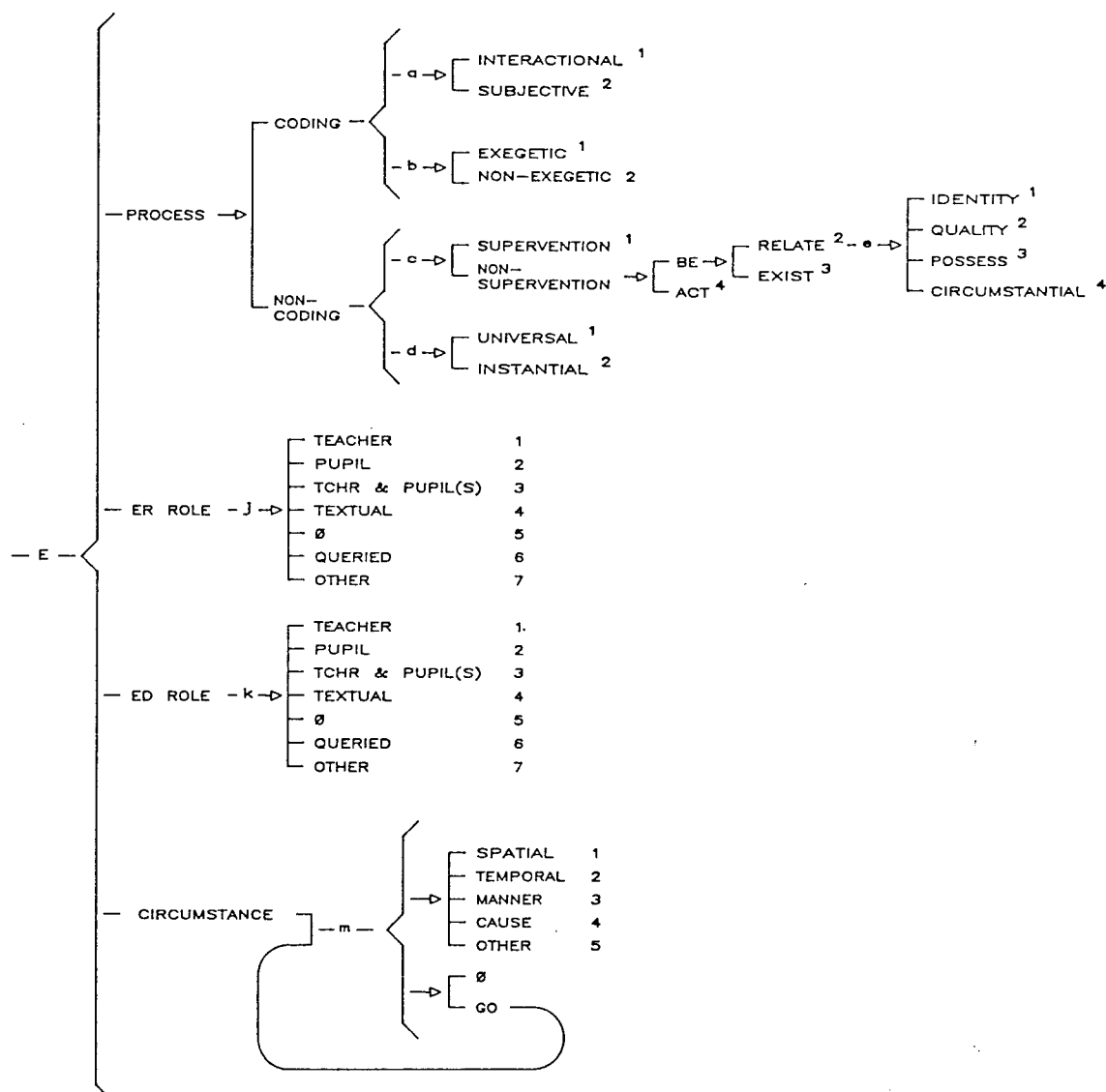


Figure 4.3 cnt. The Semantic Network Continued

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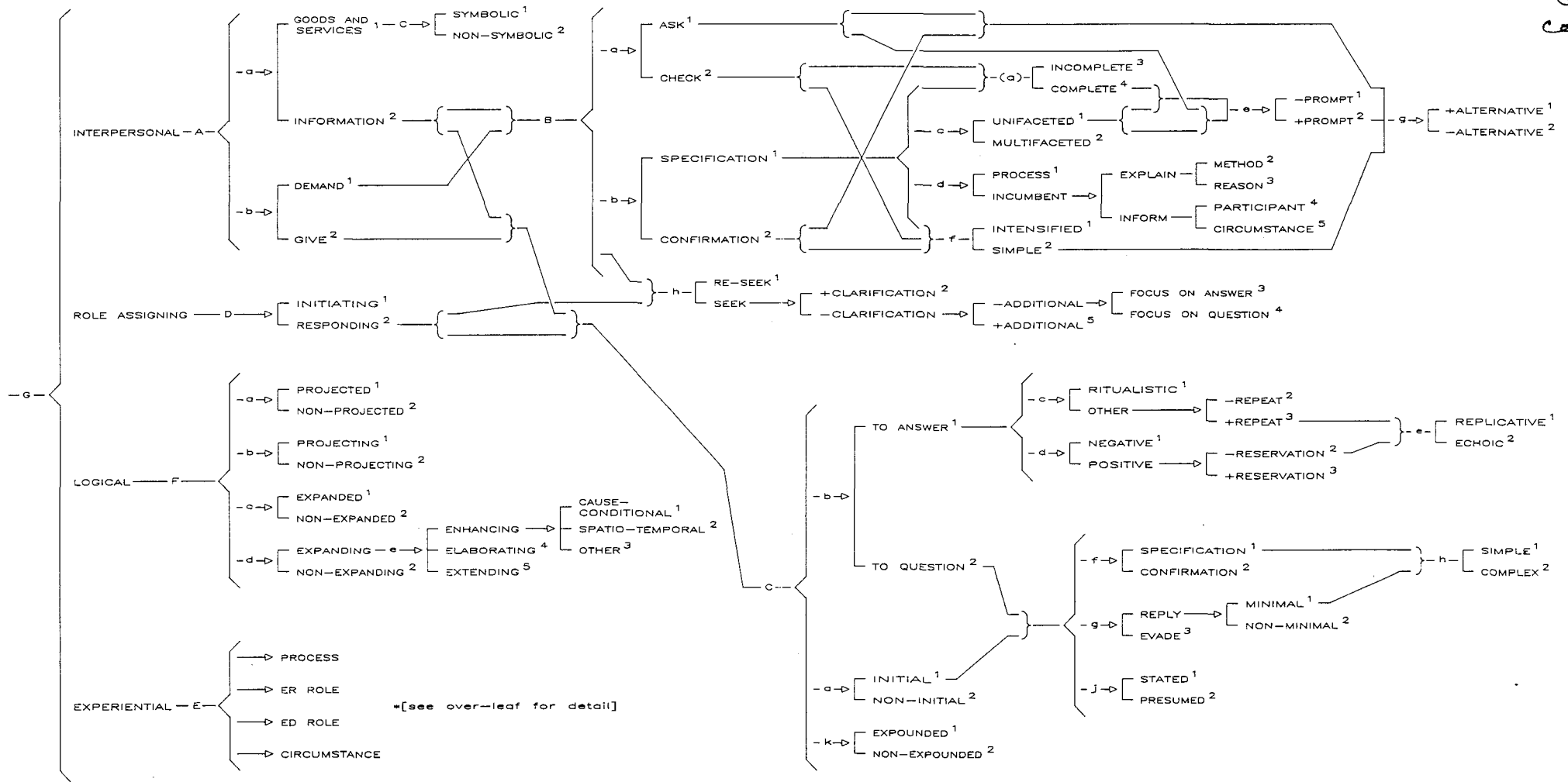


Figure 4.3 The Semantic Network